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NSF [National Science Foundation] Bernthal Testimony Subcommittee on Science February 23, 1993

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FROM: Jeffrey Weinberg *JW*

DATE: February 23, 1993

REMARKS

Here is the final National Science Foundation testimony on legislation to implement the Protocol on Environmental Protection on the Antarctica Treaty. The cleared testimony did not take a position on the legislation, H.R. 964 (see page 4).

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Final

STATEMENT
BY THE
NATIONAL SCIENCE FOUNDATION
DR. FREDERICK BERNTHAL
DEPUTY DIRECTOR
BEFORE THE
SUBCOMMITTEE ON SCIENCE
ON
FEBRUARY 23, 1993

Thank you, Mr. Chairman, for this opportunity to discuss Antarctic research, and the Protocol on Environmental Protection to the Antarctica Treaty.

The Protocol, signed by the United States at Madrid on October 4, 1991, and given the advice and consent of the Senate on October 7, 1992, designates Antarctica as a natural reserve, devoted to peace and science, and establishes a comprehensive environmental protection regime governing activities undertaken there. The National Science Foundation whole-heartedly supports its basic goal of according priority to research, while requiring that all activities, including scientific research, be undertaken in a manner that preserves the Antarctic environment.

Antarctic research has made many important scientific contributions, and is critical to our understanding of global ecological and environmental problems. Most recently --

- o Antarctic researchers observed the lowest ozone levels and the largest ozone "hole" during the 1992-1993 season. Despite the Montreal Protocol curbing CFC production, the chemical destruction of ozone continues unabated due to the atmospheric reservoir to chlorine compounds from global, not Antarctic, sources.

- o A four-station Antarctic UV monitoring system provides a continent-wide perspective on the scope of increased levels of ultraviolet radiation associated with the Antarctic ozone hole. Recent results suggest that marine productivity is reduced six to twelve percent during the time of maximum ozone depletion.
- o South Pole measurements of microwave background radiation are helping astrophysicists understand the evolution of the universe. Because of extremely clear atmospheric conditions at the South Pole, the quality of data collected there is unsurpassed.
- o Scientists at a joint US-Russian ice camp in the Weddell Sea took the first ever coordinated set of measurements of interactions of ice, ocean and atmosphere in the region. Early discoveries include algae that are biologically active in the winter, new sources of bottom water formation, and the accurate location of the continental shelf. These fundamental findings are essential to a better understanding of the effects of the Antarctic ocean on global change.

Antarctica is an unmatched natural laboratory for scientific research, in large part, because the Antarctic environment is relatively unaffected by human activity there. The National

Science Foundation (NSF) is committed to protecting the Antarctic environment, and, to that end, has implemented a series of environmental protection measures. These include improvements in U.S. Antarctic Program (USAP) waste handling procedures; development and implementation of oil spill prevention and spill management plans; and commencement of routine monitoring of ambient air and water quality at McMurdo station so as to gather baseline information to detect unforeseen impacts of USAP activities. USAP has also ceased open burning of waste at all of its stations, has instituted comprehensive waste minimization and recycling programs, has worked towards the prevention of fuel spills by replacing rubber fuel bladders with steel tanks, and old, short-length fuel hoses with new, long-length "dry-break" connections.

The list of NSF's environmental stewardship activities goes on, and environmental practices continue to improve. Attached to this testimony are descriptions of some of the environmental actions undertaken by NSF during the past three Antarctic seasons. Although the Protocol is not yet in force, NSF already conducts its Antarctic activities in a manner largely consistent with its requirements, and will soon publish final Antarctic waste management and waste disposal regulations that, among other things, require U.S. citizens to comply with the Protocol's waste management and waste disposal requirements.

The Clinton Administration is establishing a new interagency working group to review U.S. policy for Antarctica. That review will include the question of legislation to implement the Protocol on Environmental Protection to the Antarctic Treaty. H.R. 964, which was introduced on February 18th by you, Mr. Chairman, and co-sponsored by Reps. Brown, Walker, Boehlert, Valentine, Barcia, Johnson, and Minge will be carefully considered by the interagency working group. As soon as the review is completed, the Administration will advise you of the outcome.



UNITED
STATES

antarctic PROGRAM

Information

May 1992

ASPECTS OF RECENT ENVIRONMENTAL ACTIONS AND PROGRESS

Antarctic Peninsula

- During the 1990-1991 season, a joint U.S. Antarctic Program (USAP) - National Parks Service (NPS) team surveyed East Base to document items of archaeological and historical value still present at the site and to prepare for clean up efforts during the 1991-1992 season. The M/V EREBUS arrived at Palmer Station on February 18, 1992, with materials for the continuing cleanup, survey and restoration of East Base on Stonington Island.

This season's work at the site was completed on March 6, 1992. Waste materials were picked up by a crew of eight including two members of the British Antarctic Survey (BAS); a small amount of hazardous substances were properly containerized and removed from the site. Unidentified, potentially hazardous substances were so labeled, and properly containerized. Old medical wastes were accepted by the BAS for processing. All other waste materials collected were then transported aboard the EREBUS to Palmer Station where they will be properly staged awaiting transfer to McMurdo Station for retrograde to the United States. Cleared of debris, old dump areas were surveyed and covered with gravel.

Warning signs, in four languages, were placed at old dump sites. Signs were put up to indicate that East Base is a protected, historic monument that dates from the late 1940s. A small museum and interpretative display were set up in the former science building for the benefit of future visitors to the site. The roof of Ronne's Hut was replaced and other buildings were repaired and secured after survey for future preservation efforts. The NPS team has published its initial findings from the 1990-1991 survey, and a report responding to their recommendations will be prepared in late 1992.

- Along with Antarctic Support Associates, Inc. (ASA), USAP sampled soils around two former dumps at Palmer Station for evidence of past contamination. Preliminary interpretation of results by the Center for Environmental Monitoring and Assessment at Idaho National Engineering Laboratory indicated that:

- few USEPA-analytical method "target" semi-volatile organic compounds (SVOCs) were present. Those "target" SVOCs found were phthalates normally associated with plastics;

- numerous semi-volatile hydrocarbon, tentatively-identified compounds (TICs), suggestive of burning of heavy fuels, were present. Two of these, 2-propionic acid and guanidine, were in 90% and 80% of samples, respectively;

- twelve "target" volatile organic compounds were detected, most below USEPA action levels. Methylene chloride was found in all dump samples and acetone was found in 90% of the samples;

- three sampling sites (within control and runoff sampling areas) were conspicuously free of volatile TICs;

- relatively high metal concentrations were detected in dump vs control sites (and some control sites--outside of former dump areas showed some metal contamination);

Interpretation of these draft results is, as yet, in its preliminary stage. Nonetheless, ASA is working to determine the most appropriate remediation options as further evaluation of the data is accomplished;

• Continuing Peninsula Progress

- Palmer Station continued to utilize used, drained lubrication oil as fuel for the station's diesel generators. This recycling lowers the amount of drained oil retrograded considerably.
- Palmer's wastewater macerator continues to operate; although the submerged outfall is susceptible to ice damage, maintenance work continues when it is damaged.
- Burning of waste was halted at Palmer three seasons ago. All solid waste continues to be removed from the Treaty Area; and Palmer's hazardous and toxic wastes are transported to McMurdo for return to the U.S.



- Additional Environmental Action Memoranda detailing the potential impacts of proposed projects at Palmer have been completed. They include: Phase II of Cultural Resource Assessment and Site Cleanup of East Base, Stonington Island; Palmer Automatic Weather Station; Shelter for Seismological Instruments for S-091; Construction of a Bird Blind for S-013; Shelter for VHF Local Boating Radio Repeater; and, Facility for Wind Generation of Energy at Humble Island
- USAP continues consultation with, and provision of information to, Argentine officials on mitigating the effects of the BAHIA PARASIO grounding. Division of Polar Programs (DPP) staff recently reviewed a Memorandum of Understanding (MOU) between the governments of Argentina and the Netherlands that proposes an effort to remove remaining fuel from the vessel. DPP has prepared a set of environmental assessment "scoping" issues for consideration by the parties to the MOU during the assessment process;

Continental Antarctica

- Following months of planning, and an environmental impact assessment completed in October 1992, the USAP accelerated portions of its Safety, Environment and Health (SEH) strategy to clean up areas at McMurdo Station. Activities included:
 - Cleanup of asbestos-containing wastes and ground surface debris at Fortress Rocks. During the 1990-91 austral summer season, asbestos was discovered at the Fortress Rocks dump. NSF decided to cease open burning and disposal of waste at the site. The activity was designed to minimize the release of fibers from asbestos-containing wastes; and to remove all ground surface debris. This debris was picked up and prepared for removal from Antarctica;
 - Disposal of Liquid Waste Drums. Approximately 800 steel drums of liquid waste had accumulated at McMurdo Station. Many of the drums had unknown contents. This activity involved characterization of drum contents, proper labeling and packaging of the drums, and removal from Antarctica on the annual supply vessel along with the wastes noted above; and
 - Completion of the Wastewater Outfall. The outfall's design was re-evaluated before complete reconstruction following its destruction by wave action in February 1991. The outfall now extends about 160 feet (~525 meters) and its end is submerged about 60 feet (~197 meters).

As noted, the wastes from Fortress Rocks and the orphaned drums were properly labeled and packaged for shipping to the U.S. by the Naval Support Force Antarctica. The wastes, shipped from Antarctica on the annual supply vessel GREENWAVE, reached Keyport, Washington, on March 6, 1992. The wastes were inspected by a representative of the Washington State Department of Ecology. The representative noted that USAP's waste retrograde shipment represented "an absolutely superb operation" and that "all Federal agencies should follow this standard of safety." As a result of careful preparation and documentation at McMurdo, processing of the waste by a contractor took only three days rather than the anticipated ten days.

Over 20 Environmental Action Memoranda (EAMs) detailing the potential impacts of several proposed projects at McMurdo Station and other continental locations have been completed. Examples include: South Pole Station Fuel Bladder Replacement; Astro Building at South Pole Station; Addendum to EAM on Black Island Telecommunications Facility Upgrade; Installation of a Transportable Earth Station at Black Island, and a Temporary, Transportable Satellite Earth Station Near McMurdo; Temporary Non-Hazardous Waste Containment Area at McMurdo Station; Above Ground Utility Stanchion System Upgrade at McMurdo Station;

• Continuing Continental Progress

- McMurdo's domestic sewage macerator and submerged outfall were in place during the 1991-1992 season. Currently, the end of the outfall pipe is about 160 feet (~525 meters) offshore at a depth of about 60 feet (~197 meters). Intense wave action experienced early in March 1992 did not obliterate the outfall as was the case last season.

Between October and December 1991 currents were measured at eight locations near the shoreline at McMurdo to support studies of the distribution, movement and constituents of the sewage effluent;

During the 1991-1992 season studies on the persistence, distribution and health risk of enteric bacteria were conducted as were studies of sewage degradation. The results of these studies will be reported in the open literature.

- During the 1991-1992 research season the Safety, Environment and Health (SEH) Council continued to meet. It identifies, discusses and resolves SEH problems encountered for the continental activities of USAP;
- Throughout the 1991-1992 summer and winter seasons at McMurdo, NSF continued to promote all-hands clean-ups to

remove litter. These grass-roots efforts involve all components of the USAP;

- USAP continues to retrograde materials from its inland research locations. The clean-up actions noted above included the removal of:

1782 tons [3,564,000 pounds] of non-hazardous solid waste (e.g., construction debris and metals);

131 tons [262,000 pounds] of hazardous solid waste (e.g., suspect, polychlorinated biphenyl-containing electrical transformers);

668 tons [1,336,000 pounds] of hazardous liquid waste (e.g., waste fuel and petroleum products, organic solvents, and various acids and bases);

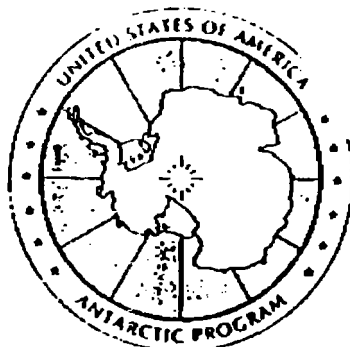
178 tons [365,000 pounds] of recyclable materials (e.g., glass, cardboard, white office paper, and plastics).

These wastes totaled about 5,518,000 pounds. In addition, USAP effected arrangements with the government of New Zealand and a waste disposal contractor to remove over 40 tons of waste food and food-contaminated wastes from McMurdo last season.

In Washington

- The Final Supplemental Programmatic Environmental Impact Statement (PEIS) for the USAP was distributed to the various components of the Program as well as over 600 interested individuals and organizations. The Division of Polar Programs appreciates the insightful comments made to date and encourages requests for the document;
- Between January 29-31, 1992, the Division of Polar Programs hosted a special workshop on Antarctic Operations Environmental Impact Monitoring and Assessment. Invited participants represented environmental organizations, Federal agencies involved in environmental monitoring, and monitoring experts. The purposes of the workshop were to develop a U.S. perspective on the issue of antarctic environmental monitoring and to help develop a strategy for a DPP program solicitation for applied environmental sciences studies to support USAP environmental decisionmaking and management. The workshop report is scheduled for completion in June 1992.
- Between March 2-5, 1992, the Division of Polar Programs hosted a meeting of the Environmental Subgroup of the Council of Managers of National Antarctic Programs. The meeting revisited the document Antarctic Environmental Assessment Process: Practical Guidelines, prepared in

Bologna, Italy in June 1991, in light of the newly adopted Protocol on Environmental Protection to the Antarctic Treaty. In addition, attendees representing the national antarctic programs of the U.S., Chile, Argentina, Sweden, Italy and the U.K. developed (in collaboration with the Scientific Committee on Antarctic Research) a draft document on antarctic environmental monitoring. The document is now being reviewed and refined for consideration by Parties to the Antarctic Treaty.



U.S. ANTARCTIC PROGRAM
RECENT ENVIRONMENTAL ACTIONS AND PROGRESS

Antarctic Peninsula

- o USAP spearheaded the deployment of rapid cleanup and environmental impact assessment teams following the grounding of the BAHIA PARASIO near USAP's Palmer Station on January 28, 1989. USAP continues to monitor the condition of the vessel and will carry on with impact studies related to the spill. USAP consultation with Argentine officials proceeds with the expectation of precluding future environmental harm from the wreck;
- o USAP has started the cleanup of Old Palmer Station and has surveyed East Base to explore what future cleanup activities are feasible. These cleanup activities are continuing during this austral summer research season. During the East Base cleanup, to occur during early March 1991, the NSF and the U.S. Department of the Interior are planning a joint venture in the preservation of materials of archaeological and historic value still present at the site;
- o Along with its civilian support contractor, USAP is developing a plan to sample soils around Palmer Station for evidence of past contamination;
- o USAP installed a domestic sewage macerator and a submerged outfall pipe at Palmer Station. The macerator is operating, improving the ability of the marine environment to assimilate Palmer's sewage effluent which receives no inputs of environmentally-harmful substances (all of Palmer's hazardous and toxic wastes are transported to McMurdo Station for return to the U.S.);

Continental Antarctica

- o The Safety, Environment and Health Implementation Team (SEHIT) has under way several environmental activities detailed in the Special Initiative Implementation Plan. For example, SEHIT's efforts for developing a new materials and waste management system for the USAP include:

- Initiation of an Interagency Agreement with the Department of Energy's (DOE) Argonne National Laboratory designed to fully evaluate options for improving solid waste management at McMurdo and Amundsen-Scott South Pole Stations. A component of this study focuses on assessment of incineration technologies that are available and suitable for selected combustible wastes at McMurdo Station; and, suitable for the antarctic context;
- continuation and expansion of waste materials separation, recycling and retrograde projects. During the 1989-1990 season, 680,675 pounds of scrap metal, and 12,800 pounds of other materials (e.g., aluminum cans, plastics and other metals) were returned to the U.S. for disposal or recycling;
- such projects implemented during 1990-1991 as:
 - discontinuation of regular use of disposable plates and utensils at McMurdo Station;
 - expansion of the recycling program to include such wastes as office and computer paper.
- o The USAP continued to retrograde materials from inland research locations. To clarify how this must be done in the future, the Division promulgated a policy on materials and waste retrograde from inland stations, bases and remote field camps.
- o The Division has received from the Naval Facilities Engineering Command, Pacific Division (PACDIV) a Spill Prevention, Control and Countermeasures Plan for McMurdo Station, South Pole Station and Williams Field. Currently, the SEHIT is reviewing all of the recommendations of that plan to define actions that will help preclude unnecessary entry of petroleum products to the antarctic environment. Some of actions already have been adopted and are being implemented. In this respect, the USAP:
 - continues to replace unreliable components of McMurdo's fuel oil distribution system (pipelino);
 - is replacing flexible hose with new "dry break" hose;
 - established and initiated adherence to Standard Operating Procedures for deployment of oil containment booms when ships are docked at McMurdo's ice pier;

- has procured and shipped steel bulk fuel storage tanks to McMurdo Station to replace fuel bladders.

- o The USAP has tasked the Naval Support Force, Antarctica and Antarctic Support Associates to effect improvements to the hazardous waste holding and retrograde (return) yard at McMurdo. This entails improving drainage patterns and grading near the area, construction of a security fence, and assuring full compliance with required labelling of all hazardous wastes prior to staging for retrograde;
- o The Program retrograded 184,134 pounds of hazardous waste and 22,700 pounds of radioactive wastes from USAP stations via McMurdo Station during the 1989-1990 research season;
- o USAP installed a domestic sewage macerator and effluent sampling tap at McMurdo Station. Work continues on extending and submerging the outfall at McMurdo Station. A nearshore current monitoring system is being designed to better understand the fate of sewage effluents;
- o In the matter of old station cleanup activities, the USAP continued the clearing of old debris and wastes from the Marble Point Air Facility. Also, USAP personnel once again visited Hallett Station to assess further cleanup activities this season. A major final task there will be removal of an empty fuel storage tank. The visiting team noted the return of many penguins to former building sites at the station;

In Washington

- o The Division of Polar Programs (DPP) has drafted procedures to implement the environmental impact assessment requirements of Executive Order 12114. The procedures have been reviewed and cleared by the Office of Management and Budget. They have been submitted to the Federal Register for public comment. The comments are now under review;
- o Staff from DPP and the National Science Foundation's Office of the General Counsel have worked since November 1989 to develop pollutant designation, permitting and control regulations under the Antarctic Conservation Act. They have:

- set a conceptual framework for defining harmful pollutants and for regulating their discharge in Antarctica;
- held a public hearing on these proposed regulations on May 18, 1990, and reviewed public and Federal agency comments on the regulations;
- received and acted on public and Federal agency nominations to an Interagency Task Group to be charged with creating an effective pollutant permit program. Nominees to the Task Group are representatives of Federal agencies, environmental groups, and the private sector. The Task Group has held two meetings, to date, and is reviewing chemical substances present at stations.

- o Work on supplementing the 1980 Programmatic Environmental Impact Statement for the USAP progresses smoothly, DPP staff have reviewed a preliminary draft. We expect to distribute a draft for agency and public comment around early January 1991;
- o The Division has received a statement of work (SOW) from DOE's Idaho National Engineering Laboratory to provide support for a USAP Program of Environmental Measurements; and, the Division is discussing terms of a SOW with another DOE national laboratory to provide support in quality assurance and quality control for this program of environmental measurements. Also, the Division has recommended for support a grant to assess microbial risks to McMurdo's potable water quality and a grant to continue study of the impacts and distribution of pollutants in Winter Quarters Bay;
- o The Division has commissioned a study to assess options for replacement of Amundsen-Scott South Pole Station. Dr. Peter E. Wilkiss provided the following guidance statement to the project contractor: "Create and implement a design that will serve the most complex frontiers of science, with technologies yet to be developed, while maintaining the essential pristine character of the vast polar plateau on which it will be situated."; and
- o The Division, under the aegis of the Council of Managers of National Antarctic Programs, is providing substantial contributions to a proposal for a future workshop on antarctic environmental impact assessment. The Division advocates the position that the workshop focus on implementation of existing environmental management and assessment recommendations promulgated at Antarctic Treaty Consultative Meetings (ATCMs). Further guidance to this workshop will derive from the Special ATCM, recently held in Chile.