

NIH Policy Manual

26101-16 - Management of Ultra-Low Temperature and Lab Grade Freezers and Refrigerators to Promote Energy Efficiency in Cold Storage for Biomedical Research

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Transmittal Notice

1. **Explanation of Material Transmitted:**

This chapter establishes the National Institutes of Health (NIH) policy for the selection, inventory, placement, and maintenance of Ultra-Low Temperature Freezers (ULTF), Laboratory Grade Freezers (LGF) and Laboratory Grade Refrigerators (LGR); and establishes procedures for the inspection of NIH facilities to ensure compliance with this policy. This revision has expanded the scope of the policy to include Lab Grade Freezers (LGF), Laboratory Grade Refrigerators (LGR), and Liquid Nitrogen (LN2) freezers. The policy originally applied to Ultra-Low Temperature Freezers (ULTF), capable of maintaining temperatures between -60°C and -90°C. Please see Appendix 4 for additional details.

2. **Filing Instructions:**

Remove: NIH Manual Chapter 26101-16, dated 07/01/2016

Insert: NIH Manual Chapter 26101-16, dated 09/08/2023

PLEASE NOTE: For information on:

- Content of this chapter, contact the issuing office listed above.
- NIH Policy Manual, contact the Division of Compliance Management, OMA on 301-496-4606, or enter this URL: <https://oma.od.nih.gov/DMS/Pages/Manual-Chapters.aspx>

A. Purpose

This policy ensures NIH is responding with energy conservation measures throughout its facilities. Improving the reliability and energy efficiency of ULTF, LGF, and LGR at NIH facilities will make a significant contribution.

This policy will promote freezers and refrigerator reliability and energy conservation by providing direction and guidance to ensure that ULTF, LGF, and LGR are managed effectively, thereby increasing freezer and refrigerator reliability, decreasing energy consumption, reducing Greenhouse Gas (GHG) emissions, reducing the cost of NIH cold storage, and preserving federal dollars for important medical research.

B. Scope

This Manual Chapter is applicable to all NIH owned or leased facilities.

C. Background

Federal laws including the Energy Policy Act of 2005, the Energy Independence and Security Act of 2007, the Energy Act of 2020, and Executive Orders, require all Federal agencies to promote energy efficiency and achieve targeted reductions in energy use.

Ultra-Low Temperature Freezers (ULTF), Laboratory Grade Freezers (LGF), and Laboratory Grade Refrigerators (LGR) are essential to support NIH mission-critical activities, providing cold storage to preserve materials related to research. When operated and maintained properly, with reliability and energy conservation in mind, ULTF, LGF, and LGR can play a significant role in reducing NIH energy use. Optimizing energy conservation begins with selecting Energy Star Certified freezers and refrigerators during acquisition. Other factors help too, including performing biannual cleaning and maintenance and placing freezers and refrigerators in well-ventilated and temperature-controlled areas without excessive foot traffic.

D. Policy

The NIH will preserve and protect the viability of research materials in cold storage in a reliable and energy efficient manner. This policy requires: (1) selection of energy-efficient ULTF, LGF, and LGR, with an Energy Star Certification, when acquiring new units consistent with Federal Acquisition Regulation 23.103; (2) Institutes, Centers, and Offices (ICOs) to list all ULTF, LGF, and LGR in the NIH Property System, and when no longer needed, disposed of according to property disposal requirements; (3) regular maintenance to be performed on all ULTF, LGF, and LGR; and (4) To the maximum extent practicable in coordination with the Office of Research Facilities Development and Operations (ORFDO), ULTFs, LGFs, and LGRs should be placed in areas that are adequately ventilated,

temperature controlled, and away from excessive foot-traffic. This policy also requires each ICO to designate a Cold Storage Coordinator as the Point of Contact (POC) for all information related to the ULTF, LGF, and LGR and to establish procedures for the inspection of NIH facilities to ensure compliance with this policy; to note deficiencies; and to remedy non-compliant occurrences.

E. Responsibilities

1. **The Office of Research Facilities Development and Operations (ORFDO)**, Office of Management (OM), Office of the Director (OD), NIH has overall responsibility for design, construction, operation, maintenance, renovation and decommissioning of NIH facilities.
 - a. **The Division of Environmental Protection (DEP), ORFDO** will:
 - i. Coordinate with Cold Storage Coordinators to schedule inspections, correct deficiencies, and relocate equipment.
 - ii. Conduct inspections of ULTF, LGF, and LGR for compliance with this policy.
 - iii. Develop and distribute reports which summarize the data collected during inspections and note non-compliance locations.
 - iv. Recommend mitigation to bring NIH facilities into compliance, including the assessment of non-compliance fees, and the removal of non-compliant ULTF, LGF, and LGR.
 - v. Map the location of ULTF, LGF, and LGR throughout the NIH, collaborate with the freezer owners and IC cold storage coordinator to identify those that are recommended for relocation and develop a plan to relocate these ULT freezers to more suitable locations, when it is possible to do so, without causing significant hardship.
 - vi. Maintain a link to the list of Energy Star Certified ULTF, LGF, and LGR available on the NIH Environmental Management System (NEMS) website. Energy Star Certification will be required in the acquisition of all new ULTF, LGF, and LGR.
 - vii. Inspect ULTF, LGF, and LGR within NIH facilities and alert owners of deficiencies identified and provide a timeline for corrections. ULTF, LGF, and LGR, with reported deficiencies, are subject to removal if not corrected.
 - b. **The Division of Technical Resources, ORFDO** will review the NIH Design Requirements Manual and make revisions as needed to support the provisions of this policy.
2. **The NIH Institutes and Centers (ICOs):**
 - a. **Scientific Directors** will assign the responsibilities of the IC Cold Storage Coordinator to a person within their IC.
 - b. **IC Cold Storage Coordinator** will:
 - i. Communicate the requirements of this policy to IC personnel.

- ii. Maintain accurate electronic records of ULTF, LGF, LGR, and LN2 freezers including the inventory, acquisitions, disposals, relocations, and maintenance records.
 - iii. Provide ULTF, LGF, LGR, and LN2 freezer records for the IC from the prior fiscal year to DEP, ORFDO during the month of October each year.
 - iv. Ensure all ULTF, LGF, LGR front sides of the unit have the “person of contact” affixed for an inspection or in the event of an emergency.
 - v. Collaborate with DEP, ORFDO on the location and scheduling of inspections, to support proper utilization of ULTFs, LGFs, and LGRs.
 - vi. Collaborate with DEP, ORFDO and freezer owners to correct ULTF, LGF, and LGR deficiencies identified during inspections.
- c. **IC staff, who operate freezers**, will follow the provisions of this policy in the selection, inventory, placement, maintenance, and disposal of ULTFs, LGFs and LGRs.
- d. **IC PCOs** will:
- i. Maintain an inventory of the ICs ULTF, LGF, and LGR to include the freezer make, model, NIH Business System (NBS) Property ID, freezer location; and identify if the freezer is a backup freezer. The freezer location will include a data field that states whether the freezer is in a freezer room, lab, hallway, equipment room or alcove.

F. Procedures

1. The ORFDO:

- i. Coordinate with Cold Storage Coordinators to schedule and conduct inspections of ULTF, LGF, and LGR for compliance with this policy using the three (3) stage escalation procedure shown below to report findings to IC leadership:
 - 1. Notify the IC Cold Storage Coordinator and freezer owner requesting deficiencies to be rectified within fourteen (14) days.
 - 2. If the deficiencies are not rectified within fourteen (14) days, the IC Cold Storage Coordinator and Principal Investigator will be contacted and requested to correct deficiencies within fourteen (14) days.
 - 3. If this is unsuccessful, the ORFDO Director will be contacted to request the IC Scientific Director to resolve the deficiencies.
- ii. Maintain accurate maps of the location of ULTFs, LGFs, and LGRs in NIH facilities.
- iii. Maintain the NEMS website to ensure all newly acquired ULTFs, LGFs, and LGRs are Energy Star Certified.

2. The NIH Institutes, Centers and Offices (ICOs):

- a. **Scientific Directors** will assign the responsibilities of the IC cold storage coordinator to a person within their IC within three (3) months of the effective date of this policy revision.
- b. **IC Cold Storage Coordinator will:**

- i. Ensure all personnel are familiar with the requirements of this policy revision.
 - ii. Keep accurate electronic records of the total life cycle of ULTFs, LGFs, LGRs, and LN2 freezers within the IC.
 - iii. Provide DEP, ORFDO a prior fiscal year summary of the ULTFs, LGFs, LGRs, and LN2 freezers within the inventory, the number of new acquisitions, those that were disposed of or relocated, and the maintenance records.
 - iv. Collaborate with DEP, ORFDO to schedule and correct ULTF, LGF, and LGR deficiencies cited during inspections in the timeframes prescribed herein.
 - v. Ensure ULTFs, LGFs, and LGRs are in program areas such as labs and freezer rooms, and not in corridors, lobbies, mechanical rooms, alcoves, elevator rooms, and other common spaces.
 - vi. At the Research Triangle Park (RTP) campus, the preference is to place ULTF in established designated hallway alcoves.
 - vii. Collaborate with DEP, ORFDO to identify ULTF, LGF, and LGR located in common spaces and to develop and implement plans to relocate these freezers to more suitable locations.
- c. **IC staff who operate freezers** will:
- i. Ensure they are familiar with and comply with the provisions of this policy in the acquisition, utilization, operations, and disposal of ULTFs, LGFs, and LGRs.
 - ii. Support increased freezer and refrigerator reliability, reduction in energy consumption, Greenhouse Gas (GHG) emissions, and operating costs by performing semiannual preventative maintenance on all ULTF and LGF located within NIH facilities, two (2) times each year, at intervals of approximately six (6) months. In general, this will include cleaning condenser filters, condenser fins and removing ice from the gasket and doors. Conducting regular preventative maintenance on LGR is recommended. See Appendix 3 for the ULTF, LGF, and LGR maintenance checklist.
 - iii. When storing chemicals in refrigerators and freezers, ICs must follow the NIH Office of Research Services (ORS), Division of Occupational Health and Safety (DOHS) requirements, including the NIH Chemical Safety Guide.
- d. **IC PCOs** will:
- i. Enter data for all ULTF, LGF, and LGR into NBS within ten (10) working days of receipt of equipment.
 - ii. Ensure that a barcode decal is affixed on the front of the accountable property so that it is visible to be scanned for inventory.

G. References

This policy was developed in accordance with current Executive Orders and the following Acts:

1. [ENERGY STAR Lab Grade Refrigerators and Freezers Final Specification:](#)
2. [FAR SUBPART 23-Sustainable Acquisition Policy:](#)
3. [Energy Policy Act of 2005:](#)
4. [Energy Independence and Security Act of 2007:](#)
5. [Energy Act of 2020](#)
6. [NIH Policy Manual, Chapter 26101-25-2 – Personal Property Management Guide:](#)
7. [NIH Environmental Management System \(NEMS\):](#)
8. [The NIH Chemical Safety Guide](#)

Appendix 1: Definitions

1. **Accountable Property:** Government owned personal property with an acquisition value of \$5,000 or more, or flagged as a sensitive item, that is recorded and tracked in the NIH Property System. All ULTF, LGF, and LGR are classified as sensitive, and are required to be included in the NIH Property System.
2. **Laboratory Grade Freezer (LGF):** A refrigerated cabinet that maintains temperatures between at or between 0°C and -50°C, and is used for the preservation of volatile reagents, biological specimens, and other research materials.
3. **Laboratory Grade Refrigerator (LGR):** A refrigeration cabinet used for storing non-volatile reagents and biological specimens at set point temperatures between 0°C and 12°C, typically marketed through laboratory equipment supply stores for laboratory or medical use.
4. **NIH Facility:** A facility owned, operated, or leased by the NIH.
5. **Ultra-Low Temperature Freezer (ULTF):** A refrigerated cabinet that can maintain set point storage temperatures between -60°C and -90°C, and is used for the preservation of volatile reagents, biological specimens, and other research materials.

Appendix 2: Acronym Glossary

Acronym	Definition
DEP	Division of Environmental Protection
DOHS	Division of Occupational Health and Safety
EO	Executive Order
GHG	Greenhouse Gas
IC	Institute and Center
LGF	Laboratory Grade Freezer
LGR	Laboratory Grade Refrigerator
LN2	Liquid Nitrogen Freezers

NBS	NIH Business System
NEMS	NIH Environmental Management System
OD	Office of the Director
OM	Office of Management
ORFDO	Office of Research Faculties Development and Operations
ORS	Office of Research Services
PCO	Property Custodial Officers
RTP	Research Triangle Park
ULTF	Ultra-Low Temperature Freezer

Appendix 3: ULTF, LGF and LGR Maintenance Checklist

1. **Check external components of the unit:**
 - a. Inspect the outside of the freezer or refrigerator, including the power cord and receptacles. Note deficiencies.
 - b. Listen for unusual sounds, such as: clicking, buzzing, or rattling. Note deficiencies.
 - c. Check the temperature setting and compare to the temperature reading on the display. Note discrepancies.
 - d. Clean or replace the condenser filter.
 - e. Clean condenser fins/coil, either by vacuuming, brushing, or washing with a cloth.
 - f. Inspect electrical wiring, components, and connections for signs of wear or overheating. Note deficiencies.
 - g. Check operation of components. Note deficiencies.
 - h. Ensure the door closes properly. Note deficiencies.
2. **If authorization to open laboratory refrigeration unit is provided during scheduled maintenance, then perform the following:**
 - a. Inspect gaskets. Note deficiencies.
 - b. Remove ice from gaskets and doors, and clean floor after removing ice.
 - c. Note the need for users to defrost freezers if ice buildup is evident.
3. **If refrigeration cabinet is empty, then perform the following:**
 - a. Investigate why freezer or refrigerator is empty and tag for follow up.

Appendix 4: Policy Updates

1. New ULTF, LGF, and LGR acquisitions must be Energy Star Certified.
2. All references to the Division of Scientific Equipment and Instrumentation Services (DSEIS) were removed.
3. ICs are now required to maintain an inventory of their ULTF, LGF, and LGR.
4. ULTF, LGF, and LGR are accountable property, be listed in the NBS property database, and have a POC for the refrigerator or freezer affixed to the front of the unit.

5. IC Scientific Director are now responsible for assigning an IC cold storage coordinator for all the information related to the ULTF, LGF, LGR and LN2 freezers within their IC.
6. The Office of Research Facilities Development and Operations (ORFDO), Division of Environmental Protection (DEP) is now responsible for scheduling inspections and relocations of ULTFs, LGFs, LGRs with the IC cold storage coordinator.
7. IC cold storage coordinators are required to share ULTF, LGF, LGR and LN2 freezer inventory and maintenance records with DEP.
8. ORFDO is now required to expand mapping efforts to include ULTF, LGF, and LGR and to work with IC cold storage coordinators to relocate ULTF, LGF, and LGR that are placed in locations that have insufficient cooling and/or ventilation.
9. Semiannual preventative maintenance requirements, to be performed for all LGF located within NIH facilities, twice per year, at intervals of approximately six (6) months, were added.
10. ORFDO is now required to inspect LGFs and LGRs.
11. A new NIH Division of Occupational Health and Safety (DOHS) requirement, for storing chemicals in refrigerators and freezers, was added.
12. The requirement for LGFs and LGRs to be disposed of in accordance with NIH property disposal requirements, was added.
13. Added Appendix 2 - Acronym Glossary.
14. Appendix 3 was expanded to include maintenance details for ULTFs, LGFs and LGRs.