

# Evaluation of Safety and Health Concerns in the U.S. Antarctic Program





# At a Glance

Evaluation of Safety and Health Concerns in the U.S. Antarctic Program  
OIG 25-03-001 | May 12, 2025

## WHY WE DID THIS EVALUATION

Through the United States Antarctic Program (USAP), NSF facilitates and manages scientific research that must be performed or is best performed, in Antarctica. Each year, about 700 people conduct scientific research at NSF's three research stations and about 2,500 people provide operational and logistical support. These individuals, known as USAP participants, include federal employees, grant recipients, military members, and contractors. Logistical support for the USAP is accomplished through the Antarctic Support Contract and other agreements.

Antarctica is one of the most hazardous environments on Earth. To help protect USAP participants, NSF provides safety expectations and guidance for activities in Antarctica through contract requirements and policy. The Antarctic Support Contractor (Contractor) also manages a safety and health program for all USAP participants. We conducted this evaluation to determine whether NSF monitored the Contractor compliance with occupational safety and health standards and instituted programs to provide safe and healthy working conditions for the USAP. We also evaluated specific complaints we received related to unsafe working and living conditions in McMurdo Station.

## WHAT WE FOUND

NSF monitors occupational safety and health for the USAP and the Contractor's safety program, as required. However, NSF and the Contractor could implement additional measures to enhance the safety and well-being of USAP participants. Specifically, we identified concerns related to central communications staffing, fire department staffing and equipment, and safety hazards in the food storage warehouse. We also found that some USAP participants feared retaliation for reporting safety concerns. NSF and Contractor have taken steps to improve safety and living conditions, such as updating its medical surveillance program, completing a fire staffing assessment, and responding to USAP participants' complaints about waste facilities and repairing dormitory bathroom facilities. NSF will also be transitioning to a new USAP support contract in 2026, which will provide an opportunity to include additional requirements in its future contract to enhance the safety and well-being of USAP participants.

## WHAT WE RECOMMEND

We made three recommendations to enhance the safety and well-being of USAP participants.

## AGENCY RESPONSE

NSF agreed with the recommendations. Please see Appendix C for NSF's response to the report.

## CONTACT US

For congressional, media, and general inquiries, email [OIGPublicAffairs@nsf.gov](mailto:OIGPublicAffairs@nsf.gov).



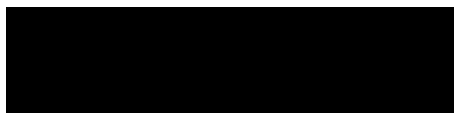
**U.S. NATIONAL SCIENCE FOUNDATION**  
**Office of Inspector General**

**MEMORANDUM**

**DATE:** May 12, 2025

**TO:** James McManus  
Acting Assistant Director  
Directorate for Geosciences

Jean Cottam Allen  
Acting Office Director  
Office of Polar Programs



**FROM:** Theresa S. Hull  
Assistant Inspector General for Audits, Inspections, and Evaluations

**SUBJECT:** Final Report No. 25-03-001, *Evaluation of Safety and Health Concerns in the U.S. Antarctic Program*

Attached is the final report on the subject evaluation. We have included NSF's response to the draft report as an appendix. NSF concurred with all of our recommendations. In accordance with Office of Management and Budget Circular A-50, please provide a written corrective action plan to address the report recommendations. The plan should detail specific actions and associated milestone dates. Please provide the plan within 60 calendar days.

We appreciate the courtesies and assistance NSF staff provided during the evaluation. If you have any questions, please contact Elizabeth Kearns, Director, at 703-292-7100 or [OIGPublicAffairs@nsf.gov](mailto:OIGPublicAffairs@nsf.gov).

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## Abbreviations

AIL	Antarctic Infrastructure and Logistics
AIMS	Antarctic Infrastructure and Modernization for Science
ARFF	Aircraft Rescue and Fire Fighting
DoD	U.S. Department of Defense
FY	fiscal year
NSF	U.S. National Science Foundation
OIG	Office of Inspector General
OPP	Office of Polar Programs
OSHA	Occupational Safety and Health Administration
PPE	personal protective equipment
SAHPR	Sexual Assault/Harassment Prevention and Response Report
SOH	Safety and Occupational Health
USAP	United States Antarctic Program

# Background

Through the United States Antarctic Program (USAP), NSF facilitates and manages scientific research that must be performed or is best performed, in Antarctica.<sup>1</sup> According to the USAP Participant Guide 2024-2025, research supported by NSF “... aims to expand fundamental knowledge of the Antarctic region, elicit the connection between Antarctica and the rest of the Earth, and leverage Antarctica as a unique research platform.”

Each year, the United States deploys about 700 people to Antarctica to perform scientific research and about 2,500 people to provide operational and logistical support. These individuals, known as USAP participants, include federal employees, grant recipients, contract employees, visitors, and military members. Most USAP participants are contractors or subcontractors supporting operations, science, and construction activities in Antarctica. NSF operates three permanent, year-round stations in Antarctica: McMurdo (where most USAP participants are located), Palmer, and Amundsen-Scott South Pole stations. McMurdo station (see Figure 1) is the largest; its population varying between 800 and 1,000 people during the austral summer season (October through February) and ranges from 120 to 200 individuals in the austral winter season (March to September). NSF also operates a research vessel and temporary field stations across the continent.

**Figure 1. McMurdo Station**



Source: NSF OIG

Logistical support for these stations is accomplished through the Antarctic Support Contract, which has been held by Leidos Innovations Corporation (Contractor) since fiscal year (FY) 2017, and other agreements. The Antarctic Support Contract, which expires in September 2026, is NSF's largest, valued at \$2.8 billion over nearly 15 years. In July 2024, NSF released a draft request for proposals for a new Antarctic Science and Engineering Support Contract.

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<sup>1</sup> At the time of our evaluation, Presidential Memorandum 6646 and Presidential Decision Directive/NSC-26 provided NSF with the authority and guidance to operate the USAP. On May 17, 2024, National Security Memorandum 23, *United States Policy on the Antarctic Region*, replaced Presidential Decision Directive/NSC-26.



The USAP supports research in some of the most hazardous environments on Earth. To help protect USAP participants from hazards, NSF provides safety expectations and guidance for activities in Antarctica through contract requirements and policy. In addition, the Contractor must develop, establish, and manage a safety and health program compliant with federal occupational and health standards for its employees and subcontractors.<sup>2</sup>

## Office of Polar Programs

The [Office of Polar Programs](#) (OPP) in NSF's Directorate for Geosciences, manages the USAP, and partners with various federal agencies to provide essential logistical support, such as the U.S. Department of Defense (DoD), which provides air transportation. Within OPP, the Antarctic Infrastructure and Logistics (AIL) Section is responsible for logistics, operational, and laboratory support in Antarctica. The AIL Section, with support from NSF's Division of Acquisition and Cooperative Support and Division of Administrative Services, monitors the Antarctic Support Contract.

OPP's Safety and Occupational Health (SOH) team guides safety and health activities for NSF-supported research in Antarctica and the Arctic. The SOH team monitors the Contractor's safety program for USAP and coordinates the physical qualification process, which determines whether a USAP candidate is physically qualified and psychologically adapted to work in Antarctica.<sup>3</sup>

## USAP Safety and Logistical Challenges

Antarctica's remote location and extreme environment present logistical challenges far beyond those typically encountered for domestic science operations. Antarctica is the highest, driest, coldest, windiest, and emptiest place on earth. At McMurdo Station, the temperature ranges from -58 degrees Fahrenheit (°F) to 46°F in the austral summer, with an average annual temperature of 0°F. The South Pole Station, at an elevation of about 9,300 feet, has an average monthly temperature range of -76°F to -18°F with an average annual temperature of -56°F. Everything needed to support human habitation and scientific research in Antarctica must be shipped or flown to the continent. Most activity at McMurdo and South Pole Stations occurs during the austral summer season (October through February); Palmer Station can be accessed by vessel year-round due to its milder climate.

Resource constraints such as limited hiring pools, lodging capacity, and continued reliance on aging infrastructure are exacerbated by the inherently difficult and dangerous working and living conditions. Though the USAP stations are equipped and staffed to provide routine medical care, capabilities are limited. Medical evacuations are complex, costly, and may be impossible for extended periods of time due to the weather.

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<sup>2</sup> The Occupational Safety and Health Administration (OSHA) has no extra-territorial jurisdiction; however, OSHA's regulations, which are outlined in 29 CFR Part 1910, *Occupational Safety and Health Standards*, provide the framework for USAP safety programs and extend to USAP operations through NSF policy and Antarctic Support Contract requirements.

<sup>3</sup> The physical qualification process is required by 45 CFR Part 675. In the case of a "not physically qualified" determination, NSF allows individuals, with their employer's endorsement, to apply for a waiver.

## Antarctic Infrastructure Modernization for Science (AIMS) Project

In 2012, the U.S. Antarctic Program Blue Ribbon Panel reported that the USAP suffered from an aging, deteriorating, and inefficient infrastructure.<sup>4</sup> To address the Panel's recommendations, NSF conducted long-term planning and sought approval for additional funding for the USAP, including the McMurdo Master Plan in 2013 (last revised in 2015) and the Antarctic Infrastructure Modernization for Science (AIMS) project.

The AIMS project construction began at McMurdo station in 2019 with an approved total project cost of approximately \$410 million. However, the AIMS project faced setbacks, including the onset of the COVID-19 pandemic, which required NSF to stop construction for 2 years and re-baseline the project. As a result, the AIMS project is now limited to two (Vehicle Equipment Operations Center and lodging) of its original six modules, with a revised total project cost of \$275 million for the two modules. To allow for the construction of the new AIMS lodging building, the demolition of three dormitory buildings began in 2019, prior to the COVID-19 pandemic, and was completed in 2022. As a result, the ongoing lodging building construction has created limited lodging capacity until construction is complete. The remaining four modules of the AIMS project will be considered for inclusion into NSF's Antarctic Infrastructure Recapitalization program, which NSF initiated in FY 2022 as a portfolio of investments in infrastructure across the USAP stations, including facilities, utilities, equipment, and vehicle fleet equipment.

## Evaluation Objective

In August 2022, NSF publicly released the Sexual Assault/Harassment Prevention and Response (SAHPR) Report, which it commissioned to examine the extent of sexual harassment and sexual assault in the USAP Community and identify corrective actions.<sup>5</sup> According to the report, "sexual assault, sexual harassment, and stalking are problems in the USAP community." In February 2023, an OIG team conducted on-site work at McMurdo Station to further evaluate risks related to sexual assault.<sup>6</sup> During this site visit, USAP participants shared substantial concerns and complaints about unsafe living and working conditions in McMurdo Station. We also received complaints about unsafe living and working conditions through the OIG hotline.

As a result of these complaints, we conducted an evaluation to determine whether NSF monitored the contractor's compliance with occupational safety and health standards and instituted programs to provide safe and healthy working conditions for the USAP. We also evaluated USAP participants' specific complaints we received related to unsafe working and living conditions in McMurdo Station. See Appendix A for information about our scope and methodology.

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<sup>4</sup> U.S. Antarctic Program Blue Ribbon Panel. 2012. *More and Better Science in Antarctica Through Increased Logistical Effectiveness*; See: [https://www.nsf.gov/geo/opp/usap\\_special\\_review/usap\\_brp/rpt/antarctica\\_07232012.pdf](https://www.nsf.gov/geo/opp/usap_special_review/usap_brp/rpt/antarctica_07232012.pdf)

<sup>5</sup> Department of the Interior's Federal Consulting Group, [NSF/OPP/USAP Sexual Assault/Harassment Prevention and Response \(SAHPR\) Final Report](#), June 22, 2022.

<sup>6</sup> While not the subject of this report, OIG investigators have been responding to allegations of sexual assault, sexual abuse, stalking, and other criminal activities occurring at USAP stations [REDACTED]. Additionally, NSF established the SAHPR program office to serve as NSF's central point of contact for the coordination of response to sexual assault, sexual harassment and stalking incidents and is responsible for overseeing comprehensive prevention practices.

# Results of Evaluation

NSF monitors the occupational safety and health for the USAP and the Contractor's safety program, as required. The Contractor has instituted a safety and health program encompassing policy, plans, procedures, training, and other safety activities. However, NSF and the Contractor could implement additional measures to enhance the safety and well-being of USAP participants. Specifically, we identified concerns related to central communications staffing, fire department staffing and equipment, and safety hazards in the food storage warehouse. We also found one other matter related to contractors experiencing fear of retaliation for reporting safety concerns.

NSF and the Antarctic Support Contractor have taken steps to improve safety and living conditions, such as finalizing medical surveillance procedures, completing a fire staffing assessment, responding to USAP participants' complaints about waste facilities and repairing dormitory bathroom facilities. NSF will also be transitioning to the next USAP support contract, the Antarctic Science and Engineering Support Contract, in 2026. This timing permits NSF to address concerns with its current Contractor and consider implementing additional requirements in its future contract to enhance the safety and well-being of USAP participants.

## NSF Monitors the Occupational Safety and Health for Polar Programs

Executive Order 12196, Occupational Safety and Health Programs for Federal Employees, requires that federal agencies maintain occupational safety and health programs and adhere to the *Occupational Safety and Health Act* ("the Act"). The Act requires employers to furnish employees places of employment free from recognized hazards that cause or are likely to cause death or serious physical harm. It also requires employers to comply with the standards outlined in 29 CFR Part 1910, *Occupational Safety and Health Standards*.

The Occupational Safety and Health Administration (OSHA), a federal agency within the U.S. Department of Labor responsible for enforcing workplace safety standards, does not have jurisdiction in Antarctica. However, OSHA's regulations (29 CFR Part 1910) provide the framework for USAP safety programs and extend to USAP operations through NSF policy and Antarctic Support Contract requirements. For example, in *OPP Safety and Occupational Health Policy*,<sup>7</sup> NSF states that the Act applies to all OPP employees and will be complied with in applicable workplaces. The policy provides OPP employees and the Contractor with the minimum safety standards that OPP expects to protect all program participants from hazards.

NSF requires the Contractor, through the Antarctic Support Contract, to comply with federal occupational safety and health standards, to develop and implement a comprehensive safety and health program to protect and promote employee safety. Additionally, *NSF's OPP Safety and*

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<sup>7</sup> NSF's *Office of Polar Programs Safety and Occupational Health Policy*, Version 5, dated September 2022, was in effect during our evaluation. In May 2024, OPP updated this policy and separated it into two volumes: Industrial Safety (Volume 1) and Health and Medical (Volume 2).



*Occupational Health Policy* requires the Contractor to comply with OSHA standards, as well as with National Fire Protection Association (NFPA) standards, local standards, the National Electric Code, and the International Building Code, among others. However, OPP recognizes it is not always feasible to comply with specific OSHA requirements "...due to conflicting circumstances, practices, laws, regulations, or other limitations" and requires in those cases that "a waiver/variance request shall be made to the OPP Safety Officer."

The SOH team meets with the Contractor's safety program officials regularly and monitors ongoing safety activities, such as the Contractor's injury and illness incident reporting program, which is required by OSHA. Additionally, the SOH team inspects USAP sites and activities to evaluate the Contractor's compliance with safety requirements<sup>8</sup> and to identify safety concerns or violations that should be remediated. For example, in FY 2024, the SOH team visited McMurdo and Palmer stations to assess the Contractor's safety program and reported its findings and recommendations. The SOH team monitors the Contractor's progress on taking corrective actions until completion. The SOH team also provides input to the Contracting Officer's Representative in the AIL Section, who is responsible for monitoring, evaluating and assessing the Contractor's performance.

## **The Contractor Established an Occupational Safety and Health Program for the USAP**

The Contractor developed, established, and managed a safety and health program to ensure compliance with contract safety requirements, OSHA standards, and the *OPP Safety and Occupational Health Policy*, as required. Specifically, the Contractor's program, as documented in its *Environmental, Safety and Health Plan*, encompasses policy, plans, procedures, training, injury and illness incident reporting, and other safety activities. The Contractor's program is intended to manage risk, reduce liability, maximize resources, and improve the general welfare, health, and safety of all participants. In 2024, the Contractor strengthened its safety program by finalizing procedures for medical surveillance. Additionally, the Contractor has indicated that it plans to improve its job hazard analysis program, which is an ongoing process to identify and assess occupational hazards and hazardous situations.

### **Medical Surveillance and Industrial Hygiene Programs**

According to OSHA, medical surveillance is the analysis of health information to look for problems that may be occurring in the workplace that require targeted prevention. OSHA requires employers to conduct medical surveillance to monitor its employees who are or may be exposed to hazards at or above the permissible exposure limits.<sup>9</sup> Medical surveillance involves medical examinations that provide baseline and periodic assessments or measurements to help detect abnormalities. Additionally, OSHA standards require employers to include a medical surveillance

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<sup>8</sup> USAP safety requirements include requirements in the contract, OSHA standards, and NSF's *OPP Safety and Occupational Health Policy*.

<sup>9</sup> 29 CFR Part 1910.120(f)(2)(i)

program in their written safety and health program for employees involved with hazardous waste operations.<sup>10</sup>

Though the Contractor had a medical surveillance program, it did not have this program documented in a written plan until 2023. In 2023, the Contractor documented its medical surveillance program after two individuals complained about abnormal blood test results they received as a result of the Contractor's routine medical surveillance examinations. The abnormal blood test results were related to heavy metals, which can negatively affect people's health at higher levels. NSF and the Contractor further reviewed the results and determined that the abnormal toxicology results were based on New Zealand's thresholds, which are more conservative than U.S. regulation levels.<sup>11</sup> The Contractor provided NSF with a draft plan in July 2023 and finalized its medical surveillance program plan with NSF's approval in February 2024. This plan will help ensure the Contractor's medical surveillance program has consistent sampling, analytical, and evaluation procedures.

As part of its efforts to document its medical surveillance program, the Contractor also worked to establish an industrial hygiene program in 2023. The draft industrial hygiene program procedures establish how the Contractor will assess and detect abnormalities in workers exposed to work-related health hazards. The Contractor has not finalized its industrial hygiene standard operating procedure as of March 2025. Implementing these procedures will help further identify potential health risks and determine the effectiveness of exposure prevention strategies.

The Contractor also analyzes job hazards to help identify, control, or eliminate task-specific dangers in the workplace. However, in our review of the 8 job hazard analyses for waste management and 23 for the fire department in McMurdo as of January 2024, only 1 had both supervisory and safety staff approval documented. In addition, 8 of 31 job hazard analyses reviewed were not in the Contractor's newer format, which was updated in September 2020. This occurred because instead of updating older job hazard analyses to the new format, the Contractor reviewed and updated the analyses as safety incidents occurred. The updated job hazard analysis form includes a risk assessment related to each hazard, including the probability of impact, the severity of impact, and the estimated risk reductions from implementing safety measures. The updated form also more thoroughly captures the personnel protective equipment that can be used to reduce job hazards and includes a section to review the job hazard analysis if a safety incident occurs.

The Contractor has indicated it plans to update older job hazard analyses to the newer format and ensure they are regularly reviewed. Additionally, the SOH team plans to review a sample of job hazard analyses for various functions as part of its inspections. According to OSHA, job hazard analyses should be periodically reviewed to ensure they remain current and identify any new hazards.

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<sup>10</sup> 29 CFR Part 1910.120(b)(1)(i)

<sup>11</sup> In its Medical Surveillance Program procedure, the Contractor's states "[s]amples taken in New Zealand or anywhere outside of the U.S. may be subject to local testing or regulatory interpretation regarding baseline levels."

# Evaluation of USAP Participants' Safety Concerns

USAP participants reported safety concerns to us during our site visits to McMurdo Station in February 2023 and October – November 2023, as well as through our hotline. These concerns generally fall under the Contractor's responsibilities for operating and maintaining Antarctic infrastructure.<sup>12</sup> Based on USAP participants' complaints and our observations, we identified the following areas of concern:

1. Central communications staffing levels
2. Fire department staffing levels
3. Age and condition of the airfield rescue and fire fighting equipment
4. Safety hazards in the frozen food warehouse

We also received complaints about waste facility conditions, dormitory occupancy levels, and food storage, as described in Appendix B. These complaints were either addressed by the Contractor during our evaluation and/or are part of broader USAP infrastructure issues.

In December 2024, we visited McMurdo Station as part of a separate audit of NSF's oversight of its USAP infrastructure, including fleet, facilities, and the AIMS construction project. We have included updates resulting from the site visit to the areas of concern below and in Appendix B.

## Area of Concern 1: Central Communications Staffing Levels

Operating 24 hours a day, 7 days a week, McMurdo Central Communications (also referred to as "Central Comms" or "dispatch") serves as the McMurdo station 911 emergency call center and supports the station and field communications. When fully staffed, dispatchers work in building 165 and have access to multiple workstations with individual radio systems. Central Comms must monitor at least 11 radio channels at all times and may monitor up to 17 channels.

Although the Antarctic Support Contract indicates the professional certifications required for dispatchers, it does not specify minimum staffing requirements. According to National Fire Protection Association standards for emergency services communications, there "should be a minimum of 2 qualified telecommunicators on duty and present in the communications center at all times."<sup>13</sup> However, Central Comms did not always have at least two dispatchers on duty during the 2023-2024 summer season.<sup>14</sup>

The Contractor approved eight dispatcher positions for the 2022-2023 summer season but just six positions for the 2023-2024 summer season. The dispatchers said the reduction in staff was attributed to a 20 percent funding cut across the USAP program. Although six dispatchers were approved for the 2023-2024 summer season, Central Comms only had four dispatchers at McMurdo Station for most of the season because one dispatcher was terminated and one was

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<sup>12</sup> OPP policy requires the Contractor to seek a waiver if it is unable to comply with safety standards or requirements.

<sup>13</sup> National Fire Protection Association 1225, Standard for Emergency Services Communications, 2022.

<sup>14</sup> In the winter season, Central Comms works from the firehouse and has only one dispatcher on duty at a time.

transferred to South Pole Station. With only four staff working 12-hour shifts, it is not possible to have at least two dispatchers on duty at a time. According to a dispatcher, four-day time shifts and four nighttime shifts per week only had one dispatcher working. When only one dispatcher is on duty, the dispatcher cannot leave the room, such as to use the bathroom, and cannot adequately cover all the radio transmissions. To help address this issue, Central Comms relocated to the firehouse for most of the 2023-2024 summer season so that on-duty firefighters could cover when a dispatcher needed to take a break. According to a dispatcher, there have also been instances in which off-duty, night-shift dispatchers had to come in to cover so an on-duty dispatcher could take a break.

When the dispatchers work out of the firehouse, they only have access to one workstation with one radio system instead of the four workstations and radio systems in building 165. This creates additional risk and the potential for missed calls and a delayed response. For instance, one dispatcher said radio traffic on one channel can easily be interrupted by another channel, and they are unable to mute a channel because they need to monitor all 17 channels. Missing radio calls or delaying emergency medical treatment, according to the Contractor's procedures, "could result in severe injury or loss of life."<sup>15</sup>

During our December 2024 site visit, Central Comms had six dispatchers at McMurdo Station, which allowed at least two dispatchers to be on duty at a time and use their regular workstations in building 165.

## **Area of Concern 2: Fire Department Staffing Levels**

The Antarctic Fire Department in McMurdo station provides emergency services within the station and Aircraft Rescue and Fire Fighting (ARFF) capabilities at the two airfields, which are located approximately 9 and 13 miles from the station. Fire is a serious threat in Antarctica, especially since shelter is critical to survival. Because of Antarctica's extremely dry and windy conditions, fires start easily and spread rapidly. Most fires are caused by carelessness, poor housekeeping, or faulty electrical or mechanical operations.

According to the Antarctic Support Contract, the Contractor must respond to fire and medical emergencies within three minutes in McMurdo station. Additionally, the Contractor must provide ARFF firefighting and rescue capabilities to support DoD-provided air transportation to and from Antarctica in accordance with DoD regulations. At least 8 firefighters are needed at each airfield when they are open for operations to meet minimum ARFF regulations for military flight operations.

According to National Fire Protection Association standards, the fire department "shall identify minimum crew staffing levels necessary to meet the deployment criteria to ensure that a sufficient number of members are assigned, on duty, and available to respond with each crew."<sup>16</sup>

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<sup>15</sup> Antarctic Support Contract for NSF OPP, *Central Communications: General Rules and Regulations*, OPS-SOP-0128, Version 8, October 2023.

<sup>16</sup> National Fire Protection Association 1710, *Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Career Fire Departments*.

However, the contract does not specify the number of firefighters that must be on-duty or available at any one time.

The Contractor completed a fire department staffing posture assessment for McMurdo station in September 2023 and identified the staffing levels needed for various response capabilities when supporting simultaneous airfield operations. The Contractor determined that it needs a minimum staffing level of 32 firefighters to support both airfields and maintain a defensive posture within the McMurdo station. A defensive posture means firefighters can only attempt to suppress a fire from outside the building, while an offensive posture means firefighters can suppress a fire inside a building. The Contractor determined that a minimum of 44 firefighters would be needed to maintain an offensive posture when both airfields are operating. Both airfields are open at the same time for more than a month at the beginning and end of the austral summer to support regular flight operations. When both airfields are operating, the fire department deploys firefighters to the airfield for 48-hour shifts.

However, the Contractor's posture assessment indicated that, on average, it had no more than 40 firefighters. Additionally, hiring "...was initially constrained by a limited hiring pool interested in contracts that are less than one year in duration. The initial recruiting challenge still exists and is, more recently, further impacted by budgetary and population constraints." Fire department staff told us that the physical qualification process, vetting process, and staff turnover also contributed to staffing challenges.

For the 2023-2024 austral summer, the Contractor planned a staffing level of 32 for the McMurdo Fire Department. However, it could not sustain that staffing level for the entire season due to resignations, terminations, and transfers to the South Pole station. Staffing peaked at 32 in October 2023 and fluctuated below that level between November 2023 and February 2024. As a result, the McMurdo Fire Department could not always ensure that a defensive posture was supported when it deployed firefighters to the station's two airfields during the 2023-2024 season. Additionally, when firefighters were deployed to the airfields, the Contractor's station leadership requested that McMurdo-based participants reduce any high-risk operational activity during these times due to "very limited fire department emergency response support."

For the 2024-2025 summer season, the McMurdo Fire Department had an approved staffing level of 42 firefighters. However, firefighters we interviewed during our December 2024 site visit said hiring challenges still exist and that staffing may only peak at 32 firefighters during the 2024-2025 summer season.

### **Area of Concern 3: Airfield Rescue and Fire Fighting Equipment**

The Contractor must provide ARFF capabilities to support DoD-provided air transportation to and from Antarctica in accordance with DoD regulations, see Figure 2. ARFF capabilities include qualified firefighters and equipment capable of carrying water and fire extinguishing chemicals in case of an aircraft fire or crash.



**Figure 2. U.S. Air Force C-17 Globemaster III, assigned to Joint Base Lewis-McChord, Washington, at Phoenix Airfield in McMurdo Station.**



Source: NSF OIG

The McMurdo Fire Department has 12 ARFF-related vehicles, including 4 trucks, 2 tracked vehicles, 1 tractor, 2 "Chieftain" trucks, and 3 ARFF sleds, see Figures 3a – 3d. Overall, these ARFF related vehicles and heavy equipment date from 1983 through 2010.<sup>17</sup>

**Figures 3a. and 3b. ARFF sleds at McMurdo Station**



Source: NSF OIG

**Figures 3c and 3d show two Chieftains in McMurdo station.**



Source: NSF OIG

<sup>17</sup> The McMurdo Fire Department also has two fire engines and two ambulances not listed as ARFF related equipment.

We received complaints about the age of vehicles and equipment used for airfield ARFF support. At the time of our inspection, all fire safety vehicles, ARFF equipment, and related heavy equipment in the USAP were over 12 years old. Other fire department vehicles, such as ambulances and fire engines, date to 2010 or earlier and some vehicles and heavy equipment are over 30 years old. However, the contract does not mandate when the ARFF equipment should be replaced. According to the Federal Aviation Administration, “an ARFF vehicle normally has a 10–12-year service life and, in many cases, even longer based on an airport’s level of activity.”<sup>18</sup> The Federal Aviation Administration provides guidance for determining replacement needs for ARFF vehicles to allow for the programmed replacement over a span of years.

The ARFF regulations do not prescribe the number of ARFF vehicles needed to support flight operations, but rather the minimum quantity of water and firefighting chemicals needed to execute rescue operations of an aircraft involved in a fire.<sup>19</sup> During our October 2023 site visit, we observed two ARFF sleds at the airfield. In January 2024, we were told that the station’s two “Chieftain” trucks, which hold water and firefighting chemicals, could not be used during the 2023–2024 season (see figures 3c and 3d).

NSF has identified the two Chieftain trucks, obtained in 1989 and 1991, and three ARFF sleds obtained in 2010 for replacement in FY 2025. Firefighters also have less assurance ARFF equipment will function properly if there is a plane crash because environmental regulations prohibit releasing fire suppressing chemicals into the environment for testing purposes. Additionally, the aged vehicles require more maintenance and may be difficult and expensive to repair. For example, according to the FY 2025 Antarctic Support Contract project recommendation for replacing the two Chieftains and ARFF sleds, “[t]he Chieftains and ARFF Sleds have high operating costs...Separate powered vehicles are required to move the cumbersome ARFF Sleds, which drives additional operating costs and maintenance labor hours.” The proposal also states that failing to procure new Chieftains and ARFF Sleds “will hinder adequate firefighting response to aircraft emergencies at all McMurdo Station airfields.”

During our December 2024 site visit, we followed up on the fire department’s vehicles and ARFF equipment status. The two chieftains remain out of service. A firefighter told us that although one chieftain could be salvaged, it was low on the vehicle maintenance priority list. Additionally, the heavy equipment vehicles the firefighters typically use to pull the ARFF sleds have not been available. As a result, firefighters pull the sleds with an overpowered tractor, risking damage to the sleds. Furthermore, firefighters use one tractor to pull two sleds, which a firefighter explained does not permit the ideal placement of the sleds on the airfield when providing ARFF support for flight operations.

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<sup>18</sup> U.S. Department of Transportation, Federal Aviation Administration, Advisory Circular, *Guide Specification for Aircraft Rescue and Fire Fighting (ARFF) Vehicles*, June 2011

<sup>19</sup> [Air Mobility Command Instruction 11-208, February 8, 2017](#)

## Area of Concern 4: Safety Hazards in the Frozen Food Warehouse

During our site visit in October 2023, we observed a significant slip hazard near a rear exit door in McMurdo station's frozen food warehouse (see Figures 4a, 4b, and 4c). Specifically, the freezer unit in the warehouse leaked, and the resulting dripping water froze, which created a large ice fall and slipping hazard.

**Figure 4a. Leaking condenser; 4b Ice fall; 4c. Frozen Food Warehouse at McMurdo**



Source: NSF OIG

Participants also reported difficulty using the fall protection equipment when accessing higher shelves in the frozen food warehouse; see Figure 6c. Participants wear self-retracting lanyards as part of the system intended to protect them from falling when climbing food crates to access certain products. Participants said the system was difficult to use because the lanyards could get caught on brackets, and the system sometimes became inoperable. In its full site visit report provided to us in January 2024, the SOH team identified the fall protection concerns in the frozen food warehouse. However, in December 2024, we confirmed the ice fall remains an issue and were told that the fall protection equipment had not been improved.

## Other Matter: Retaliation Concerns

According to the *USAP Participant Guide*, USAP participants must put safety and environmental protection first while living and working in Antarctica. USAP participants are encouraged to speak up if they observe an unsafe condition or practice by immediately notifying “affected personnel and the responsible supervisor or relevant leadership.” If, after notification, a participant believes the condition is “not being mitigated or addressed” they “may file a confidential complaint with the NSF Safety Officer directly by email at [oppsafety@nsf.gov](mailto:oppsafety@nsf.gov).” The USAP Participant Guide further states that “no retribution shall be taken” against any participant “who reports an unmitigated hazard, unsafe condition, or unsafe practice.”

However, current and former contractors and subcontractors we interviewed expressed concerns about retaliation for reporting safety issues — e.g., not receiving a contract for the following season (many USAP contractors and subcontractors who work in Antarctica do so on a seasonal/contractual basis). Of the 35 people we interviewed, 10 (29 percent) said they either feared retaliation, had experienced retaliation or threats of retaliation personally, or were aware of others who had experienced retaliation or threats.



# Recommendations

We recommend that Acting Office Director, Office of Polar Programs:

1. Consider including requirements in the Antarctic Science and Engineering Support Contract for minimum contractor staffing levels for critical program areas such as Central Communications and the Fire Department needed to meet minimum safety standards.
2. Consider requiring a replacement schedule for Aircraft Rescue and Fire Fighting vehicles and equipment according to Federal Aviation Administration guidance in the Antarctic Science and Engineering Support Contract.
3. Ensure the Antarctic Support Contractor takes corrective action related to the food storage occupational hazards identified in this report.

## OIG Evaluation of Agency Response

NSF agreed with our findings and recommendations. NSF stated it has taken steps to advance recommendation implementation, including executing an agreement to acquire new Aircraft Rescue and Fire Fighting vehicles. NSF also affirmed its commitment to our shared goal of maintaining a safe and healthy working environment for USAP.

# Appendix A: Objective, Scope, and Methodology

## Objective

Our objective was to determine whether NSF monitored its Contractor compliance with occupational safety and health standards and instituted programs to provide safe and healthy working conditions for the USAP. We also evaluated specific complaints we received related to unsafe working and living conditions in McMurdo Station.

## Scope and Methodology

We conducted this evaluation from August 2023 to March 2025, including follow up onsite at McMurdo Station in December 2024, in accordance with the *Quality Standards for Inspection and Evaluation* issued by the Council of the Inspectors General on Integrity and Efficiency. Those standards require that evidence must sufficiently and appropriately support evaluation findings and provide a reasonable basis for conclusions. We believe the evidence obtained provides a reasonable basis for our findings, conclusions, and recommendations.

As part of assessing the USAP safety-related complaints during NSF OIG's on-site visits and the OIG Hotline, we:

- Gained an understanding of the responsibilities and requirements of NSF, OPP, and the Contractor for ensuring occupational safety and health in USAP.
- Reviewed contractual agreements between NSF and its Contractor and the Contractor's contractual agreements with its subcontractors.
- Reviewed NSF and Contractor safety policies, plans, and procedures pertaining to the USAP.
- Reviewed numerous concerns raised by USAP participants in calendar year 2023.
- Planned and conducted a site visit to McMurdo station in Antarctica in October and November 2023.
- Interviewed OPP officials, contractors, and subcontractors, including 35 USAP participants in McMurdo as part of interviews and during OIG office hours open to USAP participants.
- Conducted walk-throughs and observed fire, food service, and waste management facilities. We also met with contractors supporting other areas of USAP operations at McMurdo station.
- Requested and reviewed supporting documentation when applicable.

Based on the evaluation work conducted, we validated numerous concerns and identified areas for strengthening USAP safety and operations. We did not rely on computer-processed data for our evaluation.



# Appendix B: Other USAP Participant Concerns

## Waste Facility Conditions

Waste disposal and management are essential to meeting [Antarctic Treaty](#) requirements and minimizing operations' impact on the Antarctic environment. McMurdo station's refuse is collected, sorted, and prepared for shipment off the continent in waste facilities known as "waste barns." Operations conducted in the "solid waste barn" (see Figure 5) consist of collecting waste and processing and segregating items into categories to maximize recycling and minimize landfill disposal. Hazardous waste requires special handling and must be processed at a separate facility.

**Figure 5. Solid waste barn at McMurdo station.**



Source: NSF OIG

The solid waste barn was built in 1973, and an Antarctic Support Contract facilities condition assessment from 2014 described it as in "poor condition and past its useful lifespan." Although the solid and hazardous waste barns were identified for replacement in the 2015 McMurdo Master Plan, these projects have not been realized, and there are no immediate plans for constructing new waste facilities. According to the Contractor, no other facilities at McMurdo Station are suitable for solid waste management.

## Waste Barn Conditions

We received numerous complaints related to the waste facilities including:

- lack of potable and running water;
- lack of an operable eye washing station (see Figure 6a);
- unusable and clogged sinks (see Figure 6b);
- poor condition of outhouse, including that it was unsanitary, unheated, and for liquids only (see Figure 6c);
- holes and leaks in the roof leading to slippery floors (see Figure 7a);
- poor lighting (see Figure 7b);
- steel floor plates popping up and creating a trip hazard;

- broken and leaking furnace;
- boots not provided to employees of the waste facilities; and
- waste facility truck in disrepair.

**Figures 6a. Eye wash station; 6b. Sink in Warm Up Shack; 6c. Outhouse with space heater**



Source: NSF OIG Hotline complaint from April 2023

**Figures 7a. Hole in the solid waste barn ceiling; 7b. Solid waste barn lighting**



Source: NSF OIG Hotline complaint from April 2023

Neither waste facility has running water, and subcontractors must transport potable water, which they said requires labor to haul and is time-consuming. The solid waste facility has a sink that uses a water tank; however, it was clogged during our February 2023 site visit. The hazardous waste facility employees wear gloves when processing hazardous waste and use a handwashing station with a pump to wash their hands. In the event of contamination, there is an emergency shower inside the hazardous waste facility.

The solid waste barn outhouse, likely installed over 20 years ago, included a heat trace to prevent the urine line from freezing, as well as a potentially hazardous space-heater. Although the heat



trace was compliant with the fire code, it caused a fire in September 2022 when pallets placed on the floor in the outhouse pinched the heat trace cord and created an electrical short.

After we shared the solid waste barn complaints with NSF, the Contractor took immediate steps to address some of the concerns, such as installing a new eye wash station, repairing the ceiling and insulation, and improving lighting. In its July 2023 response to the waste barn complaints, the Contractor stated that the space-heater was not compliant with the fire code due to the presence of flammable materials (i.e. wood) and was thus removed. The Contractor later added another outhouse, reportedly a week before our October 2023 site visit.

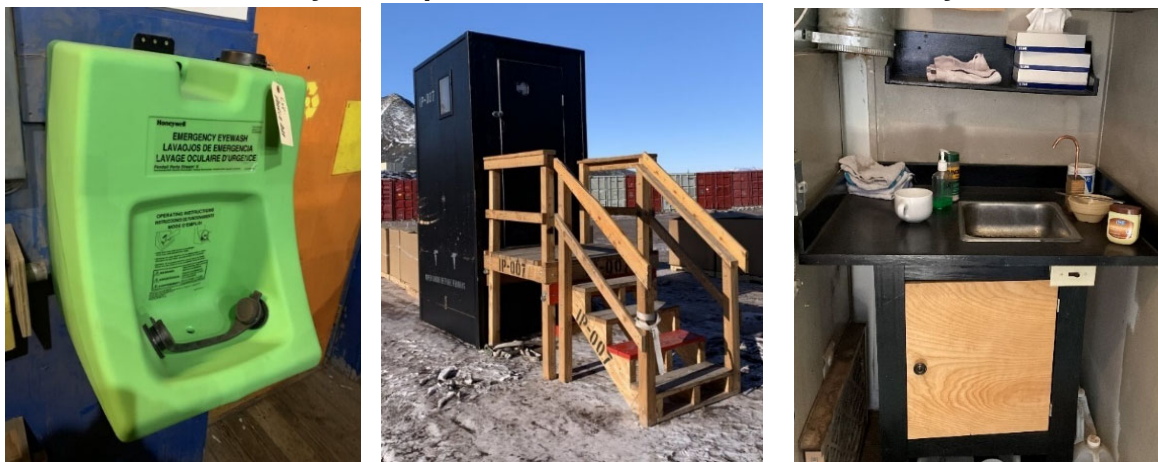
We observed these repairs and the additional outhouse during our October 2023 site visit, see Figures 8a, 8b, 8c, 9a, 9b, and 9c. However, according to the Contractor, some improvements such as plumbing for bathrooms and sinks are impossible in the current facility due to McMurdo's infrastructure limitations. Also, although the floors had been repaired by October 2023, they will likely continue to pop up because the material is inappropriate for the Antarctic climate. The aged furnace also requires constant maintenance.

**Figures 8a. Improved lighting in solid waste facility; 8b and 8c. Repaired ceiling**



Source: NSF OIG

**Figures 9a. New eye wash station in the solid waste facility; 9b. additional outhouse behind the solid waste facility; 9c. replaced sink in the solid waste facility**



Source: NSF OIG

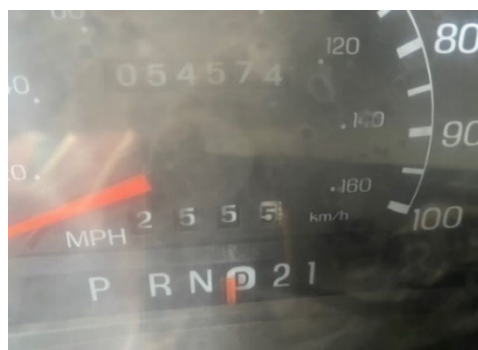
## Concerns with Safety-toe Boots

Safety-toe boots, a type of personal protective equipment (PPE), are required for various waste barn duties. According to the Antarctic Support Contract, the “Contractor shall stock and provide” PPE. However, the waste processing subcontract only requires the subcontractor to “coordinate” PPE for their employees versus supplying or providing PPE. Neither the Contractor nor the subcontractor provided safety-toe boots to the waste barn employees. As a result, solid and hazardous waste barn subcontractors provided their own safety-toe boots. In addition, neither the contract, subcontract, USAP PPE procedures, nor OPP’s *Safety and Occupational Health Policy* provided guidance on the type of safety toe boots appropriate for Antarctica. The type of safety toe boot is an important consideration because composite toe boots may be better suited for Antarctica than steel toe boots. For example, in April 2023, a waste barn employee who was wearing steel toe boots received medical treatment for frost nip on their toes after working outside. Regarding this incident, the NSF Occupational Safety and Health manager said steel toe boots are not conducive to a cold environment and not recommended for use in Antarctica.

## Concerns with Waste Facilities Truck

During our October 2023 site visit, waste facility subcontractors reported that the vehicle they use for their operations was in disrepair and could cause an accident. Specifically, the gear shift display did not work and thus the driver needed to count and remember each shift to determine which gear was engaged. They also told us the vehicle, which was acquired in 1999, was not on the list of high priorities and was part of a broader challenge of keeping up with the maintenance on vehicles “multiple decades” past their useful life. We shared these concerns with NSF, and subsequently, the vehicle was repaired to display the correct gear; see Figures 10a and 10b.

**Figures 10a. Waste management truck; 10b. Repaired gear shift display**



Source: NSF OIG

During our December 2024 site visit, we visited the solid and hazardous waste facilities. We observed the sink and outhouse at the solid waste facility, which were both reportedly operational. At the hazardous waste facility, the toilet in the bathroom facility onsite was out of service. We also observed Truck 147 working and displaying the correct gear.

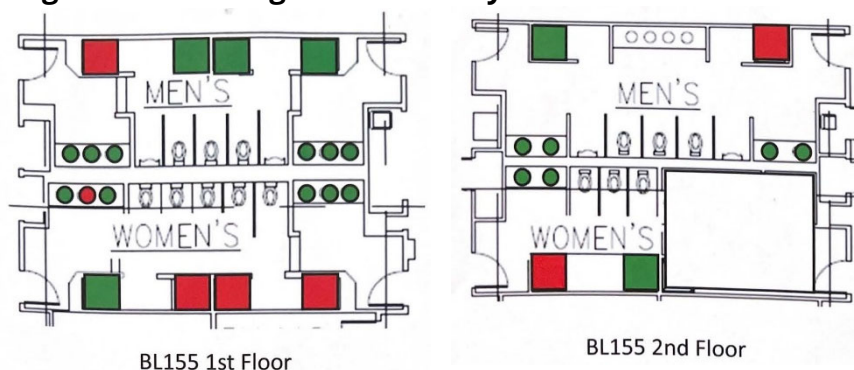
## Dormitory Occupancy Levels in McMurdo Station

As part of the AIMS project, the Contractor completed the demolition of three dormitory buildings in 2022 to make way for a new lodging building, which is scheduled to open for occupancy in 2026. This has resulted in a shortage of bed space in McMurdo Station, with some dormitory rooms having 5 occupants instead of the usual 4 during peak population in the austral summer. According to the *OPP Safety and Occupational Health Policy*, when it is not feasible to comply with a specific safety and health requirement due to conflicting circumstances, practices, laws, regulations, or other limitations, the OPP Safety Officer must approve a waiver/variance request. The OPP Safety Officer waived the occupancy limits for some of its dormitory buildings, including the dormitory in building 155 for the 2022–2023 and 2023–2024 summer seasons.

USAP participants questioned if the dormitory exceeded the occupancy levels allowable under building and fire codes. NSF reviewed the occupancy complaint and determined that the building met the USAP Building Code<sup>20</sup> and National Fire Protection Association standards for egress, meaning occupants could safely exit the building in the event of an emergency.

The USAP Building Code also specifies the number of toilets and bathing facilities required for male and female occupants. The OPP Safety Officer approved the safety waiver for building 155 for safety waiver for building 155 for 2022–2023 and 2023–2024 summer seasons because the building did not have the required bathroom facilities to meet USAP Building Code requirements at the higher occupancy levels. However, due to electrical problems, fewer sinks and showers were available than planned when the occupancy waiver was approved for the 2023-2024 season. In October 2023, a USAP participant raised concerns about the limited availability of bathroom facilities, which negatively affected the dormitory residents' quality of life, especially for employees that work with fuel. During our October 2023 site visit, only one shower was available in the women's bathrooms on each floor in the dormitory in building 155. Shower stalls were also limited in the men's bathrooms and a sink was not operational in the women's bathroom. Figure 11 depicts the showers and sinks that were operable (green) and inoperable (red) in September 2023.

**Figure 11. Building 155 Dormitory Bathrooms**



Source: USAP Participant

<sup>20</sup> NSF has adopted the International Building Code and International Existing Building for USAP.



During our site visit in October 2023, the facilities subcontractor was actively working to resolve the electrical problems, and NSF was aware of the ongoing repairs. In January 2024, we confirmed that the bathroom facilities were repaired and operable.

During our December 2024 site visit, we followed up on the status of building 155's bathrooms and learned that, as of our visit, there had not been any prolonged sink or shower outages during the 2024-2025 season.

## **Food Storage**

According to the Antarctic Support Contract, a subcontractor must produce high-quality food and follow U.S. food industry standards for food storage, preparation, and meal service to prevent foodborne illness. We received numerous complaints about "expired" food at McMurdo station. However, federal regulations do not require expiration dates on food, except for baby formula,<sup>21</sup> and use-by dates are generally a marker for peak quality and freshness rather than an indicator of food safety. According to the U.S. Department of Agriculture Food Safety and Inspection Service, food frozen at zero degrees Fahrenheit stays safe almost indefinitely. We did not identify any recorded cases of foodborne illness outbreaks at McMurdo station.

## **Food Inventory Management**

According to NSF, in 2017 or 2018, a "significant" supply of "old food" was identified in an outside snow berm storage area at the South Pole station, where the Contractor told us food was historically stored. The Contractor moved some of the food from the snow berm storage (see Figure 12a) to its indoor, underground logistical arch storage (see Figure 12b) at the South Pole, where it is more accessible, as well as to McMurdo station, to use or dispose of as needed. The Contractor created depletion plans to help ensure it uses the older food inventories at McMurdo and South Pole stations in FY 2024 and is considering using new inventory management software to increase efficiency.

The Contractor noted that multiple factors have led to the volume of old food, including ordering too much food due to not correctly assessing the food inventory, miscalculating projections of food consumption and expected station populations, entering incorrect quantities for orders, and underutilizing food. The Contractor noted that "first in, first out" plans are currently being used at both McMurdo and South Pole to the greatest extent possible to prevent future overages.

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<sup>21</sup> The U.S. Food and Drug Administration requires a "use by" date on infant formula. The U.S. Department of Agriculture does not require quality or food safety date labels for products under its purview.

**Figure 12a. South Pole Station snow berm storage; 12b. Underground logistical arch storage**



Source: NSF OPP; Instagram @TodayatSouthPole

NSF does not consider the size of the food storage facilities in McMurdo station ideal for the existing population nor adequate for the anticipated population increase once the new lodging building is complete. Replacement of the McMurdo food storage facilities was included in the McMurdo Master Plan, but the Central Services facility that would have stored food was not included in the remaining AIMS project. NSF told us it will continue to rely on the existing food storage facilities and add temporary food storage containers when the population increases.

During our December 2024 site visit, we followed up with the personnel responsible for food inventory management who noted no changes and noted the Contractor has not implemented a new inventory management software as previously considered.

# Appendix C: Agency Response



U.S. National Science Foundation  
Directorate for Geosciences

DATE: April 9, 2025

TO: Theresa S. Hull, Assistant Inspector General, Office of Audits, Evaluations, and Inspections, NSF Office of Inspector General (OIG)

FROM: Dr. James McManus, Acting Assistant Director, Directorate for Geosciences, NSF  
Dr. Jean Cottam Allen, Acting Director, Office of Polar Programs, NSF

SUBJECT: NSF's Response to the OIG's Official Draft Report, *Evaluation of Safety and Health Concerns in the U.S. Antarctic Program*

JAMES  
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Date:  
2025.04.11  
10:09:31  
-0400'

NSF appreciates the opportunity to review and provide comments to the OIG's draft report for its Evaluation of Safety and Health Concerns in the U.S. Antarctic Program (USAP). As stated in the OIG's draft report, there have been improvements to USAP health and safety in the areas of medical surveillance, assessment of staffing, and facility repair.

NSF agrees with the three recommendations arising from the OIG's evaluation. Correspondingly, we have already taken steps to advance their implementation, including executing an agreement for the acquisition of new Aircraft Rescue and Fire Fighting vehicles. We look forward to receiving the final report and finalizing a corrective action plan to fully and timely address the recommendations.

NSF acknowledges the OIG's consideration of NSF's oversight processes to inform its evaluation, which we view as resulting in constructive, actionable recommendations to help improve USAP health and safety. NSF remains steadfast in its commitment to our shared goal of maintaining a safe and healthy working environment for USAP.

2415 Eisenhower Avenue | Alexandria, VA 22314

# National Defense Authorization Act General Notification

Pursuant to Pub. L. No. 117-263 § 5274, business entities and non-governmental organizations specifically identified in this report have 30 days from the date of report publication to review this report and submit a written response to NSF OIG that clarifies or provides additional context for each instance within the report in which the business entity or non-governmental organizations is specifically identified. Responses that conform to the requirements set forth in the statute will be attached to the final, published report.

If you find your business entity or non-governmental organization was specifically identified in this report and wish to submit comments under the above-referenced statute, please send your response within 30 days of the publication date of this report to [OIGPL117-263@nsf.gov](mailto:OIGPL117-263@nsf.gov), no later than June 14, 2025. We request that comments be in .pdf format, be free from any proprietary or otherwise sensitive information, and not exceed two pages. Please note, a response that does not satisfy the purpose set forth by the statute will not be attached to the final report.

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## Contact Us

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**Freedom of Information Act inquiries:** [FOIAOIG@nsf.gov](mailto:FOIAOIG@nsf.gov)

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- Anonymous Hotline: 1-800-428-2189
- Mail: 2415 Eisenhower Avenue, Alexandria, VA 22314 ATTN: OIG HOTLINE

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