United States General Accounting Office

GAO

Testimony

For Release
on Delivery
Expected at
2:00 p.m. EDT
Thursday
April 25, 1991

NUCLEAR HEALTH AND SAFETY

Environmental, Health and Safety Practices at Naval Reactors Facilities

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Before the
Department of Energy Defense
Nuclear Facilities Panel
Committee on Armed Services
House of Representatives

Mr. Chairman and Members of the Committee:

We are pleased to be here today to discuss our work to date on the Naval Reactors Program's environmental, health, and safety practices at its research and development facilities--the Knolls Atomic Power Laboratory near Schenectady, New York; the Bettis Atomic Power Laboratory near Pittsburgh, Pennsylvania; and their related reactor sites. We were asked by Representative Mike Synar, Chairman of the Environment, Energy and Natural Resources Subcommittee, House Committee on Government Operations to conduct the review because of several allegations concerning poor environmental, health, and safety practices at the facilities. These allegations involved employee over-exposures to radiation, reactor safety, asbestos problems, and improper management of areas containing radioactive and hazardous waste. We are testifying today with Chairman Synar's agreement.

In the past we have testified many times before this Committee regarding problems in the Department of Energy (DOE). It is a pleasure to be here today to discuss a positive program in DOE. In summary, Mr. Chairman, we have reviewed the environmental, health, and safety practices at the Naval Reactors laboratories and sites and have found no significant deficiencies. We interviewed all individuals that made allegations, contacted over 60 individuals referred to us that supposedly knew of problems, and distributed 4,000 notices to Knolls' personnel requesting information on any

problems concerning environment, health, and safety. Our audit is now complete and we are in the process of finalizing our report.

The Naval Reactors program is a joint program of DOE and the Navy. Its purpose is to perform research and development in the design and operation of nuclear propulsion plants used in Navy vessels and conduct training of naval personnel in reactor plant operations. The laboratories are contractor-operated and Naval Reactors has established field offices at both laboratories to oversee the operations. The two laboratories operate three prototype training reactor sites that have a total of seven operating reactors.

Our review included an evaluation of the specific programs related to the various allegations. They are radiological controls, reactor safety, asbestos controls, waste handling and disposal procedures, external and internal oversight of Naval Reactors activities, status of past problems, and finally classification practices.

I will now discuss the details in each of these areas.

RADIOLOGICAL CONTROL

Our review of Naval Reactors' radiological procedures and requirements, visits to radiological areas at the laboratories and

sites, and evaluations of procedures to detect and measure personnel exposures to radiation disclosed no evidence that unsafe radiological operations or conditions were present at the Naval Reactors laboratories and sites reviewed. In addition, according to documentation we reviewed, the laboratories and sites are in full compliance with federal and/or state standards regarding radioactive releases to the environment.

The laboratories and sites prevent releases of radiological material by using shielded cells, glove boxes, and other engineered containments. In addition, radiological work areas are required to be isolated by visible barriers and plainly marked, and all employees and visitors are indoctrinated on radiological controls. The radiological work areas are also monitored by alarms that sound off if a release occurs.

There are basically two types of radiation exposure that personnel can receive--internal and external. Internal exposures occur when radioactive particles are either breathed into the lungs or swallowed into the digestive system. External exposures occur from sources that discharge penetrating rays that can pass through the skin and enter body organs. Naval Reactors laboratories and sites have programs to detect internal radiation and measure external exposures.

To detect internal radiation, the Naval Reactors laboratories and sites operate a routine bioassay program consisting of lung scanning and/or urinalysis. External exposures are detected and measured by requiring that all radiological workers wear thermoluminescent dosimeters--a device used to measure radiation. Using a judgmental sample of 153 radiological workers, we verified that radiological workers received routine bioassaying at least every 3 years and that employees' dosimeters were read at least once a month and the results were recorded in the employees' permanent exposure record. In addition, we verified that individuals involved in incidents that had a potential for internal exposures received lung scans and/or urinalysis, and the results were recorded on the individual's permanent exposure records.

During our review we examined information pertaining to an allegation that seven people at Knolls had received internal radiation exposures in excess of DOE's allowable limits. These exposures were calculated by a health physicist employed at the laboratory using historical bioassay information contained in the individuals' permanent exposure records. GAO's nuclear engineer reviewed these calculations and determined that the methodology was flawed in that unrealistic assumptions had been used. Thus, we concluded there was no basis for the allegation that over-exposures had occurred. In addition, the contractor at Knolls laboratory had the calculations assessed independently, and DOE's Office of

Inspector General also investigated the matter. Both concluded there was no basis for the allegation.

The radiological control program implemented at Naval Reactor laboratories and sites has resulted in minimal exposures. Naval Reactors has administratively established a limit of 2 rem per year for its personnel and for its contractors, compared with the federal standard of 5 rem per year. Our review of personnel exposure records, incident reports, and other exposure information dating back to 1967 disclosed no evidence that anyone in the Naval Reactors program has exceeded the 5 rem per year limit. In addition, information available back to 1984 shows no one has exceeded the 2 rem per year limit established by Naval Reactors.

REACTOR SAFETY

In evaluating reactor safety, two elements must be considered--reactor design and reactor operations. We evaluated the design and the operational aspects of each operating prototype reactor, and found that Naval Reactors laboratories and sites have provided safety measures that are consistent with the requirements for commercial nuclear reactors. According to the Nuclear Regulatory Commission's (NRC) Deputy Director for Reactor Regulation, the prototype reactors may exceed some of the commercial safety requirements because of their rugged design and construction for combat stress and their relatively small size.

Moreover, our review of historical incident reports and discussions with many personnel located at the reactor prototype sites disclosed that no significant nuclear accidents--those resulting in fuel degradation--have occurred during prototype operations. Furthermore, none of the more than 1,700 randomly selected reactor incident reports we reviewed, out of a total of over 12,000 reports dating back to the initial operation of each reactor, noted any major safety problems.

The reports reviewed included all those from a special category established by Naval Reactors in 1983 that contains reports that they judged to be more significant than others. For example, if an automatic safety system is activated as a result of operator error or equipment failure, the incident report is assigned to the special category. Many of the incidents reported consisted of blown electric fuses, loose wires, and personnel procedural errors.

While a large number of personnel errors may be considered significant, especially in light of the sequence of events that lead to the accidents at Three Mile Island and Chernobyl, the errors made at the prototypes are different in that they are minor and occur in a controlled environment. These reactors are shut down or scramed at the slightest out-of-normal condition and provide training opportunities in a controlled situation. For

example, a student trainee de-energized a wrong power supply, causing a momentary loss of power, resulting in a reactor scram. There was no significant reactor consequences, however, the student was required to take additional training.

It should be noted that all incident reports were thoroughly reviewed and critiqued by Naval Reactors, in that the reports contained extensive details on the incidents, their causes, and necessary corrective actions. In addition, a formal commitment date is established for completion of corrective actions and this date is entered into a formal tracking system and monitored by Naval Reactors.

Contrary to some allegations, we found that the prototype reactors do employ enhanced safety systems and do meet the intent of NRC's safety criteria for normal operations and accident conditions. In this respect, all the reactor designs and major modifications have been reviewed, at the request of the Naval Reactors program, by NRC, the old Atomic Energy Commission, or the Advisory Committee on Reactor Safeguards.

While not required to do so, Naval Reactors has acted on the recommendations and concerns resulting from these reviews. In addition, Naval Reactors has established a system to routinely review and determine the applicability of NRC bulletins and publications that note equipment or component reliability problems

in the commercial sector. For example, from January 1988 to August 1990, Bettis reviewed 360 such documents and found 30 pertinent to its prototypes at the Idaho site.

Another factor that is extremely important for safe reactor operations is the qualifications and training of the contractor personnel who manage, operate, and maintain the reactors. These managers, supervisors, and operators receive the same training as Navy officers and crew members. For example, the senior contractor representative stationed at the prototype reactors on a full-time basis is the shift supervisor. A prospective shift supervisor is recruited out of college with a Bachelor's degree in a technical field such as mechanical, electrical, chemical, nuclear, or marine engineering. Beyond that, it takes 5 or more years of training to become a shift supervisor.

ASBESTOS CONTROLS AND PROCEDURES

As you know, asbestos exposure is a serious health hazard, and federal standards have been established to control asbestos exposures. The asbestos controls and procedures implemented at Naval Reactor laboratories and sites have been responsive to federal standards and in some cases exceed the standard. However, asbestos incidents have been reported at Naval Reactors facilities, and in 1986 the Knolls laboratory had a major lapse in asbestos control when several Navy personnel were exposed to asbestos levels

that exceeded federal standards. The incident was investigated and, as a result, numerous recommendations were implemented to improve asbestos controls at that time.

Bettis laboratory and its prototype site have adopted the Occupational Safety and Health Administration and the Environmental Protection Agency (EPA) standards for exposure limits and controlling asbestos. However, Knolls laboratory and its sites have established more stringent requirements. For example, federal standards permit individuals working with asbestos to wear half-faced respirators while Knolls requires full-faced respirators. In addition, the Knolls laboratory requires authorization from its Industrial Hygiene group before anyone removes any ceiling access panels. Federal standards do not require this additional safeguard.

During our review, the GAO Manager for Health and Safety, who is responsible for an extensive asbestos control and removal program at our headquarters building, toured all the Naval Reactors laboratories and sites, except one small site attached to Knolls. In addition, he took 57 independent air samples at these locations in areas he judged to have a high potential for airborne asbestos. None of the samples had a statistically significant level of asbestos and all were below detectable limits for the methods of analysis. However, during tours of the facilities, damaged wrapping on pipes containing asbestos was noted and asbestos fibers

were found in the cracks in some wooden flooring in one of the buildings. Our Health and Safety manager considered these to be less than significant given the age and size of the facilities toured. However, he also concluded that it is necessary that the laboratories and sites maintain a close vigilance on these potential problems.

To avoid the potential for asbestos problems, Naval Reactors has approved a program to remove or stabilize asbestos at all of its facilities over the next 10 years. The program is currently estimated to cost $68 million and should start at most of the facilities this year.

WASTE HANDLING AND DISPOSAL

Naval Reactors laboratories and sites generate two types of wastes--radioactive and chemical. Naval Reactors has developed procedures and requirements for handling, collecting, storing, and shipping the waste off-site. We verified that the procedures were being implemented by physically inspecting the generating and storage areas and verifying or tracing the documentation of 78 shipments--from generation to final disposal in approved facilities. All waste materials were accounted for at all stages.

EXTERNAL AND INTERNAL OVERSIGHT

Although Naval Reactors is exempt from most external oversight its laboratories and sites are inspected by EPA and state agencies against standards for handling and disposal of chemical waste. For example, from January 1988 to July 1990 the Knolls laboratory and its largest site was inspected 10 times by EPA and 23 times by New York state agencies. These inspections resulted in one deficiency and one violation. Both were minor and were corrected by the contractor. In addition, all laboratories and sites are in the process of complying with the Resource Conservation and Recovery Act, administered by EPA, which requires that potentially hazardous areas be characterized and remedial action taken if necessary.

Internal oversight is carried out by the two contractors, the Naval Reactors field offices, and Naval Reactors headquarters. The contractors perform audits, inspections, assessments, and surveillances. They use program procedures and regulations as criteria and report any deviation. These are entered into local computer tracking systems that identifies the procedure violated and indicates whether corrective action has been taken. During our review at Bettis' Idaho site we had a computer listing prepared of all radiological control audit findings for a 1-month period in 1989. There was a total of 199 observed radiological deficiencies, and according to the computer listing, all had been corrected.

While most of the findings were minor, the large number of deficiencies reflects the emphasis placed on adhering to the procedures and regulations.

Naval Reactors field offices audit all aspects of contractor activities. For example, from January 1988 to December 1990, the two field offices performed 919 formal audits. These included audits of environmental, health, and safety programs that contained recommendations. The recommendations require a response from the contractor, and their implementation is tracked and verified by Naval Reactors officials.

Naval Reactors headquarters also audits the laboratories and sites. These audits are performed by as many as 20 senior level personnel and include radiological controls, reactor safety, environmental compliance, and other health and safety aspects. These audits are also responded to by the contractor.

PAST PROBLEMS REQUIRE MONITORING

Problems associated with past activities at Naval Reactors laboratories and sites are being controlled and monitored to protect public and worker health and safety. These problems include radioactively contaminated buildings and areas and chemical wastes in landfills and disposal sites. For example, during the early 1950s a plutonium facility was operated at Knolls

which generated radioactive waste. Some of the waste was spilled onto soil that has since been removed and disposed of. We reviewed all the past problems at each laboratory and site and found that they have all been characterized, are periodically monitored, and controlled where necessary. All contaminated sites will need to be monitored in the future to assure their continued safety. We found no evidence that Naval Reactors attempted to hide past problems or their significance.

CLASSIFICATION PRACTICES

As part of our review, we were asked to determine if Naval Reactors classifies information to prevent public disclosure of problems that could be embarrassing to the program. In this connection I would like to note that we were given full and complete access to all classified and other information needed during our work. We reviewed thousands of classified documents and could find no trend or indication that information was classified to prevent public embarrassment.

We did note eleven documents that we felt should not have been classified. We asked a Naval Reactors classifier to review the documents. As a result, six of the documents were declassified, and the classification was downgraded for two of the remaining five documents. These documents did not contain information that identified significant environmental, health and safety problems.

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Mr. Chairman, this concludes my statement and I would be happy to answer any questions at this time.