

**NASA Ames Research Center
Ames Environmental Procedural Requirements****Chapter 26 - Environmental Management System (EMS)**

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[26.1 Applicability](#)

This instruction applies to all civil servants, contractor employees, resident agency personnel, and partners at Ames Research Center and Crows Landing Flight Facility (ARC).

[\[Back to Table of Contents\]](#)**[26.2 Purpose](#)**

This chapter describes and establishes the requirements of Ames' Environmental Management System.

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26.3 Policy

It is the policy of ARC to comply with all applicable federal, state, and local environmental regulations. NASA Policy Directive 8500.1, NASA Environmental Management, states NASA's environmental policy. This policy is available through NASA's web pages and NODIS (http://nodis3.gsfc.nasa.gov/library/displayDir.cfm?Internal_ID=N_PG_8553_0001&page_name=main). Ames Policy Directive 8800.4 states Ames' environmental policy. This policy is available through the Ames Center Directives Management System (<http://adms.arc.nasa.gov>).

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26.4 Authority

All relevant federal, state, and local laws and regulations, Presidential Executive Orders, and NASA Policy pertaining to Environmental Management Systems, including, but not limited to:

1. APD 8800.4, Ames Environmental Policy
2. APR 1601.4, NASA ARC Emergency Preparedness, Response, and Recovery Plan
3. APR 1700.1, Ames Health and Safety Manual
4. APR 8800.3, Ames Environmental Procedural Requirements
5. Code of Environmental Management Principles (CEMP), Environmental Protection Agency, October 16, 1996
6. Executive Order 13148, Greening the Government Through Leadership in Environmental Management, 3 CFR, April 21, 2000
7. ISO 14001, International Organization for Standardization (ISO) for Environmental Management Systems, September 23, 1996
8. NPD 1440.6, NASA Records Management
9. NPD 2800.1, Managing Information Technology
10. NPD 8500.1, NASA Environmental Management
11. NPR 1400.1, NASA Directives System Procedural Requirements/li>
12. NPR 1441.1, Records Retention Schedules
13. NPR 7120.5, Program and Project Management Processes and Requirements
14. NPR 8553.1, NASA Environmental Management System, May 6, 2002
15. NPR 8580.1, Implementing the National Environmental Policy Act and Executive Order 12114
16. NPR 8621.1, Mishap Reporting, Investigating, and Recordkeeping
17. NPR 8820.3, Pollution Prevention
18. NPR 8715.2, NASA Emergency Preparedness Plan
19. NPR 8715.3, NASA Safety Manual
20. 48 CFR Subpart 23.10, Federal Acquisition Regulation (FAR), Federal Compliance with Right-to-Know Laws and Pollution Prevention Requirements

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26.5 Responsibilities

26.5.1 All Directorates

1. Implement NASA Environmental policy and guidelines.
2. Ensure employees engaged in activities associated with EMS high priority impacts or compliance activities receive appropriate training.
3. Ensure training records are maintained in accordance with NPD 1441.1C.
4. Manage all other impacts so that they do not become high priority impacts. These do not require EMS defined objectives and targets.
5. Implement NASA's Emergency Preparedness Plan Procedures and Guidelines NPR 8715.2 and

- corresponding APR 1601.4.
6. Support environmental assessments as necessary to ensure that Center programs, projects, facilities, systems, and operations comply with all environmental requirements.

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26.5.2 Center Management



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26.5.3 Environmental Services Division, Code QE

1. Assign roles and responsibilities for the Ames EMS Representative.
2. Serve as the focal point for all required coordination (NASA Headquarters, other Federal agencies, state and local agencies, public organizations, etc.)
3. Report to NASA HQ Environmental Management Division (EMD) on EMS progress and metrics as requested.
4. Participate in NASA Environmental Management Board (EMB) to formulate policy and guidelines.
5. Identify and document Ames' activities (past, present, and future), products, and services (in the context of normal, abnormal, and emergency conditions).
6. Determine the environmental aspects category and associated impact(s) of the documented activity, product, or service.
7. Apply the EMS priority impact risk criteria to impacts, including completing a risk matrix form.
8. Establish and document the objectives and targets for the EMS high priority impacts and time frames for achievement of objectives and targets.
9. Periodically review and update the high priority impacts determinations.
10. Identify applicable state, local, facility-specific, and permit driven legal requirements and proposed changes to existing legal requirements.
11. Evaluate NASA-wide and Ames' agreements and commitments.
12. Ensure applicable legal and other requirements are available to appropriate individuals.
13. Establish and maintain documented Ames' objectives and targets consistent with the environmental priority impacts derived from aspects.
14. Determine EMS training needs.
15. Conduct training as required at each relevant level and function of the organization.
16. Verify and record that the necessary EMS training has occurred.
17. Perform a periodic review of EMS documents and update as necessary and remove obsolete documents.
18. Document procedures that limit adverse impacts associated with high priority impacts to the environment or are needed in order to manage NASA's environmental policy or compliance activities.
19. Establish and maintain documented procedures to track, monitor, and measure the key characteristics of operations associated with EMS Objectives and Targets and EMS High Priority Impacts
20. Establish procedures to track nonconformance and corrective action.
21. Ensure use of the NASA NPD 1440.6E NASA Records Management, NPR 1441.1C Records Retention Schedules, and NPD 2800.1 Managing Information Technology for EMS records.
22. Ensure retention of records of compliance activities in accordance with legal and regulatory guidelines.
23. Periodically review conformance with EMS including compliance with local environmental regulations. Report to the Center Director and NASA HQ EMD on the results of EMS Audits and on the status and viability of the EMS.

24. Review and update (as necessary) objectives and targets.
25. Review the determination(s) of technical feasibility and economic reasonability where it was decided not to set objectives and targets to address high priority impacts.
26. Develop and review corrective actions addressing non-conformances identified as a result of evaluating and reporting of metrics.

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26.6 Definitions

26.6.1 The Code of Environmental Management Principles (CEMP)

An Environmental Protection Agency (EPA) document comprised of five principles:

1. management commitment,
2. compliance assurance and pollution prevention,
3. enabling systems,
4. performance and accountability, and
5. measurement and improvement

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26.6.2 Competence

A demonstrated ability to apply knowledge and skills (training, education, and experience) defined by the organization as appropriate for all personnel whose work may involve a priority environmental impact.

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26.6.3 A Consequence

The resulting potential (adverse or beneficial) effect associated with an environmental impact on or resulting in change to:

1. a natural or cultural resource,
2. a cost to NASA,
3. NASA's mission,
4. reputation or stakeholder relationship,
5. health and safety, or
6. an environmental legal/regulatory implication.

Consequences may occur as a component of normal operations where they are expected as a result of regular, planned operations. An abnormal consequence is associated with an unplanned or unexpected effect or change. An emergency consequence is associated with an emergency as defined by an installation in accordance with NPG 8715 and APG 1601.4.

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26.6.4 Continual Improvement

The process of enhancing the environmental management system to achieve improvements in overall environmental performance in line with NASA's and Ames' environmental policy and mission.

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26.6.5 Document

A written procedure or requirements that requires regular maintenance or review.

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26.6.6 Environmental Management System

A system that incorporates people, requirements, resources, responsibilities, and work practices in a formal structure to address the development, implementation, achievement, and review of the environmental policy.

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26.6.7 EMS Audit

A systematic and documented verification process of objectively obtaining and evaluating evidence to determine whether an organization is conforming to its environmental management system and for communicating the results of this process to management.

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26.6.8 EMS Representative

Chief, Environmental Services Division, or her designee, who manages the EMS and is responsible for reporting to senior management and NASA HQ EMD on EMS performance and results of the functional assessments, audits, and management reviews.

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26.6.9 Environmental Aspects

Elements of NASA's activities, products, or services that can interact with the environment. NASA has determined that these elements fall into four major focus areas: Prevention, Compliance, Restoration, and Conservation.

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26.6.10 Environmental Impact

Any change to the environment, whether adverse or beneficial, wholly or partially resulting from NASA's activities, products, or services.

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26.6.11 Environmental Objective

An overall environmental goal, arising from the environmental policy, that NASA sets for itself to achieve, and which is quantified where practicable.

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26.6.12 Environmental Target

A detailed performance requirement, quantified where practicable, that arises from the environmental objectives and that needs to be set and met in order to achieve those objectives.

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26.6.13 Functional Assessment

A comprehensive, systematic, and documented verification, led by a headquarters team, of a functional area whereby evidence is obtained and evaluated to determine whether specific environmental activities, events, conditions, management systems, or information about these matters conforms with criteria.

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26.6.14 ISO 14000

The international standard and guidelines for environmental management tools and systems developed by the International Organization for Standardization.

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26.6.15 Legal and Other Requirements

Those requirements that an organization is regulated to or has committed to meeting. These include local, state, and federal regulations, Office of Management and Budget (OMB) circulars, Executive Orders, and international obligations (legal). They also include internal standards, Agency agreements, presidential initiatives, industry codes or practice, contractual obligations, and non-regulatory guidelines (other).

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26.6.16 NASA Online Directives Information System (NODIS)

An Internet application used for creating NASA directives and for automating the coordination/clearance process. Approved NASA directives will be maintained in NODIS, enabling users to retrieve, view, and print NASA directives electronically.

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26.6.17 Noncompliance

Failure to meet legal or other requirements.

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26.6.18 Nonconformance

Failure to meet an EMS-specified requirement.

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26.6.19 Operational Controls

Documented procedures that limit adverse impacts to the environment and are needed in order to manage NASA's environmental policy and compliance activities.

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26.6.20 Priority Environmental Impact

A NASA environmental impact that must be managed to avoid or prevent a serious adverse environmental effect, or create a substantial beneficial effect.

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26.6.21 A Record

A written or printed object that cannot be revised and provides evidence of what was done or has occurred.

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26.6.22 An EMS Record

A record that has been identified as pertaining to the EMS.

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26.7 EMS Program Description--Specific Requirements

26.7.1 Planning

26.7.1.1 Environmental Aspects and Impacts

The Ames Environmental Division will determine the center's high priority environmental impacts using the procedure outlined in NPG 8553 Section 3.1 and will be listed in a spreadsheet or database. The EMS database will be reviewed every three years, as codes are assessed to ensure all Ames activities, products, and services are captured in this process.

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26.7.1.2 Legal and Other Requirements

NASA Headquarters has contracted with the Naval Facilities Engineering Service Center (NFESC) to supply regulatory support to the NASA Field Centers, including Ames, in the form of a weekly e-mail containing a federal regulatory summary. This e-mail is received by the Ames Environmental Services Office Division Chief who then distributes it to all environmental civil servants and contract managers.

The Ames Environmental Division shall review and identify federal, state, and local environmental regulations and proposed changes to existing environmental regulations to

determine applicability to Ames on an as needed basis, and ensure that the requirements are available to the appropriate individuals and Ames organizations.

The Ames Environmental Division shall review facility specific permits, agreements, and commitments for environmental requirements and obligations on an as needed basis, and ensure that requirements are available to the appropriate individuals and Ames organizations.

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26.7.1.3 Objectives and Targets

The Ames Environmental Division shall establish specific objectives and targets for any adverse high priority environmental impacts. These shall be reviewed and updated every year or as needed. If the determination is made that high priority environmental impacts cannot be addressed due to being technically unfeasible or economically unreasonable, the rationale behind this determination will be documented. All other impacts will be managed so that they do not become high priority impacts.

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26.7.1.4 Environmental Management Program

Ames' Environmental Management Program is documented in this chapter as well as throughout the chapters of APG 8800.3, the Ames Environmental Procedures and Guidelines, otherwise known as the Ames Environmental Handbook.

The Ames Environmental Management Program shall:

1. Demonstrate that Ames is addressing its identified objectives and targets by listing metrics in each chapter where applicable.
2. Address major compliance activities which link to environmental aspects and impacts.
3. Identify required resources (technical and financial) to carry out the EMP.
4. Reflect changes in objectives and targets.
5. Ensure that regulatory compliance driven objectives and targets are maintained.
6. Establish the timeframe for which objectives and targets are to be achieved.

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26.7.2 Implementation and Operation

26.7.2.1 Structure and Responsibility

The Ames Center Director is responsible for providing authority and resources for the effective operation and maintenance of the EMS.

The Ames' Environmental Division Chief, or her designee, shall serve as the EMS Representative and be responsible to document and communicate EMS roles, responsibilities, and authorities, request resources for the effective operation and maintenance of the EMS, implement and maintain the EMS, and periodically assess, review, and report on the condition of the EMS.

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26.7.2.2 Environmental Training, Awareness, and Competence

Upon determination of Ames high priority environmental impacts, employees engaged in associated activities with those impacts shall receive appropriate training. Training records shall be maintained by the Ames' Environmental Division or by the employee's supervisor in accordance with NPG 1440.6 and NPG 1441.1.

Employees' training shall include the following:

1. High priority environmental impacts and associated objectives and targets
2. EMS requirements, including roles and responsibilities
3. NASA Environmental Policy
4. Emergency preparedness and response.

Ames Environmental, Health, and Safety Divisions manage an extensive training program which includes the following classes:

- Hazard Communication
- Hazardous Waste
- PCB Awareness
- Chemical Hygiene
- Environmental Essentials
- NEPA Overview
- Monthly EHS Forums on various topics
- EHS Training for Managers

A Training Needs Assessment is completed by resident staff and a Training Survey is completed by Directors and Chiefs which lists all training requirements for individual employees. In addition, Code QH maintains a training database which tracks attendance in EHS classes.

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26.7.2.3 Communication

Ames utilizes a number of mechanisms to ensure effective internal communication to various organizational levels:

1. The Ames Environmental Division holds monthly Environmental Forums on a wide range of environmental topics. The forum is open to all Ames employees and is announced by centerwide e-mail.
2. Centerwide e-mails are used to announce environmental speakers or seminars and inform employees on timely and important environmental issues.
3. The Astrogram, the Ames bi-weekly newsletter, often features articles on environmental topics and is distributed to employees centerwide.
4. Ames' Environmental Division sponsors an annual Earth Day street fair for all employees where information on Ames' environmental services and programs is distributed.
5. Memoranda, signed by the Ames' Environmental Division Chief or her representative are utilized to convey information to other Ames' organizations and are retained in the Environmental Division's chronological files.
6. The Ames' Environmental Division Chief attends weekly meetings with the Director of the Safety, Environmental, and Mission Assurance Office where important and timely environmental issues may be discussed.
7. The Ames' Environmental Division Chief or her representative gives monthly briefings to the Ames Management Council, which is comprised of senior management.
8. The Director of Safety, Environmental, and Mission Assurance provides monthly Management Reviews to Center Senior Management and additional time on the agenda may be requested as needed.

9. The Ames' Environmental Division Chief reports to the Executive Safety Board as needed.
10. Resident agencies and NRP partners will be notified by postal mail of any environmental matters as needed. A mailing list is maintained by Code QE.

The following procedures are followed when receiving, recording, and responding to relevant communication from external parties:

1. All Freedom of Information Act requests are processed through Code DXC, Ames' Communication Branch.
2. Written communications with environmental regulators are handled by Ames' Environmental Division and records are maintained in chronological files.
3. Ames' NEPA project communications are handled in accordance with APR 8800.3 and NPR 8580.1.

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26.7.2.4 Environmental Management System Documentation and Document Control

Ames' EMS procedures and guidelines shall use the Ames Center Directives Management System. Ames EMS documents shall be reviewed annually and updated as necessary. Obsolete EMS documents shall be removed as needed.

The following EMS elements require written documentation:

- Activities, Products and Services.
- Objectives and Targets for High Priority Impacts.
- Environmental Management Programs
- Roles, responsibilities, and authorities for implementation of EMS
- Operational procedures that limit adverse impacts associated with High Priority Impacts or procedures needed for management of policy or compliance activities.
- Monitoring and measurement of key characteristics of operations with high priority impacts

The following require EMS procedures (written or non-written):

- Identification of applicable state, local, facility-specific, and permit-driven legal requirements.
- Determining EMS training needs.
- Document control.
- Non-conformance and corrective action tracking.
- Communications procedures (internal center-wide e-mails).

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26.7.2.5 Operational Control

Ames' high priority environmental impacts shall have documented operating procedures within APR 8800.3. These procedures must stipulate the specific operation and maintenance criteria and be communicated to contractors and customers as appropriate. Each high priority impact will be linked to those APR 8800.3 chapters which apply, and will be listed in Ames EMS Aspects/Impacts matrix. Contractor, partner, and tenant operations require compliance with federal, state, and local environmental regulations and APR 8800.3. This is stated in the NRP Partner Handbook as well as leases, interagency agreements, and contracts.

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26.7.2.6 Emergency Preparedness and Response

Ames' Center wide emergency preparedness and response plan is documented in APR 1601.4.

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26.7.3 Checking and Corrective Action

26.7.3.1 Monitoring and Measurement

Ames' High Priority Environmental Impacts will be periodically reviewed during internal environmental self-assessments. Assessments will be conducted on a three-year cycle, during which objectives and targets for high priority environmental impacts will be assessed. Self-assessments will be recorded and documented using the RITS (regulatory inspection tracking system) database.

Equipment used for monitoring shall be calibrated and calibration records maintained.

The following equipment is maintained and calibrated by Code QE:

Equipment	Responsibility	Use	Frequency
pH meter	Code QE, Subsurface	Groundwater sampling	Monthly or prior to use
Oakton pH meter	Code QH	Drinking Water sampling	Prior to each use
LaMotte 1200 Colorimeter S/N 6924-1702	Code QE	Drinking Water sampling	TBD
pH meter, hand held	Code QE	Code QE, Field test sample pH (wastewater)	Prior to each use
Wastewater Flow Meter	Code JFP	JFP, QE, Monitoring wastewater discharge to Sunnyvale	Annually
PH meter/recorder (S1)	City of Sunnyvale	City of Sunnyvale, continuous monitor pH of Sunnyvale discharge	Calibrated by Sunnyvale
Wastewater flowmeter, S2	Code JFP	JFP, QE monitor ww discharge to Palo Alto	Semi-annually
Water Flowmeters W42, W47, W48, W105, W106, W107, W108	San Francisco Water District	SFWD, Codes JFP and QE to monitor water delivery to NASA Ames	Calibrated by SFWD

PH meters 20010402735, 98090317, 98090314, 20010402736, 98090315, 98090316	Code QE	Wastewater treatment plant pH monitoring	Weekly
Incinerator burning unit and the temperature control unit	JFS/[REDACTED]	JFS - Air permit [REDACTED] from the BAAQMD	Annually
Nitrogen Oxides Monitor	ASF/[REDACTED]	ASF - Air permits [REDACTED] from the BAAQMD	Annually
Burn unit for the boiler in [REDACTED]	ASF/[REDACTED]	ASF - Air permits [REDACTED] from the BAAQMD	Internal maintenance requirements
Burn unit for the 2 boilers in the boiler house [REDACTED]	JFP/[REDACTED]	JFP - Air permits [REDACTED] from the BAAQMD	Internal maintenance requirements
[REDACTED] Toxic Gas Cabinet Exhaust System	JFP	Storage of toxic gases	Maintenance required
TK-105-1 Leak Detection System	JFP	NASA	Leak detection of tank; Hi/Lo alarms
7 [REDACTED] Hi/Lo Level Alarms	FO	FO	TBD
TK-[REDACTED]-881 Alarm System	FO	FO	TBD
TK-[REDACTED]-5	FO	FO	TBD
TK-[REDACTED]-879	FO	FO	TBD
E-24 @ [REDACTED]	FO	FO	TBD
TK-[REDACTED]-6	FO	FO	TBD
TK-[REDACTED]-7	FO	FO	TBD
TK-[REDACTED]-10	FO	FO	TBD
TK-[REDACTED]-11	FO	FO	TBD
TK-[REDACTED]-4	FO	FO	TBD
E-38 @N [REDACTED]	FO	FO	TBD
TK-[REDACTED]-1	FO	FO	TBD
TK-[REDACTED]-2	FO	FO	TBD
N-2 [REDACTED]	JFP	NASA, Overfill	TBD

Generator		alarm, inner wall leak detector	
[REDACTED] Generator	JFP	NASA, Overfill alarm, inner wall leak detector	TBD
TK-[REDACTED]-2	JFP	NASA, Overfill alarm, inner wall leak detector	TBD
TK-[REDACTED]-1	JFP	NASA, Overfill alarm, inner wall leak detector	TBD
TK-[REDACTED]-1	FO	FO, [REDACTED]	TBD
TK-[REDACTED]	Credit Union	GBFCU, Overfill alarm, inner wall leak detector	TBD
Scale @ [REDACTED]	QE	Haz Waste/Weight	TBD
Scale @ [REDACTED]	QE	Haz. Waste/Weight	TBD
MiniRAE Plus Photo Ionization Detector, S/N 1 [REDACTED]	QE-Subsurface Group	Toxic Gas Detection	Monthly
Oakton pH/CON 300 Series S/N [REDACTED]	QE-Subsurface Group	pH, conductivity, temperature measurements	Weekly
Rosemount, Pressure Differential, S/N 1 [REDACTED]	QE-Subsurface Group	Pressure Differential Measurement	Factory Calibrated
Rosemount, Pressure Differential, S/N [REDACTED]	QE-Subsurface Group	Pressure Differential Measurement	Factory Calibrated
Rosemount, Pressure Differential, S/N [REDACTED]	QE-Subsurface Group	Pressure Differential Measurement	Factory Calibrated
Rosemount, Pressure Differential, S/N [REDACTED]	QE-Subsurface Group	Pressure Differential Measurement	Factory Calibrated
Rosemount, Pressure Differential, S/N [REDACTED]	QE-Subsurface Group	Pressure Differential Measurement	Factory Calibrated
Danfoss Flowmeter, S/N	QE-Subsurface Group	Flow Measurement	Factory Calibrated



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26.7.3.2 Nonconformance, Corrective, and Preventive Action

Nonconformances with the EMS and with Environmental regulations will be documented during internal self-assessments. Nonconformances and corrective actions will be documented and tracked in RITS.

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26.7.3.3 Records

The following records are required by the EMS and shall be maintained in accordance with NPD 1440.6, NPR1441.1C, and NPD2800.1:

1. Priority Impact Risk Matrix
2. EMS Training Records
3. Compliance activity records in accordance with Legal and Other requirements
4. Calibration and maintenance records
5. Management review results
6. Results of test of emergency response procedures
7. Decision with regard to external communication of High Priority Impacts
8. Changes in the documented procedures resulting from corrective and preventive action

Records shall be legible, identifiable, and traceable to an activity, product, or service. In addition they shall be maintained and stored in a manner that allows for the ready retrieval and protects them from loss, damage, or deterioration.

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26.7.3.4 NASA HQ Environmental Functional Review

NASA Headquarters EMD will assess Ames every three years for EMS conformance and environmental compliance. Review results will be shared with Center management.

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26.7.3.5 Management Review

The Ames Environmental Division will report annually to Center Management on the status of the EMS and the results of internal self-assessments and Headquarters functional assessments. The management review will utilize internal self-assessments to determine necessary changes to environmental policy or the EMS.

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26.7.3.6 Metrics

Ames will report on metrics as determined by NASA Headquarters EMD to NASA Headquarters EMD. Ames shall take corrective action for non-conformances identified as a result of evaluating

and reporting metrics. Metrics shall be documented. The following are metrics to be tracked:

- Number of findings during internal self-assessments.
Goal: 0
- Number of findings during HQ Environmental Functional Review
Goal: 0

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26.8 Sources of Additional Information or Assistance

1. Environmental Services Division [REDACTED]
2. NPG 8553.1, EMS Procedures Manual (which resides on NODIS and can be found at:
http://nodis3.gsfc.nasa.gov/library/main_lib.html)

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26.9 Appendices

26.9.1 Appendix A: NASA Installation EMS Implementation Guide

http://www.hq.nasa.gov/office/codej/codeje/je_site/library/misc/pdf/nasa_ems_implementation_guide.pdf

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