

MWI 8550.5
REVISION K

EFFECTIVE DATE: June 24, 2020
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MARSHALL WORK INSTRUCTION

AS01

HAZARDOUS MATERIAL MANAGEMENT

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DOCUMENT HISTORY LOG

Status (Baseline/ Revision/ Change/ Revalidation/ Canceled)	Document Revision/ Change	Effective Date	Description
Baseline		6/16/2002	
Revision	A	6/24/2004	Added language throughout document to specify use of the Marshall Retail Store for ordering chemicals. Restructured Section 6.2.
Revision	B	10/22/2004	This revision is in response to an action from NASA Headquarters requiring specific verbiage and updating document references
Revision	C	12/21/2005	This revision updates organization codes from AD to AS; removes the phrase "out of shelf life" from paragraph 6.4.5; updates the document in general to reflect the Center's requirements for ordering and barcoding chemicals. Added paragraph 6.5.5 to address the use of expired chemicals as required by NCR 693.
Revision	D	8/14/2006	This update changes the document name from "Hazardous Material Management" to "Chemical Management;" removes the pre-approval requirement for chemical purchases; adds exemptions to the barcoding process; changes EEMO to EEOH; updates the document in general to reflect the Center's requirements for barcoding and managing chemicals; removes the MSFC Retail Store as the mandatory source for chemical purchases; and adds Supervisor Safety Visit requirements.
Revision	E	3/1/2007	Added information as follows: Guidance for chemicals formulated in house, paragraph 6.2.1; guidance for secondary containment, Section 6.3.7 and 6.3.8; requirement for using MSFC Form 4099, "MSFC Chemical Inventory Addition" when a chemical is not barcoded in 6.4.3.2 and 6.4.7.
Revision	F	11/7/2007	Deleted references to the MSFC Form 4286 checklist since this form is no longer available. Added paragraph 6.3.9 which requires employees to ensure that cleanup materials are available in chemical storage areas to cleanup small spills less than 1 gallon. Added paragraph 6.3.10 which requires that supervisors add chemical storage sites to monthly SHE visits. Added spill cleanup and reporting information in section 6.5. Updated titles of MPD 1280.1, MWI 8715.12, and MWI 8715.16. Includes minor editorial changes. This revision addresses findings of NCR 922.
Revision	G	4/28/2008	Revised 2. Applicability statement to address the applicability of this directive to the Michoud Assembly Facility. In paragraph 6.4.3.1, added lead solder and welding rods as items currently exempted from barcoding. Revised section 10 to reflect the change in training module required.
Revision	H	10/08/2008	Revised 4.1 to update the name of MSFC Form 4099 to "Chemical Barcode Request Form." Revised 6.1.1.1 to avoid excess chemical purchasing (in response to NCR 1105). Revised 6.3.4 to exclude the requirement of documentation for chemical storage areas (in response to NCR 1104). Revised 6.4.3.1 by adding Clubs and Security to the barcode exemption list. Added 3.2 for Emergency Planning and Community Right to Know Act. Added 6.4.5.2 to specify EEOH requirement to provide the Toxic Release Inventory Report. Added 6.4.5.3 to specify EEOH requirement to provide the Tier II Report. Changed chemical spill phone number from 4-4246 to 4-9578. Revised 9.4 by changing EEOH to EEOH Support Contractor. Other changes include minor editorial changes.
Revision	I	1/16/2013	Total re-write: Title was changed from Chemical Management to Hazardous Material Management to be more inclusive of all hazardous

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			material processes. Document was modified in the new template to include instructions from Hazardous Communications and Hazardous Chemicals in Laboratories. MPR 1840.2, “MSFC Hazardous Communication Program” and MPR 1840.3, “MSFC Hazardous Chemicals in Laboratories Protection Program” were incorporated into this document and will be cancelled upon approval. Instructions were also added for purchasing hazardous materials, exposures to reproductive and developmental hazardous materials, and the movement of hazardous materials. The spill procedure and barcode exemption list were also modified in order to clarify processes and improve reporting.
Change	1	9/6/2013	Removed references to MWI 8715.4, replaced with MWI 8715.15 “Ground Operations Safety Assessment Program.” Modified definitions to add “hazardous material for transportation” and added requirements to ensure hazardous materials are transported in accordance with DOT requirements.
Revision	J	3/10/2014	Requirement for secondary containment for petroleum products in containers greater than 55 gallons was added in 5.4.1.11 and 5.4.1.12. This requirement had been in Revision H but was accidentally removed from Revision I. Corrected title of Form 4601 in 4.15, and 5.10.1.2. (History Log Note for Change 1 on 9/6/13: 5.1.1.1 Note was revised to allow for a response to requesters without a signed Form 4599 due to a revision update to Form 4599.)
Change	1	6/16/2014	On 6/16/14, at the request of the OPRD in response to NCR 1681, administrative changes were made by adding “Proactive Procurement” parenthetically to heading of section 5.1, “Industrial Safety Office” as a reviewer of requests to NOTE of section 5.1.1.1, and ISB to Appendix B, Acronyms.
Change	2	6/29/2015	On 6/29/15, at the request of the OPRD, administrative changes were made to update the title in 4. Applicable Documents And Forms; update the title in 5.4.1.10; and update the links in Appendix D. Records.
Change	3	4/18/2016	On 4/18/16, at the request of the OPRD, administrative changes were made to modify 5.1.1.1 to reflect the new online submission system and remove the MSFC Form 4599; modify 5.1.1.2 to reflect how to select “Emergency” on online form; add verbiage to “Note” to 5.4.2.3 clarifying posting requirements for MSFC Label 74; and modify “Appendix D: Records” to reflect changes to documents.
Change	4	5/30/17	On 5/30/17, at the request of the OPRD, administrative changes were made to modify 5.2.2.2a., 5.2.2.4a., 5.3.1.2 NOTE, and 5.10.1.1 NOTE to reflect the updated web links.
Change	5	9/21/17	On 9/21/17, at the request of the OPRD, administrative changes were made to modify 5.2.2.4b to reflect correct nomenclature. Deleted obsolete Form 4599 from Appendix D.12 and D.13. and replaced it with the Proactive Procurement Request site link.
Change	6	2/13/18	On 2/13/18, at the request of the OPRD, an administrative change was made at 5.2.3.d to clarify correct definition.
Revalidation	J	12/4/2018	Revalidate expiring document without changes.
Change	7	4/18/19	On 4/18/19, at the request of the OPRD, Change 6 was re-inserted into the Document History Log and 5.2.3.d corrected to add “...as defined in Appendix A.”
Revision	K	6/24/2020	Added section 5.12 Additive Manufacturing and 3D Printers to reflect new requirements for 3D printing processes within the center. Changed Inventory of Hazardous Operations (IHOPS) references to Hazardous Operations Tracking (OPSTRAK).

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1. PURPOSE

1.1 To provide work instructions for managing hazardous materials at MSFC in accordance with MPD 8500.1 and MPR 8500.1.

1.2 This MWI also establishes the process for all employees (Government and contractor) to send their incoming hazardous materials through MSFC Central Receiving for barcoding. This allows the Center to maintain a more accurate hazardous material inventory and maintain a safer work environment.

2. APPLICABILITY

2.1 This MWI applies to Center personnel, programs, projects, and activities including contractors and resident agencies to the extent specified in their respective contracts or agreements. (“Contractors,” for purposes of this paragraph, include contractors, grantees, Cooperative Agreement recipients, Space Act Agreement partners, or other agreement parties.)

2.2 This MWI does not apply to the Michoud Assembly Facility.

2.3 This MWI applies the following: all mandatory actions (i.e., requirements) are denoted by statements containing the term “shall.” The terms: “may” or “can” denote discretionary privilege or permission; “should” denotes a good practice and is recommended, but not required; “will” denotes expected outcome; and “are/is” denotes descriptive material.

2.4 This MWI applies the following: all document citations are assumed to be the latest version unless otherwise noted.

2.5 This MWI applies to Center-level directives developed or revised after the effective date of this MWI.

2.6 This MWI applies to personnel purchasing, using, or storing hazardous materials onsite. Activities exempted from barcoding are listed in 5.2.3.

3. AUTHORITY

3.1 MPD 8500.1, MSFC Environmental Management Policy

3.2 MPR 8500.1, MSFC Environmental Engineering and Occupational Health Program

4. APPLICABLE DOCUMENTS AND FORMS

4.1 29 CFR Part 1910.1200, Hazard Communication

4.2 49 CFR 172.101, Purpose and Use of Hazardous Materials Table

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- 4.3 49 CFR Subtitle B, Chapter I, Subchapter C Hazardous Materials Regulations
- 4.4 MPR 3410.1, Training
- 4.5 MWI 8550.1, Waste Management
- 4.6 MWI 8550.2, Stormwater & Wastewater Management
- 4.7 MWI 8621.1, Mishap and Close Call Reporting and Investigation Program
- 4.8 MWI 8715.10, Explosives, Propellant, and Pyrotechnics Program
- 4.9 MWI 8715.12, Safety, Health, and Environmental-Finding Tracking System (SHEtrak)
- 4.10 MWI 8715.15, Ground Operations Safety Assessment Program
- 4.11 MSFC Form 4099, Chemical Bar Code Request Form
- 4.12 MSFC Form 4476, Chemical Container Bar Code Collection Sheet
- 4.13 MSFC Form 4546, Reproductive and Developmental Health Hazard Questionnaire
- 4.14 MSFC Form 4582, Chemical Inventory Worksheet
- 4.15 MSFC Form 4601, MSFC Chemical Movement Record
- 4.16 MSFC Label 74, Chemicals in Use or Storage

5. INSTRUCTIONS

5.1 Hazardous Material and Environmental Sensitive Equipment (ESE) Purchases (Proactive Procurement)

5.1.1 Purchaser of Hazardous Material and/or ESE:

5.1.1.1 Complete the Proactive Procurement Request, found at <https://sharepoint.msfc.nasa.gov/sites/shared/proproc/SitePages/Home.aspx>, no less than 10 working days prior to purchasing the hazardous material.

NOTE: EEOH and the Industrial Safety Branch (ISB) reviews the request and responds to the requester with information that identifies any constraints to minimize identified risks such as, but not limited to, Air Permit impacts, special waste handling, and Personal Protective Equipment (PPE) requirements. This process may take up to 10 working days. If EEOH and ISB do not respond within 10 working days from receipt of the request, the user will automatically be permitted to purchase the material. Hazardous Material or ESE

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found onsite that has not been through review will be documented as a SHEtrak finding against the user organization.

5.1.1.2 If urgent, select “Emergency” as the Request Type while filling out the form.

NOTE: Requests marked as urgent will be processed in 1 working day. If an organization submits more than 3 urgent requests within a month, they will be investigated by EEOH and if it is found that the system is being abused, a SHEtrak finding will be entered requiring the organization to develop a corrective action plan to facilitate purchase planning.

5.1.1.3 Do not order excess amounts of hazardous materials. This practice reduces onsite storage and disposal requirements.

5.1.1.4 Route all hazardous materials shipments, regardless of source, through MSFC Central Receiving (Building 4631) to receive a barcode.

5.1.1.5 Obtain written permission from EEOH Chemical Management Support Contractor when shipping to Building 4631 is not feasible. EEOH Chemical Management Support Contractor may be reached at (256)544-6007 or (256)544-1253.

5.1.1.6 Purchase less toxic or hazardous materials if data indicates that a less toxic or hazardous material is appropriate and it does not degrade process.

5.1.1.7 To facilitate timely delivery of hazardous material received, request vendor to ensure final recipient contact information is included in delivery documents.

NOTE: The effort here is to ensure that the material, when received, identifies the owner. Failure to do this step may result in a delay in delivery of your material.

5.2 Hazardous Material Inventory & Labeling

5.2.1 Personnel who are assigned the control of hazardous material containers that are barcoded are the points-of-contact (POC) for EEOH for inventory reporting.

5.2.2 Hazardous Material users:

5.2.2.1 Inspect all hazardous material containers and user-created containers for labels that, at a minimum, contain the hazardous material name as it appears on the Safety Data Sheet (SDS) and the applicable hazard warnings.

NOTE: User-created containers for immediate use, kept less than one shift and only used by the person creating the container are exempt from this requirement.

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a. If a hazardous material container is found with a deficient label, obtain or develop a replacement label and place on the container.

NOTE: It is preferred the National Fire Protection Association (NFPA) or the Hazardous Material Identification System (HMIS) labeling system be used for user-created or transfer containers.

5.2.2.2 Inspect hazardous materials for proper labeling and ready access to an SDS and reconcile hazardous material inventory with EEOH records at least quarterly by calendar year.

NOTE: A material developed in one laboratory for use in another laboratory requires labeling and an SDS.

a. Obtain the chemical inventory for your area from the EEOH Portal (<https://eeoh-portal.ndc.nasa.gov/chemical-inventory>) and provide inventory discrepancies to MSFC-Hazardous-Materials@mail.nasa.gov.

NOTE: Discrepancy reports provided to EEOH are not records but worksheets for updating chemical inventory.

5.2.2.3 Leave barcodes on materials that are turned in for re-utilization.

5.2.2.4 Remove barcodes and place them on MSFC Form 4476 for empty containers.

a. Submit MSFC Form 4476 with attached barcodes to EEOH Chemical Management Support Contractor or utilize the Chemical Barcode Turn-In Screen (<https://eeoh-portal.ndc.nasa.gov/chemical-inventory/barcode-turn-in>) at least quarterly.

NOTE: MSFC Form 4476 is not a record. The barcodes on Form 4476 are scanned to remove the information from the database. Once scanned, Form 4476 is no longer needed and is disposed of.

b. To obtain barcodes for hazardous material containers that are less than or equal to 55 gallons with missing, damaged, or unreadable barcodes, contact the Chemical Management Support Contractor and provide the requested information (e.g., material name, manufacturer, container size, building, organization, room, SDS number, if known, and number of containers). Requests for barcodes may be done via email, phone (256-544-6007 or 256-544-1253), or by using MSFC Form 4099 “Chemical Bar Code Request Form.”

NOTE: MSFC Form 4099 and e-mail requests are used only to obtain accurate information for each barcode request. Once the information is received by EEOH, it is entered into the inventory database and the form/e-mail is destroyed.

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c. Contact the EEOH Chemical Management Support Contractor to request a new barcode at (256) 544-6007 or (256) 544-1253 for hazardous material containers greater than 55 gallons with missing, damaged, or unreadable barcodes.

NOTE: Chemical containers greater than 55 gallons are determined on a case-by-case basis.

5.2.3 The following activities are exempt from barcoding:

- a. Hobby shops and Clubs.
- b. X-ray sources and radioactive compounds.
- c. Fire extinguishers.
- d. Consumer products as defined in Appendix A.
- e. Transfer or process containers created by users.
- f. Batteries.
- g. Containers of non-hazardous material.
- h. Medical Center chemicals.
- i. MSFC barge (Pegasus).
- j. Materials that are purchased in bulk and cut, welded, or formed in the workplace to their final shape or purpose. These include items such as but are not limited to: sheet metal and alloys, polymer blanks, and composite materials.
- k. Auto Service Center.
- l. Lead solder.
- m. Welding rods.
- n. Compressed gases, including bulk storage of gases and propellants.
- o. Hazardous material containers having a volume of ≤ 200 ml (cm³) or materials whose final form is the packaging, such as metal ingots.
- p. Explosives, ammunitions, and black powder containers.
- q. National Space Science Technology Center (NSSTC).

5.2.4 The following activities are exempt from barcoding; however, POCs are required to supply EEOH with an inventory list and quantity for tracking and reporting. POCs shall use MSFC Form 4582 for inventory submittal. An annual inventory submittal is required to EEOH by February 1st of the following year for the processes listed below.

- a. Janitorial services.
- b. Cafeteria operations.
- c. Grounds maintenance operations.

NOTE: Processes governed by Construction of Facilities (CoF) and Technical Specifications for Repair and Construction (TSRC) documents are exempt from the barcoding process, but follow instructions as written in the CoF specs or TSRC.

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5.3 Hazardous Material Usage

5.3.1 Directors/Managers/Supervisors/Team Leads:

5.3.1.1 Complete the Safety, Health, and Environmental (SHE) Training Assessment in accordance with MPR 3410.1.

5.3.1.2 Verify Job Hazard Analysis (JHA), work instructions or appropriate documents contain a notation of where employees can readily access SDSs.

NOTE: Employees may use the EEOH Portal to search for SDS's (<https://eeoh-portal.ndc.nasa.gov/chemical-inventory>). For those employees not having electronic access, copies may be provided to employees by EEOH upon request by calling (256) 544-2390 or (256) 544-4246.

5.3.1.3 Verify any constraints identified by EEOH and Safety & Mission Assurance (S&MA) for safe use of the hazardous material is documented on JHAs, work instructions or similar documents.

5.3.1.4 Verify users complete quarterly inventory and label/SDS reconciliation.

5.3.1.5 Verify written procedures are developed/exist on handling and/or continual use of potentially-unstable hazardous materials that have exceeded the manufacturer's shelf life.

5.3.1.6 Verify PPE recommendations on JHAs, work instructions or other process documentation are followed.

5.3.1.7 Verify that PPE and emergency equipment specific for the work being conducted is available, in working order and used by employees.

5.3.1.8 Verify necessary signage, training and use of PPE and emergency equipment required for the work in accordance with MWI 8715.15.

NOTE: The verification steps of 5.3.1.2 through 5.3.1.8 may be performed as part of the monthly Supervisor Safety walkthrough by random inspection.

5.3.1.9 Assist employees with workplace restrictions relative to chemicals to comply with directions from EEOH, Office of Human Capital, the Office of Diversity and Equal Opportunity, and/or appropriate Contracting Officer Representative.

5.3.1.10 Notify employees of any overexposures indicated by exposure assessments.

5.3.1.11 Develop a JHA in accordance with MWI 8715.15.

5.3.1.12 Enter the appropriate data in the Hazardous Operations Tracking (OPSTRAK) per

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MWI 8715.15.

5.3.1.13 Direct all employee complaints relative to health hazards to EEOH for investigation and review.

5.3.2 Employees using hazardous materials:

5.3.2.1 Utilize any constraints identified by EEOH or S&MA for working with hazardous materials noted in JHAs, Standard Operating Procedure (SOP), or other process documents.

5.3.2.2 Report to the supervisor any unsafe or hazardous working conditions.

5.3.2.3 Complete the MSFC Form 4546, Reproductive and Developmental Health Hazard Questionnaire for distribution to EEOH, if necessary.

5.3.2.4 Consult with EEOH healthcare providers or their personal physician regarding and developmental toxicity issues, if necessary.

5.3.2.5 Submit any physician certifications regarding work restrictions or limitations to their supervisor and EEOH.

5.3.2.6 Do not use or have a hazardous material onsite without informing the EEOH Chemical Management Support Contractor. If an SDS is not available onsite, turn in the hazardous material for waste disposal in accordance with MWI 8550.1.

NOTE: An SDS is not required for a hazardous material that is formulated and used on the same shift by the person who formulated the material. If the material is kept beyond one shift, the requirements of this section apply including having an SDS created for it and having a label listing all ingredients used in its formulation as well as the date of formulation and an expiration date.

5.3.2.7 Familiarize themselves with the hazards associated with reproductive or developmental toxins in their areas of responsibility by reviewing the SDSs or consulting with EEOH and by following job-specific work instructions/training.

5.3.2.8 Comply with any use constraints identified by EEOH and S&MA and utilize engineering, administrative, or personal protective equipment controls to minimize exposure.

5.3.2.9 Dispose of spent (used) hazardous materials into hazardous waste accumulation containers designated by EEOH.

5.3.2.10 Empty containers by pumping, pouring, or aspirating as much of the contents as possible and disposing of the container as described in MWI 8550.1.

Do not throw empty aerosol (spray) cans in the trash; call the EEOH Hazardous Waste Support Contractor at (256) 544-9578 for proper disposal.

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5.3.2.11 Dispose of hazardous materials and containers before the container has lost its structural integrity. Signs of structural integrity loss include severe rusting, dents, deep scratches, bulging, warping, or any other structural defects.

5.3.2.12 Initiate a move via the Service Request System and selecting “Move Services” and then “Relocate Furniture & Other Property.” Indicate the number of containers to be moved in the “Chemicals” field.

5.3.2.13 Label refrigerators used for storing hazardous materials with “NOT FOR FOOD OR DRINK” and do not handle or eat any food or beverages in areas where hazardous materials are used or stored.

5.3.2.14 Report any suspected adverse health effects experienced during use of a hazardous material to the immediate supervisor and EEOH.

5.3.2.15 Report any conditions or operations relating to hazardous material use which may have an adverse effect on health or well-being to the immediate supervisor and EEOH.

5.4 Hazardous Material Storage

5.4.1 Employees storing hazardous materials:

5.4.1.1 Call (256)544-9578 to turn in the hazardous material for waste disposal if an SDS is not available.

5.4.1.2 Store products such that unintended chemical reactions do not occur. Examples include items such as, but not limited to, storing acids and bases separately and not storing organic materials with oxidizers. See Appendix F of this document for general guidance.

5.4.1.3 Store flammable liquids and organic materials separately from acids, bases, and oxidizers. Refer to the SDS to determine storage compatibility. If the user is unsure, call (256) 544-2390 or (256) 544-4246.

5.4.1.4 All chemicals shall be procured and stored in compatible containers. Glass containers should be shatterproof if available.

5.4.1.5 Restrict access to hazardous material storage areas to authorized personnel only.

5.4.1.6 Seal product containers/drums when not in use.

5.4.1.7 Notify the EEOH Hazardous Waste Support contractor for unneeded or unwanted products, or leaking, or severely-corroded containers at (256) 544-9578.

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5.4.1.8 Promptly correct all deficiencies noted during inspections. Uncorrected deficiencies shall be recorded as findings against the user organization in SHEtrak in accordance with MWI 8715.12.

5.4.1.9 Do not keep material capable of decomposing into dangerous compounds (e.g., picric acid, or perchloric acid) beyond their shelf life as indicated by the manufacturer. Refer to Appendix F in MPR 8500.1.

5.4.1.10 Store all outside containers of oil, hazardous materials, or liquid wastes so that they are protected from the weather and have secondary containment in accordance with MWI 8550.2,.

5.4.1.11 All oil containers (inside and outside) with the capacity to hold 55 gallons or more shall be stored using secondary containment.

5.4.1.12 Store interior containers of all hazardous materials away from floor drains.

5.4.2 Supervisors:

5.4.2.1 If there is no secondary containment, verify that spill cleanup materials are available near the storage location sufficient to respond to a potential cleanup of spills of the largest container at that storage location.

5.4.2.2 Include hazardous material usage/storage sites in supervisor's monthly SHE visits.

5.4.2.3 Where hazardous materials are stored or used, ensure MSFC Label 74, "Chemicals In Use or Storage" is completed showing SHE Organization POC, primary POC for that specific location, and is attached to the point of entry.

NOTE: For mixed use areas such as high-bays, label individual storage locations. If a single person is responsible for all chemicals in a building, MSFC Label 74 can be applied to each entrance of the building in lieu of each room.

5.5 Hazardous Materials in Laboratories

5.5.1 Directors/Managers/Supervisors/Team Leads:

5.5.1.1 In conjunction with EEOH, determine if laboratories require a Chemical Hygiene Plan (CHP). If necessary, work with EEOH to develop and implement a CHP for each applicable laboratory facility or laboratory which includes:

a. SOP relative to safety and health consideration to be followed when laboratory work involves hazardous materials.

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- b. Criteria used to determine and implement control measures to reduce employee exposure to hazardous materials including engineering controls, the use of PPE, and hygiene practices with particular attention to highly hazardous substances.
 - c. Provisions for ensuring fume hoods and other protective equipment are functioning properly and specific measures taken to ensure proper and adequate performance of the equipment.
 - d. Provisions for employee training.
 - e. Provisions for approving particular laboratory operations or procedures by the Chemical Hygiene Officer (CHO) or their designee.
 - f. Provisions for medical consultations and examinations.
 - g. Designation of personnel responsible for implementation of the CHP including the assignment of a CHO.
 - h. Provisions for additional employee protection for work with particularly-hazardous substances with, if appropriate, specific consideration given to establishment of designated areas, use of containment devices, procedures for safe removal of waste, and decontamination procedures.
- 5.5.1.2 Designate a CHO and an alternate for each applicable laboratory facility or laboratory area within their organization.
- 5.5.2 A CHO:
- 5.5.2.1 Develops and implements the overall CHP including the CHP and procedures pertaining thereto.
 - 5.5.2.2 Receive and disseminate information on any changes in hazardous material inventory, technical advice on exposure assessment, possible by-products of reactions, containment of reactions and chemicals, neutralization procedures, and alternative procedures or materials for less toxic exposure for their area of responsibility.
 - 5.5.2.3 Trains employees within their respective areas for the associated hazards of their laboratory environment, and the requirements of their CHP.
 - 5.5.2.4 Reviews proposed laboratory uses of highly toxic, carcinogenic, genotoxic, or hazardous chemicals and the proposed precautions used to protect employees, including specific designated work areas and disseminate information to affected employees.
 - 5.5.2.5 Performs annual review of the CHP and modifies the CHP as necessary also submitting an updated copy to EEOH.

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5.5.2.6 Contacts EEOH to determine if exposure assessments are necessary and if determined to be necessary, coordinates monitoring.

5.5.2.7 Verifies monitoring is conducted by EEOH to evaluate the proper functioning of fume hoods and other engineering controls and that prompt repairs are made as needed.

5.5.2.8 Verifies reference books and databases local to the affected laboratory ensure information about potential health hazards; safe handling procedures, hazardous material storage, and emergency response to fire or releases of hazardous materials stored or used in the laboratory are current.

5.5.3 Laboratory employees:

Conduct each laboratory operation in accordance with the CHP (e.g., following established work practices and procedures, wearing appropriate protective equipment and clothing).

5.6 Nanomaterials

5.6.1 Personnel using nanomaterials:

5.6.1.1 Notify the Facilities Management Office of any laboratory hoods or ventilation systems into which nanoparticulate material may be introduced.

NOTE: This provision applies only to ventilation systems designed for exposure control such as hoods or process exhaust systems and not to general building air handling systems.

5.6.1.2 In conjunction with EEOH, develop written SOP for the use of nanomaterials. Minimum elements for the SOP are:

- a. Work practices and/or methods used to prevent nanomaterials from contaminating adjacent operations and surfaces.
- b. Methods for cleaning contaminated facility and equipment work surfaces through the use of High Efficiency Particulate Air (HEPA) vacuuming and/or wet wiping at the end of the task or shift.
- c. Methods for disposing of contaminated debris to prevent re-aerosolizing nanomaterial.
- d. Prohibitions for dry sweeping and the use of compressed air for cleaning.
- e. Required PPE, when to decontaminate the PPE and/or when to dispose of it.

NOTE: When using nanomaterials, the use of disposable PPE such as, but not limited to, disposable coveralls, gloves, and shoe coverings is preferred.

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f. Details of the hazards associated with the nanomaterial.

NOTE: Details of all hazards presented by nanomaterials are not fully known. Include information such as, but not limited to, toxicity, fire/explosion risk, and hazards associated with catalytic reaction due to surface area and unique properties of the nanomaterial.

5.6.1.3 Dispose of waste materials in accordance with MWI 8550.1.

5.6.1.4 Use, at a minimum, the following protective equipment or procedures:

- a. Gloves as specified by EEOH for handling liquids that contain nanomaterials.
- b. Enclosures or local exhaust ventilation systems for operations that use, mechanically process (e.g., grind, mill, or sand) or are designed to generate nanosized aerosols or gas-phase aerosols.

NOTE: For exhaust system that re-circulates air into occupied workspace, only systems with HEPA filtration may be used.

5.6.1.5 Use required respirators if directed to do so by EEOH.

5.7 Reproductive and Developmental Hazardous Materials

NOTE: An individual may choose to maintain their pregnancy status as personally confidential; however, the involvement of the EEOH and supervisory personnel is an essential part of MSFC's reproductive/developmental toxin management program. Exposure to a fetus above the 0.5 rem limit for radiation workers is not recommended. Individuals are urged to involve these resources in work-related discussions.

5.7.1 If an individual requests MSFC to be involved in protecting their embryo/fetus, a declaration of actual, suspected, or intended pregnancy is made by:

5.7.1.1 Completing and submitting to EEOH a Declaration of Pregnancy if the 0.5 rem limit is applied.

NOTE: Individuals may contact EEOH for a confidential consultation prior to declaration.

5.7.2 Completing the Reproductive and Developmental Health Hazard Questionnaire (MSFC Form 4546).

NOTE: Once received, EEOH performs an evaluation of the workplace to determine possible exposures and mitigation measures and provides a report back to the individual, their supervisor and the MSFC occupational health physician. The individual should take the evaluation results to their personal physician for discussion. If needed, the MSFC occupational physician may consult with the personal physician regarding possible work restrictions.

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5.7.3 Utilize any restrictions or limitations on individual's work activities provided by occupational health physician.

5.7.4 Directors/Managers/Supervisors/Team Leads:

5.7.4.1 Contact EEOH regarding any work restrictions they do not understand to ensure appropriate protection for the fetus/embryo.

5.7.4.2 Forward any work restrictions to the local human resources officer.

5.7.4.3 Utilize recommendations given by the physician and EEOH to protect individual and embryo/fetus.

NOTE: Supervisor and individual may seek assistance from the Office of Human Capital, and the Office of Diversity and Equal Opportunity for assistance in implementing recommendations.

5.7.5 Individuals may receive safety information about reproductive or developmental hazards posed by potential chemical/radiological/biological/physical exposures anytime from EEOH without declaring actual, suspected, or planned pregnancy. Safety information provided may include items such as, but not limited to, answers about the individual's general workplace hazards and information on work practices to reduce exposures.

5.8 Hazardous Material Spills & Emergencies

5.8.1 Any personnel observing a spill or leak:

5.8.1.1 Evacuate the immediate area and call 911 if the amount of the spill exceeds the following:

- a. For liquid flammable material (FP <140°F), (i.e., organic solvents such as paint thinners, toluene, xylene, or paint stripper) if the amount is more than 1 gallon.
- b. For liquid corrosive material (pH<2 or pH>12), the amount is 1 gallon.

EXCEPTION: For hydrofluoric acid, the maximum amount that a non-trained employee can respond to is 500 milliliters.

- c. For solid corrosive material (aqueous pH<2 or pH>12), the amount is 10 pounds.
- d. For oils and greases spilled inside a building, the amount is 55 gallons.
- e. For oils and greases spilled outside a building, the amount is 10 gallons.
- f. For nanomaterials, any amount.

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g. For unknown material, dial 911.

h. If any material threatens to enter a waterway or sewer, dial 911.

5.8.1.2 If the quantities are below those listed above and the response can be performed without putting the employee at risk:

a. Locate and shut off the spill source.

b. Contain the spill using sorbent material (keeping it away from the soil, piping/cable trenches, floor drains, or other potential conduits into the environment).

c. Clean up the spill (properly disposing of absorbent material/spilled hazardous material).

5.8.1.3 Obtain written EEOH concurrence for any deviations to these procedures and include in local procedures.

5.8.1.4 Directors/Managers/Supervisors/Team Leads submit a Mishap Report per MWI 8621.1, Mishap and Close Call Reporting and Investigation Program, if 911 is notified.

5.9 Training and Awareness

5.9.1 Directors/Managers/Supervisors/Team Leads:

5.9.1.1 Verify employees are trained in the safe use and disposal of hazardous materials prior to introduction of new hazardous materials or changes in tasks using existing hazardous materials.

5.9.1.2 Verify that hazards created by other employers or operation in co-located workspaces are communicated across all employers, including employers such as, but not limited to civil service employees, onsite contractors, offsite contractors, and subcontractors.

5.9.1.3 Verify the hazards posed by their operations are communicated to all affected employer/employees by signs, barriers, lights, verbal communication, or some other means.

5.9.1.4 Verify that employees are trained on specific SOPs and/or JHAs for hazardous materials and their associated tasks prior to conducting non-routine tasks.

5.10 Movement of Hazardous Materials.

5.10.1 Hazardous Materials users:

5.10.1.1 Notify the Chemical Management Support Contractor at (256)544-6007 prior to moving a chemical from the area to which it was assigned.

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NOTE: To determine the area to which the material was assigned go to the EEOH Portal (<https://eeoh-portal.ndc.nasa.gov/chemical-inventory>).

5.10.1.2 Complete MSFC Form 4601, “MSFC Chemical Movement Record” showing the original location of the chemical(s) and the area to which they will be moved.

5.10.1.3 Move chemicals to new location only after receiving acknowledgment from the Chemical Management Support Contractor of receipt of MSFC Form 4601.

NOTE: MSFC Form 4601 is not a record and only used to update the chemical management computer system. Once the system is updated, MSFC Form 4601 is no longer needed and is disposed of.

5.10.1.4 Pack all boxes such that the box closure functions as intended and that container tops do not protrude above box tops or the containers are packed so full that the sides “swell” from over-packing.

5.10.1.5 Use a minimum of a medium weight cardboard box in good condition (no crushed sides, flaps or deformations) with the bottom closed with at least three pieces of fiberglass reinforced packing tape running parallel to flap closure and have one piece attached directly in middle of box flaps and the other two pieces placed one on each flap. Top may be closed with two pieces of fiberglass reinforced tape.

5.10.1.6 If multiple glass bottles are packed in a container, utilize a method to isolate the bottles from one another or other containers such as, but not limited to, the use of bubble wrap, vermiculite, and/or packing peanuts.

5.10.1.7 Verify that containers to be manually lifted or moved do not exceed 40 pounds.

5.10.1.8 Package materials homogenously by hazard class (See Appendix E).

NOTE: For assistance in determining the hazard class, contact the Chemical Management Support Contractor at (256)544-6007.

5.10.1.9 Label containers with From Org/Room, To Org/Room, Hazard Class (See Appendix E), Box Number.

5.10.1.10 Do not move any containers to other buildings or locations unless specifically authorized by the chemical user’s organization.

5.11 Shipping of Hazardous Materials

5.11.1 This section does not apply to Department of Transportation (DOT) Class 1 explosive materials. Refer to MWI 8715.10 for information on receiving and shipping Class 1 explosive materials.

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5.11.2 Personnel requiring shipment of hazardous materials regulated by the DOT off Redstone Arsenal shall take the material to Central Receiving (Building 4631) for shipment processing.

5.11.2.1 If an item's characteristics such as, but not limited to, the size, hazard category of the material (e.g., corrosive) or shape of the material prevents taking the shipment to Central Receiving (Building 4631), arrangements shall be made with the Logistics Services Office for shipment.

5.11.2.2 The Logistics Services Office ensures that the material is picked up and shipped in accordance with DOT regulations and notifies the Protective Services Office of a hazardous material shipment from a non-routine shipping point.

5.11.3 If an organization chooses to ship a DOT-designated hazardous material and does not use the Logistics Services Office services, prior to offering any DOT hazardous material for shipment to an alternative shipper, the organization shall submit to the supervisor of the Logistics Services Office (AS42) the following:

5.11.3.1 Training records that indicate the personnel that will be preparing the material for shipment has received required DOT training for hazardous material shipping, including the name of the training supplier and the course syllabus.

5.11.3.2 All documents required by 49 CFR Subtitle B, Chapter I, Subchapter C Hazardous Materials Regulations.

5.11.3.3 After reviewing the documents, the Office of Center Operations through the supervisor of the Logistics Services Office, shall provide a letter to the organization affirming its designation as an alternative shipping location as well as detailing the scope of the materials that may be shipped.

NOTE: For air or marine shipments, in addition to DOT requirements, the International Civil Aviation Organization (ICAO) issues the "Technical Instructions for the Safe Transport of Dangerous Goods by Air" for the international transportation of goods by air. The International Maritime Organization (IMO) issues the "International Maritime Dangerous Goods (IMDG) Code" for the international transportation of hazardous materials by water.

5.12 Additive Manufacturing and 3D Printers

5.12.1 All 3D printers, filament, cartridges, metal powders, and water bath chemicals shall go through Proactive Procurement review 10 business days before purchase.

5.12.2 3D Printers are not allowed in cubical areas. 3D printers currently located in cubicles shall be moved to other areas such as labs, maker spaces, or hard walled offices with adequate ventilation.

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5.12.3 3D Printers shall not be used in continuously occupied spaces (offices) unless engineering controls are utilized. EEOH can assess on a case-by-case basis and make recommendations.

5.12.4 3D printers located in maker spaces will be evaluated for health purposes prior to start up. If the area's work load increases substantially, re-evaluation may be needed.

5.12.5 Users working in additive manufacturing labs and industrial areas may request an assessment or air sampling from Industrial Hygiene as they see fit. Example: Start up of a new process, changes in work load, noticing dust in the area.

5.12.6 Use 3D printers in well-ventilated areas. EEOH recommends keeping 3D printers in rooms with 6-12 fresh air changes per hour.

6. CANCELLATION

MWI 8550.5.J, Hazardous Material Management, dated March 10, 2014.

Electronically approved by

Jody Singer
Director

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APPENDIX A DEFINITIONS

Carcinogen. A chemical that has been evaluated by the International Agency for Research on Cancer (IARC), and found to be a carcinogen or potential carcinogen; or it is listed as a carcinogen or potential carcinogen in the Annual Report on Carcinogens published by the National Toxicology Program (NTP) (latest edition); or, it is regulated by Occupational Safety & Health Administration (OSHA) as a carcinogen.

Chemical Hygiene Officer (CHO). An employee designated by the employer and qualified by training or experience to provide technical guidance in the development and implementation of the provisions of the Chemical Hygiene Plan (CHP). Minimum qualifications consist of a degree in chemistry and 1 to 2 years of experience in a chemical laboratory, or 4 to 5 years of experience working in a chemical laboratory with a working knowledge of chemical, chemical hazards, chemical manipulations, and chemical handling.

Chemical Hygiene Plan (CHP). A written plan developed and carried out by MSFC laboratory facilities to ensure the protection of employees from the effects of hazardous chemicals. The CHP sets forth procedures, laboratory and control equipment, personal protective gear, and work practices that are capable of providing this protection.

Compatibility. Chemical property of materials to coexist without adverse reaction for an acceptable period of time. Compatibility in storage exists when storing materials together does not increase the probability of an accident or, for a given quantity, the magnitude of the effects of such an accident. Storage compatibility groups are assigned to provide for segregated storage.

Consumer Products. Any material that has a container size consistent with consumer products, is formulated and used as a consumer product, is not used in a process such as product production, maintenance, or experimentation, and is not an Ozone Depleting Substance.

Container. Any bag, barrel, bottle, box, can, cylinder, drum, reaction vessel, storage tank, or the like that contains a hazardous material.

Cubicle. A small space or compartment with movable walls or non-fixed walls that can be arranged in multiple configurations.

Developmental Toxicity. Adverse effects on the developing organism that may occur anytime from conception to sexual maturity. Effects may include spontaneous abortion, structural or functional defects, low birth weight, or effects that may appear later in life.

Department of Transportation (DOT) Hazardous Materials. Means a substance or material that the Secretary of Transportation has determined is capable of posing an unreasonable risk to health, safety, and property when transported in commerce, and has been designated as hazardous under section 5103 of Federal hazardous materials transportation law (49 U.S.C. 5103). The term includes hazardous substances, hazardous wastes, marine pollutants, elevated

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temperature materials, materials designated as hazardous in the Hazardous Materials Table (see 49 CFR 172.101), and materials that meet the defining criteria for hazardous classes and divisions in part 173 of this subchapter.

Environmental Sensitive Equipment (ESE). Includes radioactive materials, machinery and equipment that may require air permitting (e.g., boilers, generators, grit or sand blasters, parts washers, tanks, non-digital photography equipment, vent hoods, wood working equipment, metal working equipment, vapor degreasers, x-ray developing, surface coating equipment, cleaning equipment, autoclaves, engines, fueling stations/equipment, propulsion engine and launch system testing equipment/articles, or any other equipment that emits chemicals, smoke, fumes, or particles into the air), or that generates ionizing/non-ionizing radiation, or the potential for noise generation above 80 decibels on the A-weighted scale.

Exposure (exposed). When an employee is subjected to a hazardous material in the course of employment through any route of entry such as, but not limited to, inhalation, skin contact or absorption and includes potential (e.g., accidental or possible) exposure.

Hard walled office. Permanent space having constructed walls with occupant(s) utilizing the area for general tasks.

Hazardous Chemical. Any chemical which is a physical hazard or a health hazard. A mixture of chemicals will be considered hazardous if it contains greater than 1% (weight or volume) of a hazardous chemical or greater than 0.1% if the mixture contains a carcinogen. A chemical for which there is statistically significant evidence based on at least one study conducted in accordance with established scientific principles that acute or chronic health effects may occur in exposed employees which include carcinogens, toxic or highly toxic agents, reproductive toxins, irritants, corrosives, sensitizers, hepatotoxins, nephrotoxins, neurotoxins, agents which act on a hematopoietic system, and agents which damage the lungs, skin, eyes, or mucous membranes. Also, chemicals for which there is scientifically valid evidence that they are a combustible liquid, a compressed gas, explosive, flammable, an organic peroxide, an oxidizer, pyrophoric, unstable (reactive), or water-reactive.

Hazardous Material. A hazardous chemical or a nanoaerosol, nanocolloid, nanocomposite, nanohydrosol, or nanomaterial. This includes material that is processed onsite such as but not limited to, sheet metal, welding rods, plastics, and composite materials.

Hazard Warning. Any words, pictures, symbols, or combination thereof appearing on a label or other appropriate form of warning which conveys the hazard(s) of the material(s) in the container(s).

Health Hazard. A chemical for which there is statistically significant evidence based on at least one study conducted in accordance with established scientific principles that acute or chronic health effects may occur in exposed employees. The term "health hazard" includes chemicals which are carcinogens, toxic or highly toxic agents, reproductive toxins, irritants, corrosives, sensitizers, hepatotoxins, nephrotoxins, neurotoxins, agents which act on the hematopoietic

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system, and agents which damage the lungs, skin, eyes, or mucous membranes. Appendix A to 29 CFR Part 1910.1200 provides further definitions and explanations of the scope of health hazards covered by this section, and Appendix B to 29 CFR 1910.1200 describes the criteria to be used in determining if a material is considered hazardous.

High Efficiency Particulate Air (HEPA). This type of filter removes 0.3 µm diameter particles with 99.97% or greater efficiency. The selection of the 0.3 µm diameter as the standard challenge diameter is based on the fact that most particulate filters are least efficient at this diameter and more effectively remove particles that are both smaller and larger in diameter. The National Institute for Occupational Safety and Health (NIOSH) is reviewing HEPA efficiency for nanomaterials and there is evidence that this may be effective at filtering nano-sized materials.

Immediate Use. When the hazardous material is under the control of and used only by the person who transfers it from a labeled container and only within the work shift in which it is transferred.

Industrial Area. An area for manufacturing (processing, assembling, mixing, packaging, repairing or similar operations). Includes larger scale activities. 3D printers are used to manufacturer components used in flight hardware, non-flight hardware, or full scale prototypes.

Label. Any written, printed, or graphic material displayed on or affixed to containers of hazardous materials.

Laboratory. Any facility (large or small) where the handling/use of hazardous materials is accomplished in containers used for actions such as, but not limited to, reactions and transfer, designed to be easily and safely manipulated by one person. It is a workplace where relatively small quantities of hazardous materials are used on a nonproduction basis.

Laboratory Scale. Work with substances in which the containers used for reactions, transfers, and other handling of substances are designed to be easily and safely manipulated by one person. Excludes those workplaces whose function is to produce commercial quantities of materials.

Laboratory Use. The handling or use of such chemicals in which all of the following conditions are met: chemical manipulations are carried out on a laboratory scale; multiple chemical procedures or chemicals are used; the procedures involved are not part of a production process, nor in any way simulate a production process; and protective laboratory practices and equipment are available and in common use to minimize the potential for employee exposure to hazardous chemicals.

Nanoaerosol. A collection of nanomaterials suspended in a gas.

Nanocolloid. A nanomaterial suspended in a gel or semi-solid substance.

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Nanocomposite. A solid material composed of two or more nanomaterials.

Nanohydrosol. A nanomaterial suspended in a solution.

Nanomaterial. A material defined as having at least one dimension in the 1 to 100 nanometer range.

pH. The measure of acidity or basicity of a material with 7 being neutral and 1 being strongly acidic and 14 being strongly basic.

Physical Hazard. A material for which there is scientifically-valid evidence that it is a combustible liquid, a compressed gas, explosive, flammable, an organic peroxide, an oxidizer, pyrophoric, unstable (reactive) or water-reactive.

Reproductive Toxins. Adverse effects on the health of the reproductive organs, endocrine system, or gametes (egg or sperm) from exposure to an exogenous agent. May result in effects such as menstrual dysfunction, impaired fertility, feminization/masculinization, or inability to maintain a pregnancy.

Safety Data Sheet(s) (SDS). Informational written or printed material, supplied by chemical manufacturers/importers, which provide pertinent safety and health information concerning a hazardous chemical.

Sensitive Equipment. Any industrial or laboratory equipment that could present adverse health effects. Sensitive equipment includes, but is not limited to laser systems, 3D printers, generators, and machining equipment.

SHEtrak. Database for documenting and tracking Safety, Health, & Environmental (SHE) findings.

Tech lab/maker space. An area in which testing or assembling of components or adjustment of pre-manufactured goods is conducted. Smaller than industrial areas; usually no sinks or fume hoods for chemical processing. 3D printers used to create prototypes or small scale items.

Use. To package, handle, react, or transfer.

Work Area. A room or defined space in a workplace where hazardous materials are produced or used and where employees are present.

Workplace. An establishment, job site, or project, at one geographical location containing one or more work areas.

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APPENDIX B ACRONYMS

AS01	Organization code for MSFC Office of Center Operations
AS10	Organization code for MSFC Environmental Engineering and Occupational Health Office
CFR	Code of Federal Regulations
CHO	Chemical Hygiene Officer
CHP	Chemical Hygiene Plan
CoF	Construction of Facilities
DOT	Department of Transportation
EEOH	Environmental Engineering and Occupational Health
ESE	Environmental Sensitive Equipment
F	Temperature, Fahrenheit
FP	Flash Point
HEPA	High Efficiency Particulate Air filter
HMIS	Hazardous Material Identification System
IARC	International Agency for Research on Cancer
ICAO	International Civil Aviation Organization
IMDG	International Maritime Dangerous Goods
IMO	International Maritime Organization
ISB	Industrial Safety Branch
JHA	Job Hazard Analysis
NASA	National Aeronautics and Space Administration
NIOSH	National Institute for Occupational Safety and Health

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NFPA National Fire Protection Association

NTP National Toxicology Program

NSSTC National Space Science Technology Center

OPSTRAK Hazardous Operations Tracking

OSHA Occupational Safety & Health Administration

Ph Potential Hydrogen

POC Point of Contact

PPE Personal Protective Equipment

S&MA Safety & Mission Assurance

SDS Safety Data Sheet

SHE Safety, Health, & Environmental

SHetrak Safety, Health and Environmental Issue Tracking database

SOP Standard Operating Procedure

TSRC Technical Specification for Repair and Construction

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APPENDIX C (Reserved for Verification Matrix)

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APPENDIX D RECORDS

The following records are maintained according to the “List of AS10 Environmental Records” located at: (<https://explornet.msfc.nasa.gov/community/msfc/office-of-center-operations/as10>).

- D.1 Personnel training records for civil service employees.
- D.2 Personnel training records for contractor employees.
- D.3 Compliance inspection and/or audit findings.
- D.4 MSFC Form 4582, Chemical Inventory Worksheet.
- D.5 Chemical Inventory Records.
- D.6 Alternate shipping point designation letter.

The following records are maintained according to the “List of AS10 Occupational Health Records” located at the following link: (<https://explornet.msfc.nasa.gov/community/msfc/office-of-center-operations/as10>).

- D.7 MSFC Form 4546, Reproductive Health Hazard Assessment.
- D.8 Personnel training records for civil service employees.
- D.9 Personnel training records for contractor employees.
- D.10 Personnel certification records.
- D.11 List of laboratories requiring Chemical Hygiene Plans and their Chemical Hygiene Officers.
- D.12 Proactive Procurement Request site:
<https://sharepoint.msfc.nasa.gov/sites/shared/proproc/SitePages/Home.aspx>

Input/Source forms (e.g., MSFC Form 4099, emails) are maintained per NRRS 2/15/B/1; destroy after the information has been entered into the database and verified.

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**APPENDIX E
CHEMICAL MOVE GUIDANCE**

These may be packed with...	These	Box Label
All mineral acids except hydrofluoric acid	All mineral acids except hydrofluoric acid	Mineral Acids
Hydrofluoric acid	Hydrofluoric Acid	Hydrofluoric Acid
Flammable non-reactive organic solvents such as xylene, toluene, n-butyl acetate, benzene, etc.	Flammable non-reactive organic solvents such as xylene, toluene, n-butyl acetate, benzene, etc.	Flammable Organics
Strong reducing agents that <u>ARE NOT</u> mineral acids	Strong reducing agents	Strong Reducing Agent
Strong oxidizing agents that <u>ARE NOT</u> mineral acids	Strong oxidizing agents	Strong Oxidizing Agent
Organic Acids	Organic Acids	Organic Acids
Non-Flammable, non-reactive materials	Other non-flammable, non-reactive materials	NFNR
Material that lists on the label as extremely toxic	Material listed as extremely toxic on label	Toxic
Shock sensitive, spontaneously combustible, air reactive, water reactive, or compounds capable of hazardous polymerization	DO NOT MOVE. NOTIFY EEOH and S&MA IMMEDIATELY FOR ASSESSMENT	As specified by EEOH

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**APPENDIX F
CHEMICAL STORAGE COMPATIBILITY**

These may be stored with...	These
All mineral acids except hydrofluoric acid	All mineral acids except hydrofluoric acid
Hydrofluoric acid	Hydrofluoric Acid
Flammable non-reactive organic solvents such as xylene, toluene, n-butyl acetate, benzene, etc.	Flammable non-reactive organic solvents such as xylene, toluene, n-butyl acetate, benzene, etc.
Strong reducing agents that <u>ARE NOT</u> mineral acids	Strong reducing agents
Strong oxidizing agents that <u>ARE NOT</u> mineral acids	Strong oxidizing agents
Organic Acids	Organic Acids
Non-Flammable, non-reactive materials	Other non-flammable, non-reactive materials
Material that lists on the label as extremely toxic	Material listed as extremely toxic on label
Shock sensitive, spontaneously combustible, air reactive, water reactive, or compounds capable of hazardous polymerization	NOTIFY EEOH and S&MA IMMEDIATELY FOR ASSESSMENT