UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

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| In the matter of | ) | |
| | ) | |
| PENNSYLVANIA POWER & LIGHT COMPANY | ) | Docket No. 50-387 |
| | ) | 50-388 |
| and | ) | |
| | ) | |
| ALLEGHENY ELECTRIC COOPERATIVE, INC. | ) | |
| (Susquehanna Steam Electric Station, | ) | |
| Units 1 and 2) | ) | |

COMMONWEALTH OF PENNSYLVANIA
STAFF TESTIMONY OF
MARGARET A. REILLY
IN RESPONSE TO CONTENTIONS
6b, 20[5][b], 20[6][a], 20 [6][b],
20[6][c], 20[7][a], 20[7][i], 20[7][k]1)

(EMERGENCY PLANNING - BUREAU OF RADIATION PROTECTION)

SEPTEMBER 29, 1981

## INTRODUCTION

This testimony, by Margaret A. Reilly, Chief, Division of Environmental Radiation, Bureau of Radiation Protection, Department of Environmental Resources, Commonwealth of Pennsylvania, is addressed to the following contentions:

CONTENTION 6b
CONTENTION 20[5][6]
CONTENTION 20[6][a]
CONTENTION 20[6][b]
CONTENTION 20[6][c]
CONTENTION 20[7][a]
CONTENTION 20[7][i]
CONTENTION 20[7][k]1)

A short summary of each of the above listed contentions is presented as an introductory paragraph for the response to that contention.

Response to additional portions of contentions 6 and 20 are addressed by the Pennsylvania Emergency Management Agency.

## RESPONSE TO CONTENTION 6b

This Contention questions the ability of the Bureau of Radiation Protection to respond at all hours to an emergency at a nuclear power station due to inadequate funding for staff and equipment.

1. The basic responsibilities of the Bureau of Radiation Protection during nuclear power station accidents are the assessment of the accident and providing appropriate protective action recommendations to PEMA.

2. Accident assessment is accomplished by dialogue with licensee. The assessment is confirmed to some extent by data from off-site measurements. The Bureau accepts off-site monitoring data from the licensee.

3. Bureau monitoring teams make similar measurements after their arrival at the site. The travel time of BRP monitoring teams from the Wernersville Office (near Reading) is two hours. Assuming a one hour mobilization time, the time lapse from team notification should approximate three hours.

4. Accident assessment does not absolutely require the presence of Bureau monitoring teams at the site, nor does it absolutely require off-site monitoring data from the licensee, since these measurements are strictly confirmatory of plant status.

5. Basic accident assessment through BRP dialogue with the licensee begins within minutes of licensee's notification to PEMA. The BRP plan provides for assuring notification and continuing assessment dialogue, for gathering available monitoring data and for passing protective action recommendations to PEMA. The Bureau, then, is capable of responding to an accident at a nuclear power station on a 24-hour basis.

6. The issue of funding has been greatly relieved in the two fiscal years following the accident at Three Mile Island. We have hired two additional Nuclear Engineers, one additional Health Physicist for emergency planning, and one additional technician for the routine surveillance programs. We have acquired a mobile laboratory and two street vans. Our communications capability includes dedicated telephone lines from our Assessment Center to each power station as well as diverse radio modes. We have purchased field equipment to ultimately field as many as nine teams, if the need were to arise, with each team capable of sampling for airborne iodine-131 and monitoring for ambient gamma radiation. We have also acquired a new multi-channel analyzer and four intrinsic germanium detectors for the headquarters laboratory, as well as a new liquid scintillation system. Our field operations now include the use of two TLD readers and several hundred dosimeters. We believe that our current compliment and equipment inventory is adequate to respond effectively to an emergency at Susquehanna Steam Electric Station.

7. That opinion notwithstanding, our response capability will be evaluated by FEMA during the full exercise required for start-up of the station (FR Volume 45, No. 162, August 19, 1980).

## RESPONSE TO CONTENTION 20, PART [5][b]

This contention says the state plan does not mention inspection, inventory, or check of emergency equipment, nor does it mention reserves of emergency equipment.

1. The BRP plan revision #3, Section 8.4.2 states that "Each BRP Area Office will have two sets of equipment operational at all times and one set in reserve." A copy of revision #3 of the BRP plan is attached as Attachment #1.

2. The BRP plan, Section 8.4.3 gives the inspection and inventory frequency of the emergency equipment.

   a. "Emergency equipment will be inspected and operationally checked at least once each calendar quarter...."

   b. "Calibration of equipment shall be at intervals recommended by the supplier of the equipment."

   c. "Emergency equipment will be inventoried after each use."

## RESPONSE TO CONTENTION 20, PART [6][a]

With respect to the capability and resources for field monitoring within the plume exposure Emergency Planning Zone, this contention says the state plan provides for such monitoring but omits specifics such as type of equipment, number of fixed monitoring sites or their location.

The BRP plan describes the capability and resources for BRP's own monitoring activities within the plume exposure EPZ in Sections 3.0, 8.4.2, and 9.4.2 of Revision 3 of the BRP plan. The BRP plan is attached as Attachment #1.

1. Section 3.4 describes the laboratory equipment used to analyze environmental samples for radionuclides. The equipment includes a low background proportional counter, a liquid scintillation counter, sodium iodide detectors, a lithium drifted germanium detector and thermoluminescent dosimeter (TLD) readers.

2. Section 3.5 describers BRP's mobile laboratory as follows: The mobile laboratory is equipped with multichannel anlayzer and at least one intrinsic germanium detector. The mobile lab has ample radio communications capability. The mobile lab will be sited near or adjacent to the EOF.

3. Section 3.6 describes the BRP field team monitoring capability as follows: "BRP field teams are equipped with air samplers with particulate filters, charcoal and silver zeolite canisters. Field estimates are made with dual channel analyzers. Teams are also equipped with beta-gamma portable

survey meters. The air sampling system has the capability to detect and measure radioiodine concentrations in air as low as $10^{-7}$ microcuries per cubic centimeter."

4. The BRP plan, Section 8.4.2 states that "each BRP Area Office will have two sets of equipment operational all times and one in reserve." A list of equipment in the monitoring kits is given on page 25 of the plan.

5. Section 9.9.2 discusses monitoring measurements.

   a. Air samplers and TLD's are already in place as part of routine surveillance program.

   b. Mobile monitoring consists of air sampling and survey meter reading.

6. The number of fixed monitoring sites and their locations are not in the plan. BRP, however, does have a list of the above information for its own use. The list for SSES is attached as Attachment #2.

## RESPONSE TO CONTENTION 20, PART [6][b]

This contention says the state plan does not mention whether it has the capability to measure radioiodine concentrations in air as low as $10^{-7}$ microcuries per centimeter.

1. Section 3.6 of the BRP plan Revision 3 states that the air sampling system has the capability to detect and measure radioiodine concentrations in air as low as $10^{-7}$ microcuries per cubic centimeter. The BRP plan is attached as Attachment #1.

2. The Field Airborne Iodine Sampling Procedure requires a minimum of five (5) cubic feet of air to obtain a Minimum Detectable Activity concentration of $5 \times 10^{-8}$ microcuries per cubic centimeter. A copy of this procedure is attached as Attached #3.

## RESPONSE TO CONTENTION 20, PART [6][c]

This contention says the plan was too vague about the procedure, detailed provisions in procedures, and mentioning specific isotopes which relate their concentrations in sample media to projected dose commitments.

Provisions are made in the BRP plan for relating various radioistopes to different exposure modes.

1. Section 9.8.4 of the BRP plan, Revision 3 relates the concentrations of I-131 in air to the child thyroid dose commitment in milk.

   a. The plan relies on the guidance offered by the FDA in the December 15, 1978 Federal Register (Volume 43, No. 242). This document also gives the PAG's for cesium-137, strontium-90 and strontium-89 in milk.

   b. The FDA guidance mentioned above also relates other specific food items to the radioactive nuclide concentrations in milk. The mathematical formula is shown in Section 9.8.6 of the BRP plan.

   c. The FDA guidance is available and has the relationships for concentrations of Cs-137, Sr-89, and Sr-90 in food to projected dose commitment.

2. The Bureau analyzes samples of vegetation, fish, and meat. The relation between the concentration of radioactive material in these foods and

projected dose is given by the mathematical formula in Section 9.8.6 of the BRP plan.

3. Section 9.8.8. of the BRP plan, Revision 3 gives the dose commitment for drinking water related to the radioactive material concentrations listed in the National Interim Primary Drinking Water Regulations (NIPDWR), EPA-570/9-76-003, Appendix B.

4. Detailed provisions for relating air sampling results to dose estimates are found in the procedure entitled, "Estimation of Airborne Consequences for Ground Level Sources" which is attached as Attachment #4..

   a. The projected whole body gamma dose as a function of noble gas concentration in air is shown in Figure 5.1 which was extracted from the Manual of Protective Action Guides and Protective Actions for Nuclear Incidents, EPA-520/1-75-001, page D-46.

   b. The projected thyroid dose as a function of either gamma exposure rate are radioiodine concentration in air is shown in Figure 5.2 which was extracted from EPA-520/1-75-001, page 5.19.

5. Certain radioisotopes in NUREG-0654, Revision 1, Table 3, page 18 are not mentioned in the BRP plan or FDA guidance because their half-lives are too short to be included in the ingestion pathway or they are inert gases which do not react with foods.

6. Post-accident dosimetry is discussed in Section 12.4 of the BRP plan.

a. In the event that significant amounts of radioiodine and/or particulates were known to be released, a suitable sample of individuals in the general public will be whole body counted.

b. Procedures for estimating population dose to not appear in the State Plan since that function will be filled by US DOE, as it was following the TMI accident.

## RESPONSE TO CONTENTION 20 Part [7][a]

Part of Contention 20 [7][a] states maps are not provided by the state showing preselected radiological sampling and monitoring points.

1. BRP, Revision 3 Appendix E, Part 4 describes the maps and sampling locations which are available. Revision 3 is attached as Attachment #1.

    a. The Bureau has a map with the preselected monitoring locations for continuous air samples, thermoluminscent dosimeters, river water, milk, and vegetation samples. This map is divided into sectors.

    b. The Bureau does not as of the date of this testimony have a map with the mobile air sampling locations which would be used by both the Applicant and BRP. This map will be provided by the Applicant.

## RESPONSE TO CONTENTION 20 [7][i]

NUREG-0654, J.10.m requires estimates of evacuation time and expected local protection from shelter against direct and inhalation exposure to be the basis for development of protection action recommendations. This contention maintains that the state plan does not satisfy this criterion. This testimony replies to the contention except for the matter of evacuation time estimates.

The BRP plan uses the accident itself as the basis for selection of protective action recommendations.

Evacuation is indicated if the accident involves or is expected to involve core meltdown and loss of containment leading to the discharge of a significant fraction of particulate inventory. This strategy is also used if projected doses are expected to exceed the lower EPA-PAG's. An example of this would be in preparation for certain planned maneuvers during an accident. This option is used whenever its employment will save a major fraction of projected dose.

Sheltering is used as a protective action when dose projections are expected to exceed the lower EPA-PAG's, when the discharge will be too soon and too short in duration to allow an evacuation, and when the discharge does not involve significant fractions of the particulate inventory. In the event evacuation would normally be recommended but cannot be effected, e.g., foul weather, then sheltering is the only alternative and would be used.

NUREG-0654, Revision 1, J.10.m footnotes three references: SAND-1725, SAND-0454, and EPA 520/1-78-0013 which consider evacuation and sheltering strategies. I am reasonably familiar with SAND-0454 and EPA 520/1-78-0013. I am not familiar with SAND-1725. Much of our rationale for devising protective action recommendations was gleaned from SAND-0454.

The document EPA 520/1-78-0013 describes a method for selecting evacuation versus sheltering strategies. The method is rather complicated. It depends on a set of variables, the values for which are prone to uncertainties. The method does not consider particulates. That method was therefore rejected.

It is our position that shelter is to be used only if needed protection cannot be achieved by evacuation. Evaluation of protection afforded by local structures will not make those structures into better shelters. The evaluation is meaningless for the way we use shelter in our plan.

## RESPONSE TO CONTENTION 20 PART [7][k]1)

Part of this contention states that the Commonwealth's plan does not identify procedures for detecting contamination.

1. Appendix A of the BRP plan Revision 3 lists the implementing procedures. The BRP plan is attached as Attachment #1.

2. The procedure concerning detection of airborne contamination is the Field Airborne Iodine Samplng procedure which is attached as Attachment #3.

3. Appendix 16, PEMA DOP contains the procedure for detecting personnel contamination. The PEMA DOP is attached to the testimony of Mr. Ralph Hippert.

MARGARET A REILLY
PROFESSIONAL QUALIFICATIONS

I am a Health Physicist, serving as the Chief of the Division of Environmental Radiation in the Bureau of Radiation Protection in the Commonwealth of Pennsylvania, Department of Environmental Resources. In this position I am responsible for Bureau planning for accidents at fixed nuclear facilities as well as for routine surveillance of environmental radiation. I have had these responsibilities since August 1967.

I received an MS Degree in Radiation Science from Rutgers University in 1967, and a BS Degree in Chemistry from College Misericordia in 1963.

From August 1963 to November 1964 I was employed as a chemist by the Pennsylvania Bureau of Standards, Department of Properties and Supplies. From November 1964 to August 1966 I was employed as a chemist by the Bureau of Occupational Health, Pennsylvania Department of Health.

I am a member of the Health Physics Society.

I am certified by the American Board of Health Physics.

I am an associate member of the Conference of Radiation Control Program Directors (CRCPD). I have served on CRCPD Task Force No. 12 on Emergency Planning since 1976.