UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of	)	
	)	
POWER AUTHORITY OF THE STATE OF NEW YORK	)	Docket No. 50-549
	)	
	)	
(Greene County Nuclear Power Plant)	)	

SUPPLEMENTAL TESTIMONY OF NRC STAFF IN RESPONSE TO CITIZENS TO PRESERVE THE HUDSON VALLEY, STIPULATED CONTENTION I.B.6 (OCCUPATIONAL EXPOSURE)

by

Thomas D. Murphy

This testimony is offered in response to Contention I.B.6 of Citizens to Preserve the Hudson Valley, which reads as follows:

> I. The Preliminary Safety Analysis Report ("PSAR") prepared by the Applicant does not provide reasonable assurance, as required by 10 CFR §50.35 and §50.40 and (a) the health and safety of the public will not be endangered, and (b) the Applicant is financially qualified to engage in the proposed activities in accordance with the Commission's regulations in the following respects. . .
>
> B. The PSAR is deficient with regard to its description and analysis of the following design features or principal safety considerations as required by 10 CFR §50.34:
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> 6. The ability or adequacy of plans for maintenance of equipment containing radio-cobalt buildup to meet occupational radiological criteria set forth in 10 CFR Part 20.

The NRC Staff's evaluation of PASNY's radiation protection program is set forth in Section 12 of the SER. The following testimony is offered in supplementation of the SER.

Our licensees are required to meet the standards for protection against radiation contained in 10 CFR Part 20 during the operation and maintenance activities associated with operating a nuclear power plant. To assure that this can be achieved for PASNY's Greene County Nuclear Power Plant we reviewed the design features and radiation protection program proposed by PASNY in their PSAR to protect workers from radiation

exposure during operation and maintenance activities. Our requirements for acceptance are outlined in Chapter 12 of NUREG-75/087, U.S. Nuclear Regulatory Commission Standard Review Plan. The main criteria used to determine the acceptability of their design and radiation protection program is that the design and programs will maintain doses to personnel within the limits of 10 CFR Part 20, "Standards for Protection Against Radiation," and will be consistent with the recommendations of Regulatory Guide 8.8, "Information Relevant to Maintaining Occupational Radiation Exposure as Low as is Reasonably Achievable (Nuclear Power Reactors)."

As implied by the contention, activated corrosion products have been shown to be a major source of occupational radiation exposure at operating nuclear power plants. Co-60 has been shown to be the significant isotope contributing to the radiation levels around reactor coolant, and auxiliary system components. PASNY has specified a maximum 0.2% Cobalt-59 (Co-60 precursor) content for materials in contact with coolant for the Greene County Nuclear Power Station. Actual values of cobalt content in austenitic steels and Alloy 600 materials in contact with reactor coolant have averaged less than 0.1% average residual cobalt. PASNY considers that to require a specification value of 0.1% maximum residual cobalt as suggested by us would increase material costs up to 5%, but would not reduce cobalt values currently experienced. We agree with this analysis at this time on the basis that the increased cost will not provide commensurate exposure reduction benefits.

With regard to high cobalt bearing alloys such as Stellite, PASNY considers that the superior wear characteristics, compatibility with reactor

coolant, and low exposed surface area argue for the selection of Stellite over other alloys. We also agree with the PASNY position at this time on the basis that the Applicant uses high cobalt bearing alloys only in areas where hard surfacing is required.

We consider that PASNY's material selection for the reactor coolant and auxiliary systems will result in the build up of activated corrosion products which will not exceed levels presently experienced at operating nuclear power plants. The resultant radiation fields from these activated corrosion products that will expose personnel required to perform maintenance activities on equipment and components in the reactor coolant and auxiliary systems should not exceed those presently experienced. Having this basis for the anticipated radiation fields, in our review of PASNY's design features and radiation protection program we sought assurance that adequate measures have been taken to protect workers from these radiation fields. Examples of features in the PASNY Greene County design and radiation protection program which provide us with this assurance and which are consistent with our acceptance criteria of Regulatory Guide 8.8 are as follows.

The Applicant has addressed its radiation protection program in the Chapter 12 of the PSAR. In Section 12.1.1 PASNY has provided a management commitment to extend every reasonable effort to design, construct, and operate Greene County Nuclear Power Plant in a manner consistent with Regulatory Guide 8.8. The Corporate Radiological Engineer and his staff will perform design reviews to assure that the plant is designed and constructed to maintain occupational radiation exposures as low as is reasonably achievable.

(Response to Q 331.23)

In Section 12.3.1 PASNY addressed the following design features to assure that doses to workers will be as low as is reasonably achievable. Radioactive equipment is located in individually shielded cubicles. Instrument racks in the annulus building are located above the cubicles or in the radial corridors. Valve selections will be made on a "best product" available basis considering materials and service conditions. Routing of all radioactive piping is planned and reviewed before installation. The liquid waste systems have permanent pipe flushing connections, and heat exchangers are provided with chemical cleaning connections. The radiation protection design features are consistent with the recommendations of Regulatory Guide 8.8.

In Sections 12.5.1 and 13.1 PASNY describes their propcsed radiation protection organization. The Radiation Protection and Radiochemistry Supervisor will be responsible for the initiation and maintenance of the health physics program. The health physics program will be designed and operated in such a manner as to maintain occupational radiation exposures as low as is reasonably achievable. The Radiation Protection and Radiochemistry Supervisor will have direct recourse to the Resident Manager to allow sufficient authority to maintain the program. The organization of the program is consistent with Regulatory Guide 8.8.

In Section 12.5.2 PASNY describes their proposed equipment, intrumentation and health physics facilities. The health physics facilities will include a radiochemistry laboratory, counting room, instrument calibration and storage

area, personnel decontamination area, equipment decontamination area, change area, access control points, and an office area. The health physics equipment will include a full range of counting equipment, portable survey instruments, personnel monitoring instruments and devices, protective clothing, and respiratory protection devices. The necessary facilities and equipment are included to allow the health physics program to be run such that occupational radiation exposure is maintained as low as is reasonably achievable.

In Section 12.5.3 PASNY states that the plant radiation protection procedures will be developed in a manner consistent with recommendations of Regulatory Guide 8.8. Therefore, we consider that PASNY has adequate plans to protect workers in compliance with the standards for radiation protection contained in 10 CFR Part 20.

PROFESSIONAL QUALIFICATIONS
OF
THOMAS D. MURPHY

EXPERIENCE

As a member of the Radiation Protection Section of the Office of Nuclear Reactor Regulation, USNRC since February 1973, and as leader of that group since February 1976, I have evaluated the adequacy of radiation protection programs in support of the licensing of commercial nuclear power plants. I helped develop review programs, acceptance criteria, and solutions to managerial and technical activities associated with those evaluations. For three years as Chief of the Quality Control Inspection Department at the Electric Boat division of General Dynamics Corporation, I managed a group of 200-300 personnel performing electrical, electronic, mechanical, piping and structural inspections and non-destructive test operations to assure compliance with plan and procedure requirements for all shipboard and shop work associated with the construction, test and overhaul of nuclear powered submarines. As Manager of the Radiological Control Department at Electric Boat, I supervised all radiological safety activities at the Groton shipyard for over four years. For one year at Allis-Chalmers Manufacturing Company and four and one-half years as a civilian employee of the Army and Navy at Fort Belvoir, Virginia and Pearl Harbor Naval Shipyard, Hawaii, I managed audit, technical and operational radiological safety functions primarily associated with the construction, operation, test, overhaul and repair of nuclear power reactors. For two and one-half years I worked as an Assistant Health Physicist on the staff of Brookhaven National Laboratory performing various research, training and monitoring activities.

EDUCATION

M.S., Management, 1972, Rensselaer Polytechnic Institute, Troy, N.Y.
M.S., Radiological Physics, 1957, University of Rochester, Rochester, N.Y.
B.S., Science, 1956, Union College, Schenectady, N.Y.

SPECIAL TRAINING

AIF Institute on OSHA Impact on Nuclear Industry, 1975
Modern Management and Supervision, USDA, 1974
Management by Objectives, General Dynamics, 1972
Statistical Quality Control Management Institute, Univ. of Conn., 1971
Nuclear Reactor Engineering and Operations, Ft. Belvoir, Va., 1964
Criticality Hazards Evaluation, ORNL, 1959
Radiological Defense Officer's Course, OCD, 1958

SOCIETIES AND SPECIAL APPOINTMENTS

Health Physics Society; American Nuclear Society; Certified by the American Board of Health Physics; Member of the ABHP Panel of Examiners; present or past member of American National Standards Institute ANS Working Group; ex-officio member of two AIF/NESP Task Forces concerned with occupational exposure; and served one year on the Wisconsin State Industrial Commission Radiation Protection Advisory Council.