

**Audit of the Occupational Health &
Safety and Medical Programs in
the United States Antarctic Program**

**National Science Foundation
Office of Inspector General**

**March 17, 2003
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Executive Summary

Purpose

This report provides the results of our audit of the occupational health & safety and medical programs in the United States Antarctic Program (USAP) instituted by the USAP contractor, Raytheon Polar Services Company (Raytheon). The purpose of our audit was to determine if the policies, procedures, and performance of Raytheon’s occupational health and safety, and medical programs ensure the overall health and safety of USAP participants, and comply with National Science Foundation (NSF) guidelines. Where relevant, we also assessed the effectiveness of NSF’s oversight and support of its contract with Raytheon.

Background

The USAP is the United States’ national program for scientific research and geopolitical presence in Antarctica. The USAP is funded and managed by the NSF through its Office of Polar Programs (OPP). The main logistical and operational support contractor for the USAP is Raytheon. As part of its contract with NSF, Raytheon is responsible for maintaining a medical program, which includes medical screening of personnel deploying to Antarctica, and staffing and operation of medical clinics at the three U.S. research bases on the Antarctic continent and aboard the two NSF research vessels that support the USAP. Raytheon is also responsible for providing an occupational health and safety program.

Results in Brief

Overall, we found that Raytheon’s medical and occupational health and safety programs do protect the overall health and safety of the USAP participants. Raytheon’s medical program has effective guidelines, policies and procedures in place to provide oversight and guidance for healthcare delivery to a medically screened population in Antarctica. The guidelines are effective in screening and qualifying candidates for participation in the USAP, and for delivering routine and emergency healthcare in this remote environment.

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Likewise, the occupational health and safety program ensures a generally safe and healthful work environment free of recognized hazards. Raytheon has demonstrated a strong commitment to improving and maintaining the health and safety and medical programs, and NSF's review and oversight help to ensure the continuing quality of these programs.

We noted, however, several opportunities for NSF and Raytheon to further enhance the quality of its programs to protect the health and safety of USAP participants. These include:

- Developing a life-cycle oriented capital asset management program for the Antarctic research stations and funding such a program as a dedicated line item in its Research and Related Activities (R&RA) budget request;
- Developing and implementing a formal work center assessment program to identify hazards and conditions that contribute to musculoskeletal injuries at specific work centers; and
- Developing procedures for overseeing the shipboard medical programs on the *R/V Nathaniel B. Palmer* and the *R/V Laurence M. Gould*, and ensuring Raytheon's compliance with its contractual responsibility to provide emergency medical technicians (EMT) on board the *Palmer* and *Gould*.

Additionally, in the Other Considerations section of the report, we note a few areas where Raytheon and NSF have made some improvements, but continued attention or follow up is desirable.

Agency Response

NSF generally agreed with the recommendations addressing hazards leading to musculoskeletal injuries and improving shipboard medical programs. However, NSF disagreed with the recommendation to improve its capital asset planning and management, and to create a separate budget line item to fund improvements, replacements and maintenance of Antarctic infrastructure and facilities.

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In its comments, NSF suggests that its current processes to plan for the infrastructure needs of its Antarctic research stations are adequate and cites its successes in completing various infrastructure initiatives. While we agree that NSF has done extensive planning for the development of facilities and infrastructure in Antarctica, our recommendation addresses a part of NSF's planning process where improvements are needed, namely the development of a life cycle oriented capital asset management program. By periodically and formally evaluating the performance of its assets throughout the assets' life cycles, NSF will be able to strategically plan for and timely justify budgets to fund modifications, improvements, and maintenance of these remotely located assets. In so doing, NSF will minimize having to defer maintenance and improvements that may affect the health and safety of USAP participants.

Further, although advisory panels have made similar recommendations in the past, NSF does not believe it necessary to create a separate line item in its budget to fund a capital asset management program. NSF contends that such a separate line item would restrict its ability to respond to unexpected changes in the needs of the Antarctic program.

However, we are not suggesting a separate appropriation to fund the infrastructure costs that would limit NSF's flexibility. Rather, we are recommending that NSF recognize and budget for, within the Research and Related Activities appropriation, funds specifically designated for infrastructure projects. As circumstances arise that require redirecting funds to science or emerging situations, NSF can consciously make those decisions and readily justify the decisions to external parties. Therefore, establishing a line item within the same appropriation will allow NSF to retain the flexibility it desires to move funds to other needs as unexpected circumstances arise, but still provide for recognizing and tracking the effects of those decisions on infrastructure activities. It will also help support future budget requests for funds to address the projects that had to be deferred.

We have included NSF's complete written response to the findings and recommendations, in its entirety, as Appendix A to this report.

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Acronyms

NSF	National Science Foundation
OPP	Office of Polar Programs
USAP	United States Antarctic Program
R/V	Research Vessel
OSHA	Occupational Safety and Health Administration (or Act)
OMB	Office of Management and Budget
R&RA	Research & Related Activities
FEMC	Facility Engineering, Maintenance and Construction

Background

The United States Antarctic Program

The United States Antarctic Program (USAP) is the United States' national program for scientific research and geopolitical presence in Antarctica, the world's seventh and southernmost continent. Through this program, the United States maintains a presence in Antarctica, funding and supporting the conduct of research and activities in all major scientific disciplines. This presence includes year round occupation of the South Pole and the two coastal stations, McMurdo and Palmer, as well as full logistical support for the approximately 1,300 program participants working in Antarctica, including more than 650 scientists. The National Science Foundation (NSF), through its Office of Polar Programs (OPP), funds and manages the USAP.

In addition to funding and supporting a diversified science program, NSF coordinates the resources of other government agencies providing operational support to the USAP. It also acquires and manages commercial contractors who support the science program, and operate and maintain U.S. Antarctic facilities. In terms of dollars, the USAP is one of the largest single projects funded by NSF. For fiscal year 2003, NSF has requested a budget of just under \$240 million for the USAP out of a total budget request for OPP of just under \$304 million.

The USAP maintains three year-round research stations on the Antarctic continent – McMurdo, South Pole and Palmer, as well as a number of summer-season field camps used by McMurdo-based researchers. McMurdo, the USAP's logistical hub, is the largest of the three stations and is located on Ross Island, where monthly mean temperatures range from minus 3 degrees Centigrade in January to minus 28 degrees Centigrade in August. Approximately 1,100 contractors, staff, and researchers make up McMurdo's summer population; in the winter, the population drops to approximately 265. OPP schedules air transport between New Zealand and McMurdo several times per week during the austral summer months, early October through late February. Winter flights are provided in August, and are feasible throughout the rest of the winter, weather permitting, and if absolutely necessary. From McMurdo, participants are able to access the other stations and camps in the Antarctic.

Background

Research at McMurdo includes marine and terrestrial biology, biomedicine, geology and geophysics, meteorology, and glaciology and glacial geology. Amundsen-Scott South Pole Station is the next largest of the three stations and is located at the geographic South Pole. Monthly mean temperatures at South Pole range from minus 28 degrees Centigrade in December to minus 60 degrees Centigrade in July. The summer population may be as high as 220, with approximately 50 people staying over the winter. Over the past few years, the summer population is higher than normal, due to the construction of the new station. When completed, the new station will house approximately 150 people. Research at the station includes glaciology, geophysics, meteorology, upper atmosphere physics, astronomy, astrophysics, and biomedical studies.

Palmer Station, located on Anvers Island in the Antarctic Peninsula area near South America, is primarily a marine biology laboratory, and is the smallest of the three research stations. It is also logistically isolated from the other stations, and relies on research vessels for transportation and supplies, rather than aircraft. Monthly mean temperatures at Palmer are mild compared to the other two stations and range from 2 degrees Centigrade in January and February to minus 10 degrees Centigrade in July and August. Currently, the station's population ranges from about 40 contractors, staff, and researchers in the summer season, to about 10 in the winter.

The USAP also operates two ocean-going research vessels, the *R/V Laurence M. Gould* and the *R/V Nathaniel B. Palmer*. The *Gould*, a 239-foot, multi-disciplinary research platform, accommodates up to 28 science personnel, and a minimum of 4 support staff, in addition to the operating crew. The *Gould* is also the primary transport and supply provider for Palmer Station. The *Palmer* is an ice breaking research vessel capable of breaking three feet of level ice at three knots. It accommodates 39 scientists, including 7 support staff, and normally sails with an operating crew of between 20 and 24.

Background

NSF contracts with Raytheon Polar Services Company to provide most of the logistical and support functions for the Antarctic program. The exceptions are aircraft operations provided by the Air National Guard, air traffic control and certain meteorological services provided by the U.S. Navy, heavy airlift capability provided by the U.S. Air Force, and icebreaker support provided by the U.S. Coast Guard.

Raytheon Polar Services Company

Raytheon Polar Services Company (Raytheon), headquartered in Centennial, Colorado, serves as the main logistical and operational support contractor for the USAP. Raytheon is a division of Raytheon Technical Services Company, which is itself a subsidiary of Raytheon, Inc., a major U.S. Government and defense contractor with approximately \$16.9 billion in year 2001 revenues and 87,700 employees worldwide. Raytheon exists exclusively to provide logistical and operational support to the USAP, under contract with NSF. It has no other customers.

As part of its contract with NSF, Raytheon maintains a Medical Program, which provides services for all personnel deploying to Antarctica, including researchers, contractors, distinguished visitors, and NSF and Raytheon employees. The Medical Program's services include providing medical and dental screening, and staffing and operating medical clinics at all three U.S. research bases on the Antarctic continent. Raytheon's Medical Program also provides limited, on-board medical services on the *Gould* and *Palmer* research vessels.

Raytheon also administers an Occupational Health and Safety Program, made more difficult because of the extreme conditions in the Antarctic. From the standpoint of enforcing occupational health and safety requirements at an individual level, Raytheon is only responsible for its own employees. However, Raytheon maintains the safety and functionality of the buildings and facilities at the USAP bases, and to that extent, the occupational health and safety program safeguards all participants in the USAP.

Background

Effective Medical and Occupational Safety and Health Programs are critical to accomplishing NSF's mission to support science in the Antarctic. Temperatures on the continent are extreme, and research stations and camps are logistically isolated from each other. Although fewer researchers and support staff remain at the stations in the harsh winters, those that do are often isolated for several months. Access to capable medical care, including fully functional equipment, adequate supplies, and reliable communications during periods of isolation, can literally be the difference between life and death.

Objectives, Scope and Methodology

The objectives of our audit were to determine if the policies, procedures, and performance of Raytheon's occupational health and safety, and medical programs ensure the overall health and safety of USAP participants, and comply with NSF guidelines. Where relevant, we also assessed the effectiveness of NSF's oversight and support of its contract with Raytheon.

To accomplish our objectives we reviewed Raytheon policies and procedures, including medical standard operating procedures and occupational health and safety programs and guidelines, and NSF regulations. To help us assess the effectiveness of Raytheon's Medical Program, we contracted for the services of an expert in the field of remote medicine, Spinnaker Medical Consultants International, LLC. Spinnaker assessed the standard operating procedures, plans, and policies that Raytheon uses to guide its healthcare delivery in Antarctica, as well as required medical staffing and position descriptions. Spinnaker then compared these policies and procedures to standard industry practices and government regulations. We also researched Occupational Safety and Health Administration (OSHA) laws and regulations, which are used as guidance for Antarctica, and are referenced as such in NSF's contract with Raytheon.

Although Raytheon provides many health and safety-related services to USAP participants including its wellness program and other specific safety programs such as laboratory or field safety, we focused our review specifically on Raytheon's Medical and Occupational Health & Safety Programs. We conducted site visits at two of the U.S. research stations in Antarctica (McMurdo and South Pole) during December 2001, and interviewed personnel at both stations to determine if the policies and procedures were being implemented. We interviewed key personnel at Raytheon headquarters in Colorado, to gain an understanding of the medical and occupational health and safety programs and what steps were being taken to improve the programs. We also interviewed personnel in OPP to determine NSF's expectations for Raytheon's performance under the Antarctic support contract and to discuss OPP's support of the health and safety programs.

Objectives, Scope and Methodology

We conducted our audit in accordance with generally accepted government auditing standards during the period, May 2001 through November 2002.

Results of Audit

Although we identified several areas for improvement, we found that, in general, Raytheon's Medical and Occupational Health and Safety Programs protect the overall health and safety of the many employees, contractors, and researchers who participate in the U.S. Antarctic Program (USAP). Raytheon's Medical Program has effective guidelines, policies and procedures in place to provide oversight and guidance for healthcare delivery to a medically screened population in Antarctica. The guidelines are effective in screening and qualifying candidates for participation in the USAP, and for delivering routine and emergency healthcare in this remote environment. Likewise, the Occupational Health and Safety Program ensures a generally safe and healthful work environment free of recognized hazards. Raytheon has demonstrated a strong commitment to improving and maintaining the health and safety and medical programs, and NSF's review and oversight help to ensure the continuing quality of these programs. These factors are critical considering the challenges Raytheon faces in supporting Antarctic research in extreme and isolated conditions.

However, we noted several opportunities for NSF and Raytheon to further enhance the quality of its programs to protect the health and safety of USAP participants. These include opportunities to improve in the areas of long-range capital planning and budgeting for facilities and infrastructure, training and assessment of work centers to reduce the number of musculoskeletal injuries, and oversight of the medical programs aboard the USAP's research vessels. Additionally, we note a few areas where Raytheon and NSF have made some improvements, but continued attention or follow up is desirable.

Raytheon's Medical and Occupational Health and Safety Programs Protect USAP Participants

In our opinion, Raytheon's programs work to protect the health and safety of USAP participants, and demonstrate Raytheon's commitment to health and safety, and generally comply with NSF guidelines. In addition to providing a sound healthcare program, Raytheon clearly emphasizes health and safety matters

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to all USAP participants. We believe this emphasis is a major factor in the success of these programs.

Under its contract with NSF, Raytheon's Medical Program provides medical screening to identify candidates that are qualified for travel and assignment to the Antarctic, and provides routine and emergency medical services for all USAP participants on the Antarctic continent, as well as on the two research vessels. Because all participants are screened prior to deployment, Raytheon tailors these services to a relatively healthy, low risk participant population. Raytheon also administers an occupational health and safety program that ensures a safe and healthful work environment free of recognized hazards. NSF oversees both of these programs and annually evaluates Raytheon's performance in these areas.

Medical Program

Under the Medical Program, each clinic operated by Raytheon in Antarctica must provide medical care comparable to an emergency care/ambulatory care facility in the U.S. Clinical staff must be experienced in diagnosing and treating injuries and illnesses anticipated in the medically-screened USAP population, stabilizing patients for transport to off-continent, tertiary care facilities as needed, and providing routine health and wellness care. Because the research stations in Antarctica are physically isolated for several months during the winter, health care providers need additional skills not normally required elsewhere. For example, a physician who is wintering over must be able to perform basic dental procedures.

An effective medical program for supporting Antarctic research has two parts; an effective screening program, and a healthcare delivery system on both the continent and the research vessels. An effective screening program thoroughly screens candidates prior to deployment, and results in a population in the Antarctic that is relatively healthy and at a lower risk for medical emergencies. Thus the screening should include requirements for rigorous medical, dental and psychological evaluations, a separate review of those evaluations to determine eligibility for travel and assignment, and annual reviews of the process to determine if the screening was effective in reducing medical

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emergencies and evacuations. Because the medical services provided in Antarctica are limited and participants with more serious injuries and illnesses must be evacuated, an effective screening program is extremely important. Strict physical and mental qualifications for deployment are necessary to ensure the health and safety of individual workers, and to prevent the cost of medical evacuations for medical situations that are likely to place individuals at extra risk.

The healthcare delivery system must provide a level of care in Antarctica appropriate for a screened population in a hostile and remote environment. As such, the policies and procedures for delivering that healthcare must include an adequate staffing structure, protocol and policies for patient care, equipment that is properly tested and maintained, adequate inventories of medical supplies, procedures for evacuating at-risk patients, and quality assurance programs to evaluate the care that the program provides. Because the environment is remote, reliable communications plays an important part in delivering healthcare to the USAP participants.

Raytheon has established an effective medical program for the Antarctic. Raytheon's medical screening program complies with NSF's medical screening regulation by requiring rigorous physical and psychological evaluations¹ for candidates deploying to the continent. A medical consultant under contract to Raytheon then reviews the evaluations and makes the eligibility determination. As for healthcare delivery, Raytheon has staffed the clinics and research vessels in accordance with its operating procedures and we did not identify any issues with the staffing levels, except for one situation that we discuss further below. We determined that Raytheon properly tested and maintained the equipment, and generally maintained inventories of supplies and medicines adequately except as discussed in the other issues section of the report. NSF and Raytheon are exploring ways to bring about improvements in communications where opportunities exist, and expand the use of communications in the medical program. For example, during the 2002 winter season, medical staff at the South Pole successfully completed their first surgery using a "telemedicine

¹ Psychological evaluations are required only for those candidates who plan to remain in Antarctica throughout the winter season.

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connection,” that allowed an orthopedic surgeon and an anesthesiologist in the U.S, to assist the physician actually performing the surgery.

Finally, NSF, together with Raytheon and an outside medical review panel, convenes a medical conference to assess the performance of the Medical Program, in detail, over the prior year. The conferees’ assessment includes a review of incidents that occurred during that time to determine if they could have been prevented, and to identify opportunities for improvement. The conferees pay particular attention to critical and non-critical evacuations. This assessment is essential to resolving problems, and to continually maintaining and improving the quality of the entire medical program.

Our medical consultant, an expert in remote medicine, reviewed and assessed the Medical Program’s staffing structure, policies, procedures, guidelines, forms, manuals and handbooks. He concluded that the guidance for the program is sound, and stated his impression of the program is very positive. Furthermore, although our consultant could not evaluate the actual quality of medical care provided by the Raytheon medical program, he determined that there were many policies and procedures in place to provide oversight and guidance for healthcare.

Occupational Health and Safety Program

To meet the requirements of the NSF contract as well as its own policy, Raytheon maintains an Occupational Health and Safety Program intended to maintain working conditions and practices that generally follow the relevant provisions of the Occupational Safety and Health Act of 1970. Raytheon has set out this program in its Health and Safety Program Manual, and its Supervisor’s Health and Safety Handbook.

An effective health and safety program provides for a safe and healthful work environment free of recognized hazards, educates employees in such things as safe work habits and practices, and ensures accountability for compliance with rules and regulations. The program also assesses the work environments and equipment frequently and regularly for safety issues, and tracks and maintains records on accidents and

injuries. Additionally, such a program ensures that the buildings and facilities, including work centers and housing, are safe and free of hazards.

As a whole, we determined that Raytheon's Occupational Health and Safety Program works to protect its employees, and, where appropriate, all USAP participants. Raytheon promotes and emphasizes healthy and safe practices for its employees and all USAP participants. In fact, NSF officials, and several Raytheon employees who had spent prior seasons on the continent under prior support contractors, advised us that they have recognized a much greater emphasis on and commitment to safety during Raytheon's tenure. This commitment to safety is evidenced by its Environmental Health & Safety Corrective Action Program, which identifies actions to address safety hazards. It has also established other programs and practices, including the periodic safety work center inspections and weekly work center safety meetings with employees, which promote health and safety, help to identify and address safety risks, and educate employees in general and specific safety habits. At a particular work center, Raytheon employees have become directly involved in working to identify and resolve safety issues through a volunteer safety committee. Raytheon has identified and is working to provide more appropriate footwear for certain employees and contractors. It has implemented an employee performance evaluation and bonus program that holds individual employees accountable for their safe performance. During our review, we did note several work centers that require some type of alteration or upgrade to eliminate various problems that could potentially affect the health and safety of some participants. This issue is discussed further below.

Raytheon maintains accident and injury statistics that provide much detailed information for analysis. A few of the categories include type of injury, cause, classification of the injured person (Raytheon division, NSF, grantees, etc.), activity of the person when the injury occurred, lost work days, etc. Raytheon then analyzes the information to identify prevention strategies. For the 2001-2002 contract year, injury and accident statistics showed a marked improvement over the prior contract year. Total injuries decreased by 12.7 percent, and, while the OSHA

total recordable incident rate increased from 16.41 to 18.45 incidents, the rate for the number of incidents that resulted in lost work days decreased from 5.44 to 2.61, and the rate for the number of lost work days (the lost work day severity rate) decreased from 13.60 to 8.31.

NSF's oversight of the Occupational Health and Safety Program contributes to the effectiveness of the program. It has incorporated into its contract a strong measurement program to evaluate Raytheon's performance, and it assesses the performance metrics annually to determine Raytheon's compliance with the contract terms, as well as its eligibility for the contract bonus. Also, NSF assesses Raytheon's implementation of the program through on site observations in Antarctica.

Raytheon's commitment to and emphasis on health and safety, along with NSF's oversight of Raytheon's performance, are important to the effectiveness of the Medical and Occupational Health and Safety Programs. Nevertheless, we have noted a few areas where NSF and Raytheon can take actions to improve certain health and safety issues faced by the USAP. Our discussion of these issues follows.

NSF Needs to Place Greater Emphasis on Life-Cycle Planning and Budgeting for the USAP Facilities and Infrastructure

The capital assets that make up the facilities and infrastructure at the Antarctic research stations are deteriorating from age and use, and include some facilities for which improvements have not been funded, presenting varying degrees of health and safety hazards. Several of the older work buildings at the stations have ventilation, space and safety issues that create conditions that may be hazardous to the health and safety of those who work in the buildings. Given the hostile and remote environment in Antarctica, and the USAP's critical need for these assets to perform as required to protect the safety and health of USAP participants, a sound capital asset management program that includes managing the assets throughout their life cycle and is supported by specifically related budget requests, is essential to address these issues. While NSF has developed long-range,

prioritized plans for developing and improving the capital assets in Antarctica, it does not have a consistent budgeting mechanism to adequately fund these improvement projects. Additionally, NSF needs to plan and budget for funds to undertake an ongoing cycle of long-range maintenance and repairs necessary to keep the USAP's existing capital assets in acceptable and safe condition at the Antarctic stations. The health and safety of USAP participants using these assets should continue to be a primary consideration in prioritizing, requesting budgets, and funding all improvement, maintenance, and repair projects, as well as new development.

A sound and disciplined capital asset management program ensures that an organization's facilities support its ability to achieve its mission and strategic goals. As such, this long-range management program provides for periodically and formally evaluating the performance of the existing assets throughout their life cycle to plan for the assets' continued use, and when necessary, their modification, improvement or termination, in light of the organization's performance objectives. The result of this evaluation is a long-range capital asset plan that identifies future maintenance and repairs necessary to keep existing capital assets performing efficiently and safely for their expected useful lives, as well as identifies new facilities' procurement or construction needs to address new or expanded functions and mission requirements.²

Additionally, an effective capital asset management program integrates a disciplined budget process that provides the basis for managing the capital assets for their complete life cycle. The Office of Management and Budget (OMB) Capital Programming Guide³ clearly identifies this unseverable link between planning and budgeting when it states that, "Thorough planning is particularly critical when managing within limited budgets. There can be no good budget without a plan, and there can be no executable plan without a budget to fund it." Thus, the program's long-range plans and prioritized projects that result from the periodic evaluations and assessments of the capital assets form the basis and justification for the budget

² Capital Programming Guide, Version 1.0, Supplement to Office of Management and Budget Circular A-11, Part 3: Planning, Budgeting, and Acquisition of Capital Assets, dated July 1997.

³ *Id.*

requests and funding to implement these plans. Additionally, an integrated capital asset management program provides needed management information. For example, an integrated program identifies unfunded, deferred maintenance or improvements, and allows management to calculate the cost of such deferrals, as well as the effect of the deferrals on mission and performance goals. This information helps strengthen future requests for funding to clear the backlog. Therefore, having a sound strategic plan for the long-term maintenance and repair of existing capital assets, and a periodic performance assessment that identifies and updates the plan for alterations and improvements, as well as new development, will be of limited value unless a viable budget strategy exists to implement the plan.

NSF needs to incorporate life cycle planning for its capital assets. It has conducted extensive planning for the development of new and the improvement of existing facilities and infrastructure needs of the Antarctic research stations. For example, NSF has a Long Range Development Plan for McMurdo Station, which identifies prioritized major improvement projects for the upgrade and replacement of existing structures, and consultants are currently updating this long-range vision for the future development of McMurdo. Similarly, for the South Pole Station, NSF has a capital asset development plan covering the new South Pole station currently under construction. NSF's current long-range vision for Palmer Station foresees no significant changes in the facilities and infrastructure. Additionally, NSF has a program in place to handle short-term maintenance and repairs, and some preventive maintenance, and includes an annual assessment of the current condition of the facilities and infrastructure at the stations to identify maintenance and repair needs for the coming year. However, for the most part, NSF is lacking in the life cycle aspect of its planning – the development of periodic, formal and detailed evaluations and goals for its assets' performance, and the associated plans and forecasts for long-range maintenance, major repairs, and the eventual replacement or other termination of the USAP capital assets so that they continue to provide safe, acceptable service and achieve or exceed their expected useful lives.

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In addition, NSF does not have a budget mechanism to provide a dedicated source of funds to carry out a continuing capital asset management program for the Antarctic stations. For example, while NSF has funded the complete replacement and modernization of the South Pole Station through the Major Research Equipment and Facilities Construction (MREFC) appropriation account, the longer-term costs to maintain and repair these facilities after construction may not qualify for funding from this account. For McMurdo Station and Palmer Station, NSF estimates costs for the upcoming year's maintenance or repair of structures and facilities when developing the Engineering, Construction and Facilities Maintenance (EC&FM) portion of its annual budget for U.S. Polar Research Programs, funded through NSF's Research & Related Activities (R&RA) account. As such, these capital asset projects compete for funding with NSF's day-to-day operations that support the polar research program, as well as the scientific research itself. Given the relatively large budgets required for major facilities and infrastructure maintenance and improvement projects, they are often deferred in favor of the scientific research and supporting operations. This results in an ad hoc, inconsistent, and reactive approach to capital asset management that could ultimately jeopardize the safety and health of USAP researchers and support personnel and the ability of the capital assets to functionally support scientific research.

As an example, while at McMurdo Station, we noted three work center buildings whose improvements Raytheon considers to be high priority. These buildings, the Facility Engineering Maintenance and Construction (FEMC) building (building 136), the carpenter shop (building 191/191A), and the paint barn (building 177), are particularly problematic from the standpoint of health and safety. The conditions include fire hazards, poor ventilation, and overcrowding. When the current Long Range Development Plan was implemented in 1996, NSF included major improvement projects for two of the three buildings in the Plan's listing of prioritized projects for McMurdo. However, these particular prioritized projects have yet to be funded, and expected completion dates have yet to be established. While NSF and Raytheon have instituted controls and procedures to

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help mitigate the hazards found in these buildings, they are short-term solutions.⁴ Also, while NSF has made some headway since 1996 in completing other projects on the prioritized list, a number of the projects still remain. Furthermore, because priorities change, and NSF has not formally reprioritized its projects since 1996, one cannot determine if those completed projects were, in fact, the highest priority at the time the work was done. By recognizing these projects in a life-cycle asset management plan that is periodically and formally updated on a continual basis, NSF management and other decision makers can readily identify those projects needing priority attention and thereby justify the associated budget requests. Further, if the funding is not provided, such a plan will also allow NSF to carry these projects as deferred maintenance or improvements.

Accordingly, the importance of a disciplined, integrated capital asset management program cannot be overstated. Deterioration and overuse of facilities and infrastructure, especially in such a remote and hostile environment, can adversely impact health and safety, reduce morale and productivity of USAP participants, and increase the need for costly major repair or early and unplanned replacement of the assets before they reach the end of their expected useful lives. Using an effective capital asset program that fully and formally combines long-range, life-cycle planning with a disciplined budget process as the basis for managing the USAP portfolio of capital assets will help NSF achieve its mission and strategic goals with the lowest life-cycle costs and the least risk. Additionally, the process will provide NSF with more accurate information on life-cycle costs, and more timely planning, prioritizing, and scheduling for long-range maintenance, improvement, and replacement needs, as well as the justification for budget requests to fund these projects. Given limited resources for competing needs, having

⁴ For example, the flammable storage warehouse's (building 174) dry chemical fire suppression system had been disconnected due to problems with inadvertent chemical discharges of the system. In lieu of that system, Raytheon had provided metal cabinets, specifically designed to store flammable materials. However, during a tour of the building, we found that many flammable materials were stored outside of the cabinets, thus reducing the effectiveness of Raytheon's mitigating controls. Likewise, Raytheon has instituted administrative controls designed to limit employees exposure to fumes in the paint barn (building 177).

an effective capital asset management program that forecasts, provides for, budgets for, and funds the acquisition, long-term maintenance and eventual replacement of facilities and infrastructure becomes that much more important.

Recommendation #1

Because the facilities and infrastructure in Antarctica are critical to protecting the health and safety of USAP participants, NSF needs to improve and formalize its capital asset planning to ensure that it includes a life-cycle orientation, and identifies and prioritizes future, long-range facilities and infrastructure needs. In prioritizing the repairs maintenance, and eventual improvement or replacement of these assets, NSF needs to pay particular attention to related safety and health issues. Finally, NSF needs to provide a dedicated budget to ensure that these facilities and infrastructure priorities are funded. Without adequate life-cycle planning and funding for ongoing, timely maintenance, repair and improvement of the USAP facilities, especially at McMurdo Station, NSF risks relying on aging and deteriorating facilities and infrastructure that will likely negatively impact the health and safety of the USAP participants, and, ultimately, NSF's ability to achieve its mission of supporting world class science on the Antarctic continent.

As such, we recommend that the NSF Director, Office of Polar Programs:

- a) Build upon NSF's existing and extensive Antarctic facilities and infrastructure plans to develop a life-cycle oriented capital asset management program for the Antarctic research stations. We recommend using the elements of OMB Circular A-11's Capital Programming Guide as guidance in developing the capital asset management program. This program should include performing formal assessments of each asset's or groups of assets' future needs, documenting those needs, and establishing and annually updating priorities for addressing those needs. When prioritizing, NSF should ensure that it considers the actual and potential effects of those

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- needs on the health and safety of the USAP participants, and
- b) NSF should include in its R&RA budget request a separate line item dedicated to funding the capital asset management program for the Antarctic stations, especially for its most critical projects related to safety and health, to ensure that USAP participants are provided a safe and healthy living and working environment. The budget should be supported by cost-benefit analyses, cost estimates, schedules, and performance goals⁵ for the projects in the program.

Agency Response

Recommendation #1 (a)

In its comments, NSF suggests that its current processes to plan for the infrastructure needs of its Antarctic research stations are adequate and highlights its successes in completing various infrastructure initiatives. We agree that NSF has done extensive planning regarding the development of facilities and infrastructure in Antarctica, and we applaud NSF for its consideration of health and safety issues as absolute priorities. However, our recommendation addresses a part of the planning process where improvements are needed, namely the development of a life cycle oriented capital asset management program for the Antarctic research stations.

To ensure that the Antarctic facilities and infrastructure continue to protect the health and safety of USAP participants, NSF must periodically and formally evaluate the performance of its assets throughout the assets' life cycles, as part of its long-range plans. With such a program, NSF will be able to strategically plan for and justify budgets to fund modification, improvement, and maintenance projects, and avoid having to defer maintenance and improvements that may affect USAP participants health and safety.

⁵ This is not a novel recommendation. Similar recommendations and observations regarding the USAP facilities and infrastructure have been made in *The United States in Antarctica, Report of the U.S. Antarctica Program External Panel* (April 1997), and *the Committee of Visitors Report on the Polar Research Support Section* for the review period 1998, 1999, and 2000.

The long-range life-cycle capital asset planning for the facilities and infrastructure at the Antarctic research stations affects the condition of the facilities, and is, therefore, intimately and inextricably linked to the health and safety of the USAP participants. As such, we reaffirm our recommendation that NSF should develop a life cycle oriented capital asset management program for its Antarctic facilities and infrastructure.

Agency Response

Recommendation #1 (b)

NSF generally agrees that adequate funding is needed to meet Antarctic facilities and infrastructure needs, but disagrees with the recommendation to create a separate line item in its budget to fund a capital asset management program. NSF contends that infrastructure needs are dependent on an ever-evolving science program, and believes that a dedicated budget for infrastructure would unduly restrict its ability to respond to unexpected changes in the needs of the Antarctic program.

We understand the close ties between the Antarctic infrastructure and the science programs it is meant to support, and are sympathetic to the challenges NSF faces in allocating limited resources among science programs, infrastructure and supporting activities. However, while the specifics of the science program and the need to address unforeseen situations will certainly drive some decisions regarding infrastructure, there are other parts of the infrastructure that must be in place, regardless of the scientific research being conducted or unforeseen situations, i.e., power or water plants, utility lines, employee housing, etc. It is this basic infrastructure that must be addressed by a dedicated budget.

Further, we are not suggesting a separate appropriation to fund infrastructure costs that could limit NSF's flexibility. Rather, our recommendation is merely to recognize and budget for, within the same appropriation, funds specifically designated for infrastructure projects. Establishing a line item within the Research and Related Activities appropriation will allow NSF to

both retain the flexibility it desires to move funds to other needs as circumstances require, and yet recognize and track the effect of those decisions on its infrastructure activities. It will also support future budgets requests for funds to address those projects that had to be deferred.

Additionally, as indicated in this report, our recommendation is not new; it is consistent with recommendations made by NSF's own expert advisory committees including the U.S. Antarctica Program External Panel, and the Committee of Visitors on the Polar Research Support Section.

Accordingly, we reaffirm our recommendation to establish a separate line item in the R&RA budget to fund a capital asset management program for the Antarctic research stations.

NSF and Raytheon Need to Improve Strategies to Address Musculoskeletal Injuries

Raytheon needs to improve its strategies to reduce the number of musculoskeletal injuries,⁶ especially in its work centers. While Raytheon has an active ergonomic program that trains and educates employees, and gathers, maintains and analyzes detailed data on injuries, it needs to institute a formal program to assess each work center on a regular basis. The program should also institute specific controls and training for each work center to address the hazards identified in its assessment.

Musculoskeletal injuries are one of the most prevalent types of injuries in Antarctica. In reviewing Raytheon's 2001-2002 Injuries and Illness Report we found that, out of 359 occupational injuries, approximately 47 percent involved some type of musculoskeletal injury. Besides the obvious pain and discomfort to the injured participant, musculoskeletal injuries also contribute disproportionately to the amount of lost work time which results in decreased productivity and possibly, increased operating costs. For 2001-2002, musculoskeletal injuries comprised approximately 59 percent of restricted duty cases and approximately 88 percent of lost work time injuries.

⁶ Although Raytheon does not specifically define musculoskeletal injuries, for the purpose of this report, we defined them as sprains, strains and repetitive motion injuries.

Results of Audit

The National Institute for Occupational Safety and Health states that an effective ergonomic program to address musculoskeletal injuries should include the following steps: looking for signs of potential musculoskeletal problems in the workplace; showing management commitment in addressing problems and encouraging worker involvement; offering training to expand management and worker ability to evaluate potential musculoskeletal problems; gathering data to identify jobs or work conditions that are most problematic; identifying and instituting effective controls for tasks that pose a risk of musculoskeletal injury, and evaluating the effectiveness of such controls; and minimizing risk factors for musculoskeletal disorders when planning new work processes and operations. Therefore, assessing and addressing workplace hazards, tracking data on injuries, and educating USAP participants to increase their awareness of safety hazards is critical to preventing and reducing the number of musculoskeletal injuries.

Raytheon collects detailed data on injuries and conducts analyses to pinpoint potential problem areas. Raytheon also provides extensive general safety training and orientation, both prior to deployment and at the work locations, and has encouraged employee involvement in the safety program through employee surveys and the creation of an employee safety committee in one of the work centers. However, Raytheon does not, as a matter of policy, have a program in place to regularly conduct workplace hazard assessments to identify potential ergonomic problems specific to individual work centers.

Instead, during the 2001-2002 summer research season, the physical therapist assigned to McMurdo Station conducted ergonomic hazard assessments and training specific to a work center as her schedule permitted and at the request of the work center. While Raytheon has made such assessments and training part of the job duties of the physical therapist for the

Results of Audit

2002-2003 summer research season, the assessments are not required and are still done only at the request of a work center.

The operations and FEMC work centers incurred the greatest number of occupational injuries, of which musculoskeletal injuries are the largest percentage. Thus, a formal, cyclical program to assess specific work centers to identify, and where possible, correct ergonomic hazards and conditions, and conduct training specifically designed to deal with those conditions, would reach and educate the population that have incurred the most accidents and injuries.

Recommendation #2

We believe Raytheon can realize improvements in its musculoskeletal injury rates by instituting a formal work center assessment program to identify musculoskeletal hazards at specific work sites. The program should include instituting work center specific controls and training to address the hazards identified in these assessments.

Therefore, we recommend that the NSF Director, Office of Polar Programs direct Raytheon to develop and implement a formal work center assessment program to identify hazards and conditions that contribute to musculoskeletal injuries at specific work centers. The program should ensure that all work centers are assessed on a regular basis, and that relevant training and controls specific to the identified hazards are instituted as needed to address the identified risks. Special attention should be provided initially to those work centers that experience the greatest number of musculoskeletal injuries.

Agency Response

NSF agreed, in general, with the recommendation, and noted that Raytheon has already made great strides in reducing overall reportable injury rates from Contract Year 1 to Contract Year 2. NSF indicated that Raytheon has instituted a program of periodic work center evaluations to address all hazards, including ergonomic hazards, initially focusing on work centers with high or severe injury rates.

Raytheon Needs to Improve Oversight of Onboard Medical Programs

Raytheon needs to improve its oversight of the medical programs on board the research vessels *R/V Nathaniel B. Palmer*, and *R/V Laurence M. Gould*. Specifically, we found that Raytheon did not, as a policy, staff the *Gould* with an Emergency Medical Technician as required by its contract with NSF. In addition, inventory levels of first aid supplies were not adequately maintained and the shipboard emergency medical reference manual was out of date.

The contract between NSF and Raytheon clearly requires that each research vessel be staffed with an EMT, and states, at Section C7.4.7.2 Research Vessel Staffing, that:

The Contractor shall provide the shipboard staffing required to support the science program on each cruise of the [research vessel R/V] *Nathaniel B. Palmer* and/or the [research vessel R/V] *Laurence M. Gould*. Staffing shall typically consist of a Contractor coordinator/manager responsible for overall science support as well as for representing the Contractor when dealing with the ship's Captain. **At least one Contractor employee on every cruise shall be qualified as an Emergency Medical Technician (EMT). [Emphasis added]**

Pursuant to the contract requirements, Raytheon's policy calls for the *Palmer* to be staffed with at least one employee with an Emergency Medical Technician (EMT) certification at all times. However, Raytheon was under the impression that this contractual requirement did not apply to the *Gould*. The *Gould* did have an EMT on board for most cruises because a particular Raytheon employee on board happened to hold that certification.

Results of Audit

We also noted other instances where improvements are needed in the shipboard medical program. For example, we found that inventories of first-aid type medical supplies taken by shipboard personnel in mid-January 2002, indicated that both vessels were completely out of some items that are normally stocked in their medical supplies, although the vessels were only half-way through the research cruise season. We also noted that Raytheon had not revised and updated the Shipboard Emergency Medical Technician Reference Manual for the *R/V Nathaniel B. Palmer*. The manual was last revised in June 1999; prior to the date that Raytheon took over support responsibility for the USAP from the prior contractor. As such, the manual contains many references to the former contractor, including outdated contact phone numbers and electronic mail addresses.

By not ensuring proper management and oversight of the shipboard medical program, including maintaining adequate inventories of medical supplies, keeping policy manuals and contact information current, and providing a certified EMT on all cruises for both of the research vessels, NSF and Raytheon risk having an illness or injury occur during a cruise, not having adequate supplies and/or qualified personnel on board to treat the illness or injury, and risk not being able to quickly contact the proper people for assistance. Besides the potential physical harm to the researchers or crew, without qualified personnel to treat an illness or injury, it is more likely that the research vessel may have to interrupt its cruise and return to port.

We believe these problems occurred because Raytheon has not established clear responsibility for overseeing the shipboard medical program. Currently, the medical program on board the ships is carried out through Raytheon's marine services department rather than its medical department. At the same time however, the medical director, as head of Raytheon's Medical Program, has responsibility for the shipboard medical program. As a result, coordination and communication between the medical director and the marine services department regarding the oversight of the shipboard medical program is hampered.

Results of Audit

We discussed these issues with NSF, as well as the Raytheon medical director and the medical department manager. NSF advised us that they have clarified the contractual requirement for an EMT on each cruise with Raytheon, and they will be monitoring the staffing under this requirement closely. NSF has also indicated to us that Raytheon's medical department is becoming more involved in the shipboard activities to improve its management and oversight of the shipboard program. Additionally, NSF plans to convene a working group to review the level of care provided on the ships, including staffing and equipment.

Recommendation #3

To improve oversight of the shipboard medical program, we recommend that the NSF Director, Office of Polar Programs:

- a) Require Raytheon to develop procedures for overseeing the shipboard medical programs on the *R/V Nathaniel B. Palmer* and the *R/V Laurence M. Gould*. In particular, the procedures should clearly identify the organizational component of Raytheon responsible for the shipboard medical program and provide this component with the necessary authority to carry out this program. The procedures should also identify measures that will be taken to maintain appropriate levels of medical supplies on board each research vessel at all times and keep manuals and other forms and operating documents on the vessels up to date with the most current procedures and contact information, and
- b) Ensure that Raytheon is in compliance with its contractual responsibilities, by providing, as a stated policy, at least one qualified Emergency Medical Technician on each cruise of the *R/V Nathaniel B. Palmer*, as well as the *R/V Laurence M. Gould*.

Agency Response

NSF agreed with the recommendation and has indicated that it has directed Raytheon to develop a medical services management program to clarify organizational responsibilities and authorities. NSF also indicated that they would include a review of shipboard medical activities as part of its annual medical review.

Additionally, NSF noted that they have reminded Raytheon of its contractual responsibility to ensure that the research vessels are staffed with Emergency Medical Technicians, and will continue to monitor Raytheon's compliance with all of its contractual obligations.

Other Considerations

In addition to the findings and recommendations discussed above, we identified several other matters that we believe warrant NSF's and Raytheon's attention. Although we have not made specific recommendations, we suggest NSF and Raytheon consider and evaluate these issues and take steps to improve or correct the issues as appropriate.

Improving Medical Recruiting

Under its contract with NSF, Raytheon recruits and hires medical personnel for the three Antarctic research stations, including physicians, mid-level medical personnel and clerical personnel. As part of the recruiting process Raytheon verifies the credentials of the individuals that it hires, and reviews and approves the new physicians' requests for privileges to perform particular medical procedures at the clinics. In the past, Raytheon has had difficulties filling medical positions in time for deployment to the continent, leaving little time for credential verifications and the proper review of privileging requests. This has been a particularly weak point in the Raytheon program. Earlier, NSF had an audit conducted of Raytheon's credentialing process, and found that the credentialing was poorly documented and the privileging process was not documented at all. Thus, the auditors could not determine to what extent the process had been implemented. During our fieldwork, we also reviewed the credentialing and privileging documentation. Although there appeared to be some information still missing from the credential files, we found that Raytheon had improved in its documentation of credentialing, but Raytheon still needs to improve its documentation of the privileging process.

We believe recent changes Raytheon has implemented in its recruiting procedures will allow more time for recruiters to recruit, verify the qualifications of, credential, hire, and privilege its medical personnel for the USAP program as appropriate. NSF should continue to monitor Raytheon's recruiting process, including documentation of its credentialing and privileging, to ensure the personnel Raytheon hires are fully qualified and able to perform as required. How well Raytheon implements this process directly affects the quality of care given to USAP participants in Antarctica.

Other Considerations

Agency Response

NSF indicated that they will continue to monitor the medical recruiting process including conducting independent credentialing audits. NSF noted that Raytheon has also instituted new measures that include a formal indoctrination program for medical staff and training in telemedicine at the University of Texas (Medical Branch).

Maintaining Medical Equipment

Based on concerns raised by its biomedical technician, Raytheon was developing a spare parts program for the Antarctic medical equipment, at the time of our site visit. As a part of that program, Raytheon was also developing a proper inventory to repair and replace medical equipment parts. Additionally, while Raytheon had in place a five-year equipment upgrade and replacement plan, during our audit, Raytheon's medical department indicated they would be reviewing and updating the five-year plan.

An adequate parts inventory are absolutely critical to maintaining the equipment the physicians and technicians need to diagnose and treat illnesses and injuries at the remote and isolated medical clinics in Antarctica. As such, NSF should continue to monitor the process to confirm that Raytheon has completed and put in place the spare parts program, parts inventory, and the upgrade and replacement plan. NSF should also ensure that Raytheon continues to make keeping these plans and the inventory updated a priority.

Agency Response

NSF indicated they are pleased with Raytheon's progress in addressing this issue and will continue to monitor this issue, including evaluating Raytheon through contract performance metrics.

Documenting Quality Control Checks on Medical and Telemedicine Equipment

NSF and Raytheon need to ensure that medical personnel maintain a properly documented program of quality control checks on medical equipment used at the Antarctic clinics. These checks serve not only to ensure that the equipment is operating within expected parameters, but also help medical personnel, often inexperienced in operating the equipment, maintain a level of proficiency with the equipment. Additionally, at the time the tests are performed, medical personnel can confirm that they have an adequate inventory of supplies for the equipment.

We found that one particular piece of equipment, the Ecktachem chemical analyzer at the South Pole clinic, had no quality control checks documented for almost seven months, and the physicians who operated the analyzer had difficulty obtaining accurate results. However, a medical laboratory technician deployed to the South Pole to check the analyzer's operation found the analyzer was operating within expected parameters. Because physicians do not generally have extensive experience doing lab work, quality control checks on the analyzer would not only assure the physicians that the equipment was working properly, they would also help the physicians gain valuable experience in operating the machine.

Raytheon now requires the physicians and physicians' assistant to perform monthly quality control tests on the analyzer and send the results back to the medical director. However, Raytheon should ensure that such tests are performed on all medical equipment, as well as the telemedicine equipment and communications, as appropriate. Such a testing program should also include developing a proper inventory procedure to ensure that sufficient supplies for the equipment are on hand. This will help avoid the situations that have occurred, such as running out of reagents used for certain chemical analyzer tests, or allowing the reagents on hand to expire and thus become unusable for testing during the isolated winter season. A properly implemented testing program will ensure that the equipment is working properly, necessary supplies are available, and communications can be established when needed.

Other Considerations

Telemedicine also requires a well-implemented quality control program. Telemedicine is a significant advancement that is having a huge impact on medical care in remote locations, including the USAP Antarctic stations, since it allows consultation with any number of medical specialists via voice, still picture and video communication.⁷ For telemedicine to be most beneficial, however, it must be as reliable as possible. Periodic testing of the telemedicine equipment at the USAP stations would ensure that the equipment is always ready for use, connections are reliable and personnel are familiar with its operation.

Agency Response

NSF stated that Raytheon has implemented monthly equipment checks and that NSF measures Raytheon's performance through its annual contract evaluation.

Ensuring the Accuracy of Pharmacy System Data

Raytheon needs to develop ways to ensure the accuracy of the data in its pharmacy system. The current pharmacy system was new for the 2001-2002 season, and medical personnel at the clinics found it helpful in tracking the inventory of prescription medications. The system provides information on the number of drug lots available and the expiration dates of the drugs in inventory, and the information tracked in this system also provides data for one of Raytheon's performance metrics under its contract with NSF; prescribing only unexpired medications. Tracking expiration dates in this system allows accurate measurement of this metric. However, Raytheon admits the program still has some "bugs" in it.

We sampled a few of the program entries during our site visits to the McMurdo and South Pole Stations, and did find instances of incorrect lot numbers and expiration dates. The instances we found are a matter of inaccurate and/or confusing data entry, and we believe Raytheon should develop quality control procedures to ensure that such data entry errors are found and corrected in a timely fashion.

⁷ In July 2002, the South Pole doctor performed the first ever telemedicine-assisted surgery at the South Pole, repairing the damaged knee of a winter-over meteorologist.

Agency Response

NSF acknowledged the need to improve the pharmacy system, and noted that system refinements had been made since our site visit. NSF further indicated that the system is at all three stations and will be added to the two research vessels upon resolution of computer networking issues.

Integrating Safety into Recruitment Efforts

As discussed earlier, Raytheon's Occupational Health and Safety Program is striving to make USAP participants more "safety conscious." Raytheon has provided its recruiters' instruction on how to integrate safety into their recruitment efforts. However, the recruiters' performance evaluation is not tied in any significant way to the actual safety performance of the individuals they recruit.

We believe that investing the recruiters with a stake in the safety performance of the individuals they recruit would provide them with an incentive to ensure that they only recruit those individuals with an appropriate safety attitude. A GAO report discusses a similar recommendation for tying military recruiter incentives to the percentage of recruits who successfully complete basic training.⁸ While we leave it to Raytheon to develop an appropriate incentive program, we realize that negative incentives may not be appropriate, as the recruiters do not have direct control over the action of their recruits. We recommend a positive incentive program, perhaps tying a bonus to the percentage of recruits that complete their contract with no injuries.

Agency Response

NSF indicated that, along with Raytheon, they have been reviewing recruiting efforts for over two years, and while safety is one aspect of recruiting, the process has several other variables. NSF further indicated that, while Raytheon has hired professional recruiters, the main responsibility for safety rests with the employees and on-site managers. Raytheon gives

⁸ GAO Report NSIAD-97-39, Military Attrition: DOD Could Save Millions by Better Screening Enlisted Personnel, dated January 1997.

significant attention to safety in these areas, and NSF feels utilizing resources in these areas would have a more positive effect on on-site safety than recruiter bonuses.

Ensuring Independence in Medical Screening Oversight

In addition to operating the medical clinics in Antarctica, Raytheon qualifies prospective USAP participants as medically able to deploy to Antarctica. A contract physician advisor performs this screening, with input from the Raytheon medical director when questions arise. If a medically qualified individual later becomes ill or injured while on the continent, and must be transported out of Antarctica, the medical director must review the transport to determine, first, if it was necessary and second, if anything was missed during the screening process. This information is used to improve the screening process. Raytheon reports the findings of these reviews during the annual end of season medical conference held with NSF. However, we believe this is a conflict of interest since Raytheon is, in effect, evaluating and reporting on its own screening work.⁹

In 2001, NSF contracted for an independent audit of Raytheon's screening process. The independent auditors generally agreed with all of the screening decisions reviewed, but raised concerns regarding the lack of documentation for some of the decisions. Raytheon has since addressed the documentation. Based on this assessment, NSF has indicated they are comfortable allowing Raytheon to continue both the actual screening, and the review of screening decisions unless it appears to NSF that the conflict may be affecting the integrity of the screening process. We fully agree that the independent assessment mitigates this conflict, but suggest that NSF maintain its vigilance in this matter by continuing to periodically contract for audits of the screening and review processes.

⁹ A similar, potential conflict was discussed regarding military review of enlistee screening decisions in GAO Report NSIAD-97-39, Military Attrition: DOD Could Save Millions by Better Screening Enlisted Personnel, dated January 1997.

Other Considerations

Agency Response

NSF stated that Raytheon reviews medical evacuations at NSF's request, and that NSF plans to continue its long-standing practice of convening independent reviews of Raytheon's screening decisions.