

John D. O'Toole
Vice President

Consolidated Edison Company of New York, Inc.
4 Irving Place, New York, NY 10003
Telephone (212) 460-2533

November 21, 1984

Dr. Thomas E. Murley
Regional Administrator
U.S. Nuclear Regulatory Commission
Region I
631 Park Avenue
King of Prussia, Pa. 19406

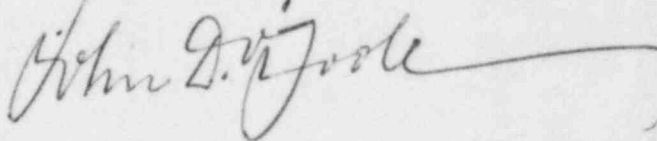
Dear Dr. Murley:

The letter of Mr. Richard C. DeYoung dated September 27, 1984 together with the Order Modifying License of the same date has been forwarded to me for reply. We agree with your observation that, as a result of the events leading to the issuance of the Order Modifying License, there were no exposures in excess of regulatory limits. However, we do see opportunities for further improving the effectiveness and functioning of our radiological controls program.

Provided herewith as Appendices A, B, and C are our response to items A(1), A(2), and A(3), respectively, from the Order Modifying the License. Appendix D contains the names of the members of the Radiation Protection Oversight Committee and their qualifications. Appendix E contains the recently approved Station Administrative Order 301, "Radiation Protection Plan" which outlines the plan for and elements of the upgraded Radiation Protection Program.

Should you or your staff have any questions, please contact us.

Very truly yours,



cc: Mr. Richard C. DeYoung, Director
Office Of Inspection and Enforcement
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Senior Resident Inspector
U.S. Nuclear Regulatory Commission
P. O. Box 38
Buchanan, New York 10511

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APPENDIX A

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RESPONSE TO ITEM A(1) - ACTION PLAN

<u>ACTION ITEM</u>	<u>DESCRIPTION</u>	<u>MILESTONE DATES</u>
1. Develop Radiation Protection Plan	<p>A description of the program (Appendix E to this transmittal) outlining the policy, basis and objectives of the Radiation Protection Program shall be developed as a Station Administrative Order for the Indian Point Station. In addition to the Station radiation protection policy and objectives, Appendix E addresses the following:</p> <ul style="list-style-type: none">a) Provision for positive control of High Radiation Areas. (Section E-1.c.)b) A clear and effective Radiation Work Permit (RWP) system. (Section E-1.c.)c) A technically adequate and effective Respiratory Protection Program. (Section E-2.b.)d) An effective Training Program for both employee and contractor health physics staff and radiation workers. (Section D)e) A program which documents existing corporate philosophy to maintain radiation exposures as low as is reasonably achievable. (Section E-1.b.)f) A system for auditing and evaluating program implementation by qualified assessors at least annually. (Section I-2.d)	October 12, 1984
2. Develop Radiation Protection Manual	<p>A manual that establishes the requirements for the Indian Point Radiation Protection Program shall be developed using the guidance contained in NUREG 0761. The manual shall describe the following:</p> <ul style="list-style-type: none">o Administrative and functional responsibilities of the Environmental Health and Safety organization.o Indian Point radiation protection training and qualification.	November 20, 1984

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<u>ACTION ITEM</u>	<u>DESCRIPTION</u>	<u>MILESTONE DATES</u>
	<ul style="list-style-type: none"> o The dose control system for evaluating, controlling, monitoring and recording doses. o The system for identification, accountability, control, movement, storage, and inventory of radioactive materials. o The type and frequency of radiological surveys. o The types, numbers and calibration criteria of radiation protection instrumentation. o The types and frequencies of radiological reviews, audits and appraisals including deficiency reporting and corrective action mechanisms. 	
<p>3. Develop Implementing Procedures for Radiation Protection Manual Requirements</p>	<p>Procedures that provide instructions and the steps to implement the Radiation Protection Manual requirements will be developed. A preliminary list of procedures by major topic/subject are attached (Attachment 1). The procedures will be subject to a field validation prior to approval and implementation.</p>	<p>March 8, 1985</p>
<p>4. Provide Training for on-site Personnel.</p>	<p>Upon completion of the Radiation Protection Manual, training objectives will be identified, lesson plans developed and supplemental training conducted for personnel working at the Indian Point Station. The training will thereafter routinely be given to the radiation protection staff and company and contractor radiation workers.</p>	<p>June 30, 1985</p>
<p>5. Program Approval</p>	<p>Upon completion of the Radiation Protection Implementation Procedures and during the conduct of retraining in the upgraded program requirements, an appraisal similar in scope and methodology to that of NUREG 0855,</p>	

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ACTION ITEM

DESCRIPTION

MILESTONE DATES

"Health Physics Appraisal Program," will be conducted by individuals knowledgeable in commercial power reactor Health Physics and independent of the station radiation protection organization. The appraisal recommendations will be reviewed by the facility staff, written responses prepared, and action items generated.

ATTACHMENT 1 to APPENDIX A

PRELIMINARY PROCEDURE LIST

ALARA

ALARA Job Review
ALARA Goals and Measurement
ALARA Reviews of Design Modifications
ALARA Reviews of Work Procedures
ALARA History File

EXPOSURE CONTROL

Administrative Exposure Control
Area Definition and Posting
Radiologically Controlled Area Access Controls
High Radiation Area Key and Access Control
Contamination Control
Radioactive Material Control
Area and Equipment Release Requirements
Decontamination of Personnel
Radiation Work Permit

RADIATION PROTECTION OPERATIONS

Routine Survey Requirements
Non-Routine Survey Requirements
Performance of Radiation and Contamination Surveys
Airborne Radioactivity Sampling
Control, Leak Test, and Disposal of Licensed Sources

DOSIMETRY

Issue and Control of TLD's
Extremity and Special Monitoring
Monitoring for Neutron Radiation
TLD Reader Operation
TLD Reader Calibration
TLD Acceptance Testing
Direct Reading Dosimeter Issue and Control
Radiation Exposure Records and Reports
Dosimetry Investigation Reports

BIOASSAY

Conduct of the Bioassay Program
Assessment of Bioassay Results
Efficiency Calibration of the NA 6700 Counting System - APT
Phantom
NA 6700 FWHM, Background Acquisition and Quality Assurance
Checks

ATTACHMENT 1 to APPENDIX A

PRELIMINARY PROCEDURE LIST

BIOASSAY

(continued)

Whole Body Counting Using the NA 6700 System
Bioassay Records and Reports

RADIOLOGICAL ENGINEERING

Temporary Shielding Program
High Radiation Area Enclosure Design and Acceptance
Commitment Tracking System
Station Radiological Status Reporting System
Installation & Acceptance Criteria for Temporary Ventilation
Systems
Dose Calculation
Radiological Work Practices Development

INSTRUMENTATION

General

Use and Care of Instrumentation
Calibration Facility Operation
Calibration, Functional and Operational Checks of Radiation
Protection Instrumentation
Decay Corrections for Radioactive Sources
Use of the Model 1000 B Gamma Calibrator
Count Room Standard Practices

Laboratory

Calibration Checks and Use of the Victoreen Condenser 'R'
Meter
Calibration and Use of the Eberline BC-4
Calibration and Use of the SPA-3 With the MS-2
Calibration and Use of the PCC11T and DS-2
Calibration and Use of the Eberline SAC-4
Calibration and Use of the Baird Atomic Poly Spec Scaler and
SSC-3 Automatic Planchet Changer
Calibration and Use of the SC2B/DS-2
Calibration and Use of the Eberline SAM2/RO-22

Air Samples

Calibration and Use of the Eberline RAS-1 Portable Air
Sampler
Calibration and Use of the Eberline AMS-2
Calibration and Use of the NMC AM-2A CAM
Calibration and Use of the NMC AM-28 CAM
Calibration and Use of the NMC 331F CAM

ATTACHMENT 1 to APPENDIX A

PRELIMINARY PROCEDURE LIST

Air Samples
(continued)

Calibration and use of the NMC Digital CAM
Calibration and Use of the NMC Digital CAM
Calibration and Use of the Triton 1055B

Calibration and Use of the Triton JLI 955B
Calibration and Use of the Triton III
Calibration and Use of the Padeco HD-28 LoVol
Calibration and Use of the GP-4 Air Monitor
Calibration and Use of the Dupont 4000A Lapel Air Sampler
Calibration and Use of the Victoreen Lapel Sampler Model
08-430
Calibration of the "Siersat" Personnel Air Sampler
Calibration and Use of the Sipin Lapel Sampler
Calibration and Use of the Gillian Model HFS 113 Lapel Air
Sampler

Portable

Calibration and Use of the Eberline RM-14
Calibration and Use of the NMC Frisker
Calibration and Use of the Eberline RO-1
Calibration and Use of the Eberline RO-2 and RO-2A
Calibration and Use of the Eberline RO-4A
Calibration and Use of the Eberline RO-7BM
Calibration and Use of the Eberline PIC 6A
Calibration and Use of the Eberline EI40
Calibration and Use of the Eberline E-510 D-N
Calibration and Use of the Eberline E-520
Calibration and Use of the Eberline E530N/HP-200
Calibration and Use of the CP-MU High Range Underwater Meter
Calibration and Use of the Eberline Teletector
Calibration and Use of the Victoreen 740 FCP
Calibration and Use of the Digimaster, Xetex 305A and 305B
Survey Meter
Calibration and Use of the Eberline PAC-4S
Calibration and Use of the Eberline PNR-4 Neutron Rem
Counter
Calibration and Use of the Ludlum Model 50M
Calibration and Use of the PRM-7 Micro R Meter
Use of the CDU 715/720
Calibration and Use of the Rad-Tad
Calibration and Use of the Xetex Digital Dosimeters, Models
409A, 415A and 415A Modified
Calibration and Use of the Ludlum 43-2 Alpha Probe
Dosimeter Charger Use

Fixed

Calibration and Use of the GA 2T Gamma Alarm
Calibration and Use of the Radiation Monitor Model PRM 110C

ATTACHMENT 1 to APPENDIX A

PRELIMINARY PROCEDURE LIST

Fixed
(continued)

Calibration and Use of the Eberline RM-16/RD17A
Calibration and Use of the Eberline RM16/HP-200
Calibration and Use of the AM-2 Gamma Alarm
Calibration and Use of the Eberline PMC/PMP-4B Portal
Monitor
Calibration and Use of the Hard Hat Monitor

RESPIRATORY PROTECTION

Respiratory Protection - Operational

Selection and Use of Respiratory Protection Devices
Control, Issue and Storage of Respiratory Protection
Devices
MPC Hour Tracking and Stay Times

Respiratory Protection - Facility

Inspection and Inventory of Respiratory Protection Devices
Cleaning and Sanitizing of Respiratory Protection Devices
Maintenance and Repair of Respiratory Protection Services
Calibration and Use of the MSA Filter Resistance Tester
Calibration and Use of the Air Techniques Model 9127 for
Testing of Respirator Cartridges
Respirator Seal Bench Testing

Respiratory Protection - Fit Testing

Calibration, Maintenance and Use of the Frontier Enterprise
Fit Test System
Calibration Maintenance and Use of the Air Technique Fit
Test System

APPENDIX B

RESPONSE TO ITEM A (2) - INTERIM ACTIONS

Consolidation of Procedures

Consolidation of Environmental Health & Safety Procedures (EH&S), Health Physics Procedures (HPP) and Health Physics Instructions (HPI) has been completed. The final index of procedures is attached to this Appendix. The procedures will be implemented upon completion of H.P. Technician supplemental training.

Personnel Training

A review of the consolidated procedures described above was conducted during the week of October 21, 1984. The purpose of the review was to determine the supplemental training required for health physics technicians. The supplemental training will be completed by December 7, 1984. Additionally, the radiation safety training provided to personnel working within radiologically controlled areas will be reviewed to determine if training modifications are necessary to enhance personnel understanding of program requirements. Designated changes will be incorporated into training lesson plans and presented as part of initial and annual requalification training. The review and revision will be performed by January 7, 1985.

Enhanced High Radiation Area Control

The following enhancements to high radiation area control have been or will be implemented:

- o Instructions on implementation of high radiation area controls, frequency of high radiation area surveillance and training of personnel responsible for implementation were put into effect for interim enclosures until the locked gates were installed.
- o Locked expanded metal gates were constructed for high radiation areas ($> 1R/hr$) within containment. The expanded metal gates are not seismically qualified but will be replaced at a later date by permanently mounted seismically qualified structures. Until construction of the permanent seismically qualified barriers, the expanded metal gates will be utilized during periods of reactor shutdowns. All entries at other times shall continue to be accomplished under the control of a qualified radiation monitor.

APPENDIX B

RESPONSE TO ITEM A (2) - INTERIM ACTIONS

- o Health Physics personnel were assigned to perform increased surveillance of the high radiation work area on the 95' and 68'/46' elevations of the Vapor Containment.
- o Additional dose indicating alarming dosimeters have been purchased and the instruction on their purpose and use have been included in worker radiation safety training.
- o The training lesson plans will be reviewed and modifications made to reasonably assure personnel understand the purpose and requirements of High Radiation Area Controls. These changes will be incorporated into training lesson plans as part of initial and annual requalification training. The review and revision will be performed by January 7, 1985.

Increased Management Oversight

A former radiation protection and radwaste manager has been assigned to the radiological assessor's position. The radiological assessor reports directly to the Vice President, Nuclear Power and provides assessments of radiological work performance and compliance.

ATTACHMENT 1 TO APPENDIX BINDEX OF CONSOLIDATED PROCEDURESALARA

HPP 1.1 Implementation of ALARA policy.
 HPP 1.2 Administrative Radiation Exposure Control.
 EHS 3.001 Radiological Protection Surveillance
 Evaluation.

ACCESS CONTROL

HPP 2.1 Radiation Work Permits
 HPP 2.2 Radiation, contamination and airborne
 activity guides and limits.
 HPI 2.24 Access control to contamination areas.
 HPI 2.210 Instructions to VC Control Point
 personnel in the event of an evacuation.
 EHS 3.101 Access Control Areas
 EHS 3.102 Controlled area entry/egress
 EHS 3.104 Vehicle entry/exit from controlled area
 staging locations.
 EHS 3.105 Supplementary access control points.
 EHS 3.106 Containment building entry.
 EHS 3.107 Vapor containment building control point
 EHS 3.109 Locked high rad area control
 EHS 3.350 Release of tools/equipment to
 unrestricted areas
 EHS 3.603 Airborne contamination monitoring
 program guidelines
 EHS 3.604 Radioactive noble gases
 EHS 3.620 Determination of maximum permissible
 concentration and MPC hours

SURVEYS

HPP 3.2 Routine and special contamination
 surveys
 HPI 3.13 Beta dose rate determination
 HPI 3.21 Contamination survey techniques
 EHS 3.203 Radiation surveys
 EHS 3.204 Requirements for hot spots

DOSIMETRY

HPP 4.1 Issuance and control of personnel
 dosimetry
 HPP 4.2 Bioassay and whole body counting
 HPI 4.11 Instruction for the issuance and control of
 dosimetry devices
 HPI 4.12 Film Badge Quality Control
 HPI 4.13 Direct-reading dosimeter leak check and
 calibration
 HPI 4.14 Direct-Reading dosimeter use.
 HPI 4.15 Use of Rad Tad
 HPI 4.16 Calibration of Rad Tad
 HPI 4.17 Lost, damaged, off-scale dosimeter leak check
 and calibration

ATTACHMENT 1 TO APPENDIX BINDEX OF CONSOLIDATED PROCEDURES

HPI 4.18	Personnel contamination and/or overexposure investigation
HPI 4.19	Dosimetry discrepancy evaluation
HPI 4.110	Use of TLD Results
HPI 4.112	Instructions for generating in-controlled area report via the health physics computer
EHS 3.201	Radiation Exposure Limits
EHS 3.202	Personnel dosimetry assignment criteria
EHS 6.401	Use of TLD Reader

INSTRUMENTATION

HPP 5.2	Survey and laboratory instruments Health Physics Instructions
HPI 5.21	Use of Eberline E-520
HPI 5.22	Calibration of Eberline E-520
HPI 5.23	Use of Eberline RO-1
HPI 5.24	Calibration of Eberline RO-1
HPI 5.25	Use of Eberline RO-2 & RO-2A
HPI 5.27	Use of Eberline PIC-6A
HPI 5.28	Calibration of Eberline PIC-6A
HPI 5.29	Use of Digimaster, Xetex 305A and 305B Portable Survey Meters
HPI 5.210	Calibration of Digimaster, Xetex 305A and 305B Portable Survey Meters
HPI 5.211	Use of Eberline Teletector
HPI 5.212	Calibration of Eberline Teletector
HPI 5.215	Use of Victoreen 740F Cutie Pie
HPI 5.216	Calibration of Victoreen 740F Cutie Pie
HPI 5.217	Use of Eberline PNR-4 - Portable Neutron Rem Counter
HPI 5.218	Calibration of Eberline PNR-4 - Portable Neutron Rem Counter
HPI 5.219	Use of Eberline RM-14
HPI 5.220	Calibration of Eberline RM-14
HPI 5.221	Use of Eberline PAC-4S
HPI 5.222	Calibration of Eberline PAC-4S
HPI 5.227	Use of GA-2T Gamma Alarm
HPI 5.228	Calibration of GA-2T Gamma Alarm
HPI 5.229	Use of Victoreen R-Meter
HPI 5.230	Calibration of Victoreen Model Condenser 'R' Meter
HPI 5.231	Use of Eberline E-530 Portable Geiger Counter
HPI 5.232	Calibration of Eberline E-530 Portable Geiger Counter
HPI 5.233	Use of Eberline RAS-1 Portable Air Sampler

ATTACHMENT 1 TO APPENDIX BINDEX OF CONSOLIDATED PROCEDURES

HPI 5.234	Calibration of Eberline RAS-1 Portable Air Sampler
HPI 5.235	Use of Dosimeter Chargers
HPI 5.236	Use of Eberline AMS-2 CAM
HPI 5.237	Calibration of Eberline AMS-2 CAM
HPI 5.238	Use of NMC AM-2A CAM
HPI 5.239	Calibration of NMC AM-2A CAM
HPI 5.240	Use of NMC AM-2B CAM
HPI 5.241	Calibration of NMC AM-2B CAM
HPI 5.242	Use of SAM-2/RD-22
HPI 5.243	Calibration of SAM-2/RD-22
HPI 5.244	Use of Triton (JLI) 955B
HPI 5.245	Calibration of Triton (JLI) 55B
HPI 5.246	Use of Triton 1055B
HPI 5.247	Calibration of Triton 1055B
HPI 5.248	Use of BC-4
HPI 5.249	Calibration of BC-4
HPI 5.251	Calibration of SPA-3 and MS-2
HPI 5.253	Calibration of PCC-11T and DS-2
HPI 5.254	Calibration of Standard Radiation Sources
HPI 5.257	Use of DuPont 4000A lapel Air Sampler
HPI 5.259	Use of the NMC AM-331F CAM
HPI 5.260	Calibration of the NMC AM-331F CAM
HPI 5.263	Use of SAC-4
HPI 5.264	Calibration of SAC-4
HPI 5.265	Establishing Reference Parameters for Model 1000 Calibrator
HPI 5.267	Use of the PRM-7 Micro R/Hr Meter
HPI 5.268	Calibration of the PRM-7 Micro R/Hr Meter
HPI 5.269	Use of Eberline RO-4A
HPI 5.270	Calibration of the Eberline RO-4A
HPI 5.271	Use of Eberline RM-16/RD-17A
HPI 5.272	Calibration of Eberline RM-16/RD-17A
HPI 5.275	Use of Eberline RM-16/HP-200
HPI 5.276	Calibration of Eberline RM-16/HP-200
HPI 5.277	Use of the AM-2 Gamma Alarm
HPI 5.278	Calibration of the AM-2 Gamma Alarm
HPI 5.280	Calibration Victoreen Label Sampler Model 08-430
HPI 5.281	Calibration of the "Siersat" Personal Air Sampler
HPI 5.282	Calibration of Sipin Label Sampler
HPI 5.283	Use of Eberline R07-BM
HPI 5.284	Calibration of Eberline R07-BM
HPI 5.285	Use of the Eberline Model E-530N Portable Geiger County with HP-200 Remote Probe
HPI 5.286	Calibration of the Eberline Model E530N Portable Geiger County with HP-200 Remote Probe
HPI 5.287	Use of Radeco HD-28 Low-Vol

ATTACHMENT 1 TO APPENDIX BINDEX OF CONSOLIDATED PROCEDURES

HPI 5.290	Calibration of Xetex Digital Dosimeters, Models 409A, 415A, and 415A Modified
HPI 5.291	Use of GP-4 Air Monitor
HPI 5.292	Calibration of GP-4 Air Monitor
HPI 5.295	Use of Siersat, Victoreen & Sipin Personnel Air Samplers
HPI 5.296	Operation of Gilian Model HFS113 Lapel Air Sampler
HPI 5.297	Calibration of Gilian Model HFS113 Lapel Air Sampler
HPI 5.2102	Use of Radiation Monitor Model PRM 110C
HPI 5.2103	Use of Triton Model 111
HPI 5.2107	Use of the Eberline E-140 Count Rate Meter
HPI 5.2108	Calibration of the Eberline E-140 County Rate Meter
HPI 5.2127	Use of the T.A. CP-MU High Range Underwater Meter
HPI 5.2128	Calibration of the T.A. CP-MU High Range Underwater Meter
HPI 5.2139	Use of the Ludlum Model-5 GM Meter
HPI 5.2140	Calibration of the Ludlum Model-5 Meter
EHS 3.701	Radiation Protection Counting Room Standard Practices
EHS 3.705	Use of PCC-11T/DS-2 Proportional Counter
EHS 3.706	Use of Baird Atomic Polyspec Scaler and SSC-3 Automatic Planchet Changer
EHS 3.707	Use of MS-2/SPA-3 Single Channel Scintillation Counting System
EHS 3.710	Use of Xetex Digital Dosimeters, Models 409A, 415A and 415A Modified
EHS 3.801	Operation of the Eberline Model 1000 Calibrator
EHS 3.806	Calibration of the Baird Atomic Polyspec Research Spectrometer and SSC-3/SSC04 Solid Sample Changer

Radioactive Material Control

HPP 6.3	Inventory and leak testing of sealed sources
HPP 6.5	Use of Calibration sources
HPP 6.6	Control of Radioactive material
HPI 6.4.3	Contamination Injury
EHS 3.356	Personnel Decontamination

Protective Equipment

HPP 7.1	Protective clothing specifications, use and maintenance
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ATTACHMENT 1 TO APPENDIX BINDEX OF CONSOLIDATED PROCEDURESTraining

HPP 8.1 Radiation Protection Training

Job Specific Procedures

EHS 3.401 Contaminated underwater diving operations
 EHS 3.402 Radiological controls for Radiography
 EHS 3.403 Steam Generator Channel Head Entry
 EHS 4.700 EH&S Support for Receipt, Solidification and
 shipment of resin from the spent resin
 storage tank (RWST)
 EHS 8.000 Installation of Temporary Shielding
 EHS 10.201 Receipt of New Fuel
 EHS 13.010 Disposal of high level waste in Unit #2
 Baling Station
 EHS 13.030 Receipt of Solidification of Evaporator
 Bottoms

Records and Reports

HPP 10.2 Reports to the NRC of Incidents Involving
 Licensed Material
 HPP 10.3 Routine reports to the NRC covering personnel
 HPP 10.4 Reports to individuals
 HPI 10.11 Scheduling of H.P. Work Coverage
 HPI 10.12 Radiation Exposure Records
 HPI 10.13 Instrument calibration records
 HPI 10.14 Radiation, contamination and airborne survey
 records
 EHS 1.300 EH&S Records Administration
 EHS 2.006 Dissemination of Information Relative to
 Environmental Health and Safety Procedures
 EHS 2.0101 EH&S Procedure Preparation, Revisions and
 Controlled Distribution
 EHS 3.003 Radiation Protection Section Duties and
 Responsibilities

Respiratory Protection Program

HPP 11.1 Respiratory Protection Program
 HPI 11.10 Respiratory Protection Training Program
 HPI 11.13 Evaluation of Hazards, selection and use of
 respiratory protection devices
 HPI 11.14 Use of self contained breathing apparatus and
 supplied airline respirators
 HPI 11.15 Maintenance and repair of respiratory
 protection devices
 HPI 11.16 Respiratory Protection Training Program for
 Air Purifying Respirators

ATTACHMENT 1 TO APPENDIX B

INDEX OF CONSOLIDATED PROCEDURES

HPI	11.17	Decontamination, sanitizing, cleaning and surveying respiratory protection devices
HPI	11.23	Use of Respiratory Protection Devices for Emergency Conditions
HPI	11.24	Respiratory Program Inspections and Quality Assurance
HPI	11.25	Use of the Q127 DOP Penetrometer for Testing
HPI	11.26	Operation and calibration of TDA 50 AEROSOL Test Booth
EHS	3.651	Respirator Seal Booth Testing

APPENDIX C

RADIATION PROTECTION OVERSIGHT COMMITTEE CHARTER

1.0 PURPOSE

To describe the Radiation Protection Oversight Committee, including the Committee membership, authority and conduct of reviews.

2.0 SCOPE

The Committee monitors and reports on the effectiveness and quality of the Indian Point Station Radiation Protection Program.

3.0 AUTHORITY

The Committee shall report to and advise the Vice President, Nuclear Power. The Committee functions will begin upon review and approval of this charter and the committee membership by the NRC Regional Administrator - Region One.

4.0 TERM

The Committee shall function at least until the completion of the action plan, and the submittal and acceptance by the Regional Administrator, Region One, of a final report which summarizes program improvements and

APPENDIX C

RADIATION PROTECTION OVERSIGHT COMMITTEE CHARTER

details plans to maintain the effectiveness of the program, at which time the Committee may be dissolved in the direction of the Vice President, Nuclear Power.

5.0 MEMBERSHIP

The Committee shall be composed of at least three (3) but not more than five (5) individuals, each of whom are qualified in examining various aspects of a Commercial Power Reactor Radiation Protection Program. All members of the Committee shall be independent of the station Environmental Health & Safety Organization. The Vice President, Nuclear Power will select the chairman who will appoint a secretary for the Committee. The Vice President, Nuclear Power shall appoint all Committee members, alternate members and replacement members should a vacancy exist, and shall provide the identity and qualifications of each Committee member to the NRC Regional Administrator, Region One.

6.0 MEETINGS

Meetings will be held monthly with a quorum consisting of at least three (3) committee members.

APPENDIX C

RADIATION PROTECTION OVERSIGHT COMMITTEE CHARTER

7.0 CONDUCT OF REVIEWS

The Committee shall review the conduct of the radiation protection program including the plans, schedules and procedures for upgrading the program. The Committee shall assign an individual independent of the radiation protection organization and the Committee to perform surveillance of the day-to-day radiation protection activities, evaluate the effectiveness of the radiation protection and contractor staff, sample worker compliance with radiation protection rules and practices, and advise the Vice President, Nuclear Power regarding the conduct of the radiation protection program.

8.0 REPORTS

7.1 A monthly report shall be prepared by the Committee and submitted to the Vice President, Nuclear Power, with a copy to the USNRC Regional Administrator, Region One. The monthly report shall document the Committee's findings concerning the effectiveness of the radiation protection program. Copies of the monthly report shall also be sent to:

Committee Members

APPENDIX C

RADIATION PROTECTION OVERSIGHT COMMITTEE CHARTER

Executive Vice President, Central Operations
Chairman, Nuclear Facilities Safety Committee
General Managers - Nuclear Power

APPENDIX D

RADIATION PROTECTION OVERSIGHT
COMMITTEE MEMBERS AND QUALIFICATIONS

MEMBERS:

Charles Boyd Meinhold
Thomas A. Peterson
Joyce P. Davis

ALTERNATES:

William E. Graber
Desmond W. Chan

QUALIFICATIONS:

See attached resumes.

HUNTER
PARQUIMENT
HAB CON INT

GENERAL PHYSICS CORPORATION

RESUME

JOYCE P. DAVIS

Education

Massachusetts Institute of Technology	S.B. (Physics)
University of Rochester, Dept. of Radiation Biology, Medical School	M.S. (Radiation Biology)
New York University, Institute of Environ- mental Medicine; and Graduate School of Engineering, Nuclear Engineering Dept. (Doctoral Program)	33 credits
Fordham University, School of Law	J.D. (Law)
New York University, School of Law, Graduate Division	2 courses
Johns Hopkins University, Masters Program in Administration	enrolled 9/84

Special Courses

U.C.L.A. Special Course in Risk Assessment for Energy Systems
M.I.T. Summer Session Course of Decision Making Under Uncertainty
M.I.T. Summer Session Courses on Nuclear Reactor Safety and Fast
Reactor Safety
ALI-ABA Courses on Nuclear and Environmental Law (Annual)
PLI Courses on Federal Water Pollution Control Act, Nuclear
Litigation, Toxic, etc.
Short Courses to maintain H.P. Certification

Academic Honors

Fordham Law School; Dean's List, Am. Jur. Award in Environmental Law
National Science Foundation Award
AEC Radiological Physics Fellowship
M.I.T., Dean's list and Scholarships

Certifications and Honors

Member of New York Bar, Admitted February 1972
Member of Maryland Bar, Admitted May 1982
Professional Engineer, Registered in New York State (since 1964),
Registered in Maryland (since 1981)
Certified Health Physicist, American Board of Health Physics (since
1966)

Experience

1981 - Present General Physics Corporation
Chief Licensing Engineer

Ms. Davis is a health physicist, attorney and engineer who serves as Chief Licensing Engineer in the Engineering and Analysis Division. Ms. Davis provides consulting, supervision and technical direction for company activities in the nuclear licensing, radiological health, environmental, and legal policy areas. Since November 1981 she has served as project manager for a series of policy related studies

relating to the concept of "De Minimis" dose carried out for the Edison Electric Institute (EEI). She has advised the EEI on strategy for fostering the promulgation of regulatory policies by government agencies, and now serves as a consultant to EEI in furtherance of this work. In 1984, she testified on this issue before NRC's Advisory Committee on Reactor Safeguards. This program involved consideration legal, policy, and technical aspects and their integration.

Starting in February 1983, Ms. Davis has also been involved in policy research and consulting for EEI on the issue of compensation for disease caused by exposure to radiation. Ms. Davis also participated in other consulting projects for EEI relating to emergency planning, the license amendment process, and reform of the licensing process.

Ms. Davis serves as Project Manager for the Atomic Industrial Forum (AIF) study project to investigate the potential for exemption of specific streams of very low level ("de minimis") radioactive waste from NRC regulatory requirements. She is also a consultant to National Nuclear Corporation on work being carried out for the Electric Power Research Institute relating to segregation of very low level trash at the TVA's Sequoyah plant.

Ms. Davis is project manager for the NRC health physics inspector training project. She is involved in preparing and presenting instructional materials for re-training of NRC regional Health Physics inspectors.

Ms. Davis developed and serves as principal instructor for the General Physics courses on Nuclear Licensing. These courses provide a background, for licensing engineers and other interested personnel, in the Atomic Energy Act and other statutes, the NRC's regulatory program, and current and likely future regulatory developments. She has been an instructor in licensing courses presented at General Physics Headquarters and at the facilities of several utilities. For Gulf States Utilities, she is developing a course in licensing and law for health physics personnel, and for Sacramento Municipal Utility District, she participated in development of instructional materials for training on- and off-site review Committee members.

As a lecturer in General Physics' Course in probabilistic risk assessment (PRA), Ms. Davis prepared and presented course material on the applicability of PRA techniques to regulatory practices. She also lectures on legal and policy issues in GP courses on emergency planning.

She has prepared and submitted comments on proposed regulations, such as NRC's proposed safety goal policy, the proposed revisions to the 10CFR Part 20 regulations on

radiation exposure control, EPA's proposed regulations on radionuclide emissions under the Clean Air Act, and EPA's low level radioactive waste criteria development program.

Ms. Davis serves on a Task Group of the NCRP which is developing guidance on the maintenance of radiation records.

1972 - 1981

Consolidated Edison Company

Senior Attorney, Environmental and Nuclear Regulatory Law

Ms. Davis was responsible for the preparation and review of documents filed in regulatory proceedings, contracts, including plant and fuel supply agreements; comments on legislative bills and proposed regulations; briefs; other legal filings; and legal research memoranda. She researched and wrote law review articles relating to nuclear regulatory and environmental law. She gained experience in NRC licensing, show-cause, enforcement and rulemaking proceedings, and proceedings before other federal and state agencies, and in the federal and State courts. Ms. Davis was secretary of the company Nuclear Facilities Safety Committee and chairman of its Radiation Safety Subcommittee. Ms. Davis was also company representative to the Nuclear Transportation Group, Utilities Nuclear Waste Management Group, and Nuclear Utilities Group on Enforcement.

1969 - 1971

S. M. Stoller Corporation

Nuclear Fuel Analyst

Ms. Davis participated in various projects including nuclear fuel cycle economics studies, evaluation of bids for fuel cycle services, studies related to nuclear licensing and regulatory developments, preparation of environmental impact reports, design of environmental monitoring programs, and evaluation of field data.

1957 - 1969

Burns and Roe, Inc.

Senior Engineer

Ms. Davis' duties included studies on future energy resources and energy conversion methods, studies in nuclear, chemical and environmental safety, site selection studies for chemical and nuclear plants, preparation of safety analysis reports for nuclear power plant licensing, radiation shielding design, health physics, radwaste system engineering, evaluation of nuclear and fossil fuel costs, preparation of bid specifications and evaluations of bids for materials and services, design of laboratories and test facilities, and systems analyses.

Educational Employment and Other Educational Activities:

Adjunct Associate Professor

Manhattan College, Department of Radiological and Health Sciences (1976 - 1981)

Courses: Nuclear Reactor Science
Environmental Radiation

City College School of Engineering, CUNY, Civil Engineering Department (1974 - 1976)

Courses: Radiological Health Engineering
Contracts and Specifications - Law for Engineers
Environmental Law

Lecturer - Health Physics Certification Courses - Columbia University (1972);
N.Y.C. Office of Radiation Control (1974).

Course in Large Scale Power Generation, Columbia University, Graduate Engineering School (1977)

Environmental Law Course, Fordham Law School (1972 - 1976)

Nuclear Regulatory Policy - Towson State University, Industry Luncheon Program (1982)

Course on Liability and Risk in the Nuclear Industry - Sponsored by TMS (1984)

Leader of Seminar on Nuclear Licensing - Company Orientation Course (1977 - 1979)

PROFESSIONAL SOCIETIES

American Bar Association

Science and Technology Section

Tort and Insurance Practice Section

Energy Committee, Vice Chairman (1984 -)

American Nuclear Society - New York Section, Officer (1962 - 1970);

Shielding Division, Executive Comm. (1978 - 1982);

National Membership Committee (1964 - 1970); Ad Hoc Radiation Records

Committee (1967); Standards Subcommittee, ANS 6.7 - Standards for

Radiation Zoning for Design of Nuclear Power Plants (1974 - 1977),

Representative to ANSI Committee on Radiation Standards (1982 - date);

Nuclear News Editorial Advisory Board (1976 - date)

Health Physics Society

State and Federal Legislation Committee (1984 - date)

-Subcommittee on 10CFR20 (1984 -)

Society for Risk Analysis

Association of The Bar of The City of New York,

Committee on Atomic Energy, Member (1975 - 1978)

Environmental Law Committee, Member (1979 - 1981)

New York State Bar Association,

Special Committee on Environmental Law, Member (1975 - 1977)

Maryland State Bar Association

Atomic Industrial Forum; Member, Environmental Steering Committee (1971 -

1981); Member, Subcommittee on Clean Air Act Amendments (1977 - 1981)

CONSULTANCIES

- U. S. Environmental Protection Agency - Science Advisory Board
- Ad Hoc Committee on Environmental Monitoring (1974)
 - Environmental Radiation Exposure Advisory Committee (1973 - 1978)
- Sub-Seabed Disposal Program - Sandia Laboratories
- Panel to Review Project Status Report (1983)
- National Council on Radiation Protection and Measurements (NCRP) - Task Group on Maintenance of Radiation Records (1984 -)

PUBLICATIONS

- The "De Minimis" Concept: Where We Are Today, presented at joint ANS-HPS meeting session, New Orleans, Louisiana, June 1984.
- "De Minimis": An Industry View, presented at the meeting of the Council of Radiation Control Program Directors, Des Moines, Iowa, May, 1984.
- Paper on "De Minimis" Policy Issues, presented at Lloyds of London Press Symposium on Radiation and Energy, December 1983.
- Orphan Waste: Will It Find a Home?, ANS Winter Meeting, October, 1983 (Co-author with J. T. Montgomery).
- "De Minimis" Aspects of Reentry and Recovery, HPS Annual Meeting, June 1983 (Co-author with S. J. Harris and William C. Rhodes).
- Potential Beneficial Impacts on Nuclear Reactor Licensees of a Regulatory Cut-Off Policy Based on De Minimis Radiation Dose Criteria, ANS Winter Meeting, November 1982 (co-author with K. Rebeck, K. Travis).
- Licensing, Regulation and Commitments; Identification for Change, NRMA Conference, September 1982.
- The Concept of "De Minimis" Dose and its Applicability to a Regulatory Cut-Off Policy, HPS Annual Meeting, June 1982 (co-author with S. J. Harris).
- The Feasibility of a Regulatory Cut-Off Policy, AIF Environment Conference, October 1982.
- Social Aspects of Regulating Waste Heat, Waste Heat Management Conference, May 1977 (Co-Author with V. dePass and C. L. Newman).
- The Permit Program of the Federal Water Pollution Control Act of 1971, Fordham Urban Law Journal, Vol. II, No. 2, Winter 1973-74 (Co-Author with Robert J. Glasser). Reprinted in 6 Envir. L. Rev. - 1975, Sherrod, Ed.
- The New Federal Water Pollution Control Act and Its Impact on Nuclear Power Plants, Nuclear Safety: Part I (May - June 1974), Part 2 (July - August 1975).

Environmental Factors in the Licensing of Nuclear Power Plants, Nuclear Safety, January 1973 and May 1973.

Taming the Technological Tyger - Licensing Nuclear Power Plants, Fordham Urban Law Journal, Summer 1972 and Fall 1972 (Vol. 1, Nos. 1 & 2).

Nuclear Fuel Cost Calculations, (Co-Author with M. Zizza) IAEA Meeting on Nuclear Power Costs, London, October 1967.

The Future of Energy Conversion, (Co-Author with S. Baron) Consulting Engineer, June 1963.

GENERAL DYNAMICS

Electric Boat Division

REACTOR PLANT SERVICES

RESUME

NAME OF CANDIDATE:

Thomas A. Peterson

EXPERIENCE:

Mr. Peterson has been employed at General Dynamics/Electric Boat Division for over 17 years. During this period, he has served in various engineering and management positions, as well as provided consultation to nuclear utilities in the areas of radiation protection, planning, maintenance, and operation.

As the Manager of Reactor Plant Services, Mr. Peterson's responsibilities have ranged from overall business development and management of the organization, through assignment as the acting Radiation Protection Manager at a large nuclear power station (Oyster Creek - periodically during 1980-1981). He was selected as a representative on the Department of Energy funded Three Mile Island Technical Assistance and Advisory Group (TAAG) for overall review of decontamination and defueling plans. Specific tasks accomplished by or under his direction while heading the Reactor Plant Services organization include: Assessment of several corporate and station radiation protection programs with associated recommendations and implementation of revised standards, development of equipment, (e.g., zero discharge decontamination systems, specialized ventilation equipment, Post Accident Sampling Systems (P.A.S.S.), contamination control products, and various training programs for utilities) to support the nuclear industry, audits of utility performance in areas of radiation protection, and outage management and planning. Marketing and technical discussions have taken Mr. Peterson to France, Yugoslavia, Spain, England, South Africa and Korea as well as throughout the United States. He was asked in France to make an impromptu presentation in front of an international Radiation Protection conference on Three Mile Island. In addition, Mr. Peterson was requested in mid 1984 to act as interim General Manager of Environmental, Health and Safety at Con Ed's Indian Point II Nuclear Station until the permanent General Manager could be hired and brought on site.

As Chief and subsequently Manager of Radiological Engineering, Mr. Peterson had overall responsibility for the technical aspects of the Division's Radiological Control program which serviced up to seven reactors per year, as well as responsibility for the Industrial Radiography Audit Group which assured NRC license compliance. Under his direction were over sixty engineers and technicians involved in developing radiological controls and engineering techniques to control/reduce contamination spread and radiation exposure, to monitor the environment,

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GENERAL DYNAMICS
Electric Boat Division
REACTOR PLANT SERVICES

THOMAS A. PETERSON
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to provide dosimetry and radiation health services, to operate a radiation analysis laboratory facility, to oversee radiological aspects of waste handling, processing and ship-out, and to develop all operating procedures for the Radiological Controls department. Additionally, a program was established for Radiological Shift Supervisors which involved selection, training, and qualification of engineering personnel to be technical/management representatives on-shift to assess and handle unusual radiological events. Throughout this period, Mr. Peterson has also served as one (of two) primary individuals to assess and advise shipyard and Navy management at the Emergency Coordination Center in the handling of radiological emergencies.

During General Dynamics/Electric Boat Division's work on the Shippingport LWBR Project, Mr. Peterson took a leadership role in developing the Radiological Controls Manual for Shippingport as well as in developing implementing procedures for use on site. Throughout the Shippingport project, Mr. Peterson provided technical support and periodic on-site radiological assessment to assure compliance with regulatory requirements.

EDUCATION:

BS in Nuclear Engineering from North Carolina State University (1967)

Name: CHARLES BOYD MEINHOLD
Born: Boston, Massachusetts - November 1, 1934

Family: Wife and five children

Education: B.S. in Physics, Providence College, 1956
AEC Fellow in Radiological Physics,
University of Rochester, 1956-57
Certified by the American Board of Health Physics

Work Experience:

1972 - present Brookhaven National Laboratory
Division Head
Safety and Environmental Protection Division

1962 - 1972 Training Supervisor and Deputy,
Operational Health Physics Group,
Health Physics Division

1957 - 1962 Operational Health Physics for Biology
and Medical Departments and
Applied Health Physics Research

Laboratory Appointment History:

1983 - present Tenured Senior Health Physicist
1974 - 1982 Senior Health Physicist
1970 Health Physicist
1962 Associate Health Physicist
1958 Assistant Health Physicist
1957 Junior Health Physicist
June 1957 Guest Fellow

Project Management Activities

Radiological Physics - microdosimetry and model development
Genetic Research - effect of magnetic fields and chemical carcinogens
Marshall Islands Radiological Safety Program
Dose Reassessments in the Marshall Islands
Toxic Materials Assessment
Groundwater Impacts
Radiological Assistance Program
NRC Assistance - Training
RARAF (Radiological Research Facility)

BNL Activities:

Ex Officio Member: Laboratory Safety, Cryogenics Safety and Reactor and Criticality Experiments Safety Committees

Member: Human Studies Review Committee

BNL Lecturer - April 18, 1973 on "Development of Radiation Protection Standards, The More Things Change, The More They Stay the Same"

DOE and ERDA Special Assignments, 1980 - 1981:

Representative to EPA Interagency Meetings on Occupational Radiation Exposure (only non-federal member)

Advisory Panel on Accelerator Radiation Safety for the National Accelerator Laboratory and the Stanford Linear Accelerator

Special Panel on "As Low as Reasonable Achievable" in DOE facilities

Task Force on Decontamination and Decommissioning

Member of Traveling Faculty on Medical Management of Radiation Accidents

Member of Traveling Faculty on Emergency Planning for Fixed Nuclear Facilities

Scientific Committee Activities:

International Commission on Radiological Protection (ICRP)

Member, Main Commission

Chairman, Committee 3 on Protection in Medicine

International Commission on Radiation Units (ICRU)

Member, Task Group on Space and High-Energy Dosimetry

National Council on Radiation Protection (NCRP)

Member, Board of Directors

Chairman, Scientific Committee 46 on Operational Radiation Safety

Chairman, 1982-1984 Program Committee

Member, 1985 Program Committee

Member, Scientific Committee 1 on Basic Radiation Protection Criteria

Member, Task Force to Review NRC Recommendation on Occupational Exposure Levels

Member, Public Relations Committee

Scientific Societies:

Society for Risk Analysis

American Nuclear Society

American Association for the Advancement of Science

Radiation Research Society

New York Academy of Sciences

Health Physics Society

Fellow - 1984
President - 1981-1982
Treasurer - 1975-1977
Member, Board of Directors 1975-1978; 1980-1983
Member, Executive Committee 1975-1978; 1980-1983
Delegate to the Third, Fourth, Fifth and Sixth International Radiation Protection Association (IRPA) Congress
Member, Annual Meeting Place Committee
Awards Committee
Finance Committee
Local Arrangements Committee
Membership Committee
Public Information Committee
Scientific and Public Issues Committee
Charter Member, Greater New York Chapter serving as Secretary-Treasurer in 1961-1962 and as President in 1963

Miscellaneous Activities:

Member - Committee on Radioactive Materials in the Environment, Albany, N.Y. 1984.

Vice-Chairman Subcommittee on Radiation Protection Engineering, ASTM - 1984

Member - RAFAF Scientific Advisory Committee - 1983-1986

Member - Panel to Review Health Physics Training Program, University of Rochester - 1983

Chairman of the Intersociety Forum on Occupational Health and Safety - 1982

Invited to 20th Anniversary Meeting of the Japanese Health Physics Society, Tokyo - May 1982

Invited to Open the Third International Symposium on Radiation Protection of the Society for Radiological Protection at Inverness, Scotland - June 1982

Member of National Academy of Science - Assembly of Engineering Panel on Manpower Needs in the Nuclear Power Industry - 1981

Instructor - International Atomic Energy Agency (IAEA) Course on Safety Analysis Review at Argonne National Laboratory - 1981

Consultant - Professional Examination Service - 1961 - 1981

Chaired Special NRC Panel to Review the Radiation Protection Program at Three Mile Island Unit 2, NRC - 1979

Member of the Advisory Committee for Programs in Radiological Sciences and
Protection, University of Lowell, Massachusetts - 1979

Listed in American Men and Women of Science
Who's Who in Atoms

September 1984

GENERAL DYNAMICS

Electric Boat Division

REACTOR PLANT SERVICES

RESUME

NAME OF CANDIDATE: William E. Graber

EXPERIENCE:

Mr. Graber has been employed at General Dynamics/Electric Boat Division for 19 years and has been associated with Radiological Control Operations for 17 of those years. Throughout his career, he has served in various radiological engineering and management positions and is currently Manager of the Radiological Control Department at Electric Boat Division.

In his current position, he is responsible for the Division's Radiological Control Program comprising engineering, training, operations, emergency planning and administrative personnel. This organization currently contains eighty-five professional and technical personnel. Also, he has assisted Reactor Plant Services (RPS) in the development and presentation of the ALARA training program. He works with state and nuclear power plant representatives in the coordination of radiation protection and evaluation techniques during radiological emergencies and is currently a member of the Governor of Connecticut's Independent Risk Assessment Team.

Mr. Graber's experience and expertise are recognized throughout the industry. He was assigned as senior site representative from Electric Boat Division at TMI for approximately 6 months commencing March 31, 1979 and was responsible for providing radiological assistance during the emergency and early recovery phases. He served as a member of the GPU Corporate Generation Review Committee TMI-2 and assisted in establishing the Health Physics Technician Training program at TMI-2. He served as Manager of Radiological Engineering during an extended outage at Oyster Creek Nuclear Generating Station for 6 months in 1981. In 1982, he provided management consultant services for 3 months at Indian Point Station, Unit 2 for Consolidated Edison. For 1 month during this period, he assumed the position of interim General Manager, Environmental Health and Safety, and during 1984, served as the RPM for nearly 3 months. Mr. Graber provided off-site radiological control support for Electric Boat Division's previous contract at Shippingport in 1976 and performed audits, start-up assistance and training assistance for the Radiological Control organization on-site.

He also directed a Radiological Control Retraining Team for six weeks in 1977 which provided a radiological control refresher course to Duquesne Light Company Radiological Control Technicians.

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ALARA ... a concept we understand ... and believe in

GENERAL DYNAMICS
Electric Boat Division
REACTOR PLANT SERVICES

WILLIAM E. GRABER
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Experience prior to being employed by Electric Boat includes three years at Shippingport Atomic Power Station from 1960 to 1963 working as a test engineer for Duquesne Light Company. Mr. Graber's primary assignments during that period involved procedure preparation, testing and outage support with concentration on radiological control projects.

Mr. Graber is thoroughly familiar with development and implementation of radiation protection and ALARA techniques. As Manager of Radiological Control Planning and Training he was responsible for radiological control training of all Division personnel, emergency planning and radiological control services for Division personnel at an off-site facility.

ACCREDITATIONS:

Professional Engineer - Ohio (currently licensed)
Pennsylvania (previously licensed)
Connecticut (previously licensed)

EDUCATION:

BSCE - Virginia Military Institute
MBA - University of New Haven

Short Courses:

- U.S. Public Health Service
Radiological Health
- Harvard School of Public Health
Radiological Emergencies
- FEMA-NRC Emergency Planning



DESMOND W. CHAN
Manager, Health Physics Services

EDUCATION

Ph.D., Computational and Nuclear Physics, University of Lowell

M.S., Nuclear Physics, University of Lowell

B.S., Nuclear Physics University of Lowell

1983 Health Physics Society Summer School on Internal Radiation Dosimetry

EXPERIENCE

1982 - Present

General Physics Corporation

Dr. Chan is responsible for the administration and development of health physics and advanced health physics and advanced nuclear physics programs and other health physics support activities. Dr. Chan also serves as a technical consultant in emergency preparedness, internal dosimetry, environmental monitoring, dosimetry tracking, radwaste management, countroom instrumentation, ALARA engineering, computer software support, mathematical modeling, nuclear data analysis, training program development, and health physics technician support services.

Dr. Chan also acted as Project Manager for advanced instruction and training material development in health physics for radiation protection and chemistry technicians for Iowa Electric Light and Power Company, Niagara Mohawk Power Corporation, Georgia Power Company, Gulf State Utilities, Southern California Edison Company, Public Services Company of Colorado, Texas Utilities Generating Company, and Toledo Edison Company. Representative projects include:

- Program Development
As Project Supervisor, Dr. Chan is coordinating and developing an Advanced Health Physics Training Program for NRC regional health physics inspectors.
- Environmental Study Project
Dr. Chan is one of the principal investigators in evaluating the benefits, risks, and costs of establishing regulatory cutoff (De Minimis) levels for radioactive waste streams for nuclear power plants for Atomic Industrial Forum, Inc.

- On-site Instruction
Conducted classes in health physics and radiation protection for Philadelphia Electric Company, Niagara Mohawk Power Corporation, Iowa Electric Light and Power Company, and Georgia Power Company.
- Project Coordination
Acted as Project Manager for instruction and development of advanced training materials in health physics for radiation protection and chemistry technicians for Iowa Electric Light and Power Company, Niagara Mohawk Power Corporation, Georgia Power Company, Gulf State Utilities, Southern California Edison Company, Public Services Company of Colorado, and Texas Utilities Generating Company.
- Materials Development
Developed training materials for a computer-based instructional system in nuclear physics, health physics, and emergency planning for Toledo Edison Company. Developed eight advanced health physics training courses for Southern California Edison and Nebraska Public Power District.
- Program Development
Developing training step program (with job/task analysis), qualification program, training implementation document, and on-the-job training programs for Niagara Mohawk Power Corporation.

1976 - 1981

University of Lowell

Dr. Chan conducted a variety of research projects in nuclear physics, including research on fast neutron scattering for ^{232}Th and ^{238}U in the framework of coupled channel collective model calculations and unified nuclear reaction mechanisms. This involved the development of computational methods, mathematical modeling, and numerical analysis. Dr. Chan was responsible for developing large scale computer codes for nuclear scattering data acquisition. Prior to this, Dr. Chan conducted research on the application of group theory to nuclear structure study, specialized in unitary group, special unitary group and symplectic group, and their applications to nuclear shell model calculations. Dr. Chan was also responsible for physics laboratory instructions, lecturing in freshman and sophomore physics, instrumentation design, and experimental testing.

**PROFESSIONAL
AFFILIATIONS**

Member, American Physical Society

Member, National Honor Physics Society (Sigma Pi Sigma)

Member, Health Physics Society

PUBLICATIONS

"Classification of Nuclear Energy Levels for A=13-8 Odd-Mass and Even-Mass Nuclei in the SU(3) Group Scheme, and Extension to Symplectic-Group Theory," Bulletin of the American Physical Society, 24(5), 760, Paper G4, 1979, Coauthor with E. Sheldon.

"Fast Neutron Inelastic Scattering on ^{232}Th and ^{238}U ," XIII Polish Summer School in Nuclear Physics, Mikolajki, Poland, 1980, Coauthor with L. E. Beghian, E. Sheldon, et al.

"Evaluation of (n,n') Scattering Cross Sections from 0.8 to 2.5 MeV for Higher Collective Bands of ^{232}Th and ^{238}U in 'Standard' Formalism," Proceedings of a Specialists' Meeting on Fast Neutron Scattering on Actinide Nuclei, OECD/OCDE, Paris, November 1981, pp. 174-196, Coauthor with E. Sheldon.

"Analyses of Fast Neutron Inelastic Scattering to Higher (Vibrational) Levels of ^{232}Th and ^{238}U :I. Standard Formalism," Physical Review, C26, #3, September 1982, Coauthor with J. J. Egan, et al.

"Analyses of Fast Neutron Inelastic Scattering to Higher (Vibrational) Levels of ^{232}Th and ^{238}U :II. Intrinsic Unified Formalism," Physical Review, C26, #3, September 1982, Coauthor with E. Sheldon.

(10/84)