OUTLINE

This testimony of Walton L. Jensen, Jr., John C. Voglewede, Bruce A. Boger and Peter L. Hearn contains the NRC Staff's response to that portion of ECNP Contention 1(d) that deals with the ranges of control room instruments that receive inputs from the core cooling and containment isolation systems.

The purpose of this testimony is to demonstrate that, as is asserted by ECNP Contention 1(d) to be necessary, the instruments in the TMI-1 control room by which the operator monitors information from the core cooling and containment isolation systems following a feedwater transient and small break LOCA are capable of on-scale measurement during accidents.

Conclusions to be drawn from this testimony:

-- The operator must take certain actions to assure adequate core cooling following a small break LOCA.

-- Those actions are described in TMI-1 Emergency Procedure EP 1202-6.

-- To know when to take those actions the operator needs to monitor certain parameters via control room instruments.

-- The parameters to be monitored and their possible ranges during an accident have been specified.

-- The ranges of the control room instruments used to monitor those parameters have been specified and provide for on-scale indication of the parameters to be monitored.

-- No operator action is necessary to isolate the containment following an accident.

-- The operator need only verify that containment isolation valves are closed following a small break LOCA.

-- Those valves have been identified and will be listed in EP-1202-6B.

-- Valve closure is indicated in the control room by indicator lights for each valve.

-- The operator can attempt manual closure using appropriate actuation switches in the control room if valve closure is not indicated.

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the matter of	)	
	)	
METROPOLITAN EDISON COMPANY et al.	)	Docket No. 50-289
	)	
(Three Mile Island Nuclear Station, Unit No. 1)	)	

NRC STAFF TESTIMONY OF PHILLIP G. STODDART
REGARDING CAPACITY OF RADIATION MONITORS IN CONTAINMENT
{In part, ECNP Contention I(d)}

Q 1. Please state your name and position with the NRC.

A. My name is Phillip G. Stoddart. I am an employee of the U. S. Nuclear Regulatory Commission assigned to the Effluent Treatment Systems Branch, Division of Systems Integration, Office of Nuclear Reactor Regulation.

Q 2. Have you prepared a statement of professional qualifications?

A. Yes. A copy of this statement is attached to this testimony.

Q 3. Please state the nature of the responsibilities that you have had with respect to the Three Mile Island Nuclear Station, Unit 1.

A. I was responsible for reviewing part of TMI's response to the Commission Order of August 9, 1979. Specifically, I reviewed their proposed methods for achieving separation and/or isolation of the inventory of radioactive liquids at TMI-2 from TMI-1. I was also responsible for reviewing and evaluating TMI-1's conformance with Appendix I of 10 CFR Part 50 and for reviewing and evaluating portions of TMI-1 responses to NUREG-0578.

Q 4. What issues are you addressing in this testimony?

A. I am addressing in part, ECNP Contention I(d), which states:

"In addition, it is reported that the radiation monitors went offscale during that TMI-2 accident. It should be noted that this eventuality was predicted in 1974 by the TMI-2 Intervenors, but dutifully denied by the NRC staff and the applicants during the TMI-2 licensing hearings. Needless to say, the TMI-2 Licensing Board accepted the assurances of adequate monitoring offered by the Staff and Applicant. Yet a similar situation still exists at TMI. . . (Reference to worst case and worst possible accidents were not accepted by the Board in its First Special Prehearing Conference Order, December 18, 1979, Page 38)."

Q 5. Are any radiation monitors at TMI-1 of insufficient range and, therefore, incapable of monitoring radiation or radioactivity releases in the event of an accident such as that which occurred at TMI-2?

A. A number of radiation monitors at TMI-1 are specifically designed for functioning under normal operating conditions and for anticipated operational occurrences and are expected to be offscale in the event of a TMI-2 type accident. However, in all cases which are of significance in evaluating accidents, these monitors will be supplemented by high-range monitors which are designed to function under accident conditions.

Q 6. What monitors have special high-range capacities?

A. There will be two high-range area monitors in the TMI-1 containment. Each identified gaseous effluent release path will be serviced by high-range effluent monitors directly measuring radioactive noble gases and sampling radioiodines and particulates in discharges to the environment.

Q 7. Have the gaseous effluent monitors been addressed elsewhere in your testimony before this Board?

A. Yes. The adequacy of these monitors is addressed in my testimony on Sholly Contention 5 and on ECNP Contention I(d), in part (specific to gaseous effluent

monitors).

Q 8. Are containment high-range radiation monitors provided at TMI-1 which will provide a display in the control room?

A. Yes. Radiation monitors will be provided as discussed on Page C8-44 of NUREG-0680).

Q 9. Is the range of this instrumentation adequate to provide on-scale readings in the event of an accident such as occurred at TMI-2?

A. Yes. The upper range capacity of this instrumentation is 10^7 R/hr. Such a capacity is adequate to measure an instantaneous 100% release of all TMI-1 reactor core noble gases, accompanied by release of 25% of all TMI-1 core radioiodines, into the TMI-1 containment atmosphere. By comparison, the TMI-2 accident is estimated to have released 40 to 50% of the core noble gases, together with a small fraction of the radioiodines, with the release occurring starting about 2 hours after shutdown and continuing over a period of several hours.

Q 10. Was the TMI-2 containment radiation monitor similar to the instrumentation at TMI-1?

A. No. The TMI-2 containment radiation monitor was shielded by approximately two inches of lead while the TMI-1 instrumentation is not shielded. The design purpose of the lead shielding of the TMI-2 monitor was to reduce the radiation reaching the detector by a factor of one hundred, so that a 10^4 R/hr detector could be used to measure radiation at up to 10^6 R/hr.

Q 11. Did the TMI-2 containment radiation monitor go offscale during the TMI-2 accident?

A. No. The range of 10^6 R/hr was adequate to meet the conditions of the accident, as reported in NUREG-0578, Lessons Learned Task Force Status Report and Short-Term Recommendations.

Q 12. The TMI-1 monitor is stated to be of different design from that used at TMI-2. What is the purpose of the change in design?

A. An inherent deficiency in the design of the TMI-2 high-range radiation monitor did not take into account the possibility that most of the radiation present in an accident, such as that which occurred at TMI-2, would be of relatively low energy and would be reduced by a factor well in excess of one hundred. In effect, the radiation detector at TMI-2 was not responsive to much of the radiation actually present. The high-range containment radiation monitors which are being installed at TMI-1 are designed to be capable of detecting photon radiations of less than 70 keV and should be capable of measuring in-containment radiation accurately while retaining the capability of staying on-scale for all conceivable circumstances.

Q 13. In your opinion, is the design of the in-containment high level radiation monitoring instrumentation, which the Licensee has provided, adequate to assure on-scale readings in the event of a TMI-2 type accident at TMI-1?

A. Yes. For the reasons stated above, it is my opinion that the design of the in-containment high level radiation monitoring instrumentation is adequate to assure on-scale readings in the event of an accident.

Phillip G. Stoddart

Effluent Treatment Systems Branch
Division of Systems Integration
Office of Nuclear Reactor Regulation

My name is Phillip G. Stoddart. I am a senior nuclear engineer in the Effluent Treatment Systems Branch, Division of Systems Integration in the Office of Nuclear Reactor Regulation. I attended the New Mexico School of Mines from 1947 to 1949. From 1949 to 1953 I was on active duty with the United States Air Force, assigned as a radiological instrumentation specialist with the Armed Forces Special Weapons Command and as a radiological safety instructor with a Strategic Air Command special weapons unit.

From 1953 to 1973 I was on the radiation safety staff of the Argonne National Laboratory, working from 1953 to 1957 at Argonne's Illinois site and from 1957 to 1973 at Argonne's test facilities at the National Reactor Training Station, Idaho Falls, Idaho. My duties there included conduct of radiation safety programs, including effluent control and waste management, for several research and test reactors and a fuel recycle facility.

In 1973 I joined the Nuclear Regulatory Commission (formerly Atomic Energy Commission) as a nuclear engineer in the Effluent Treatment Systems Branch, Division of Systems Integration. In this position I am responsible for the review and evaluation of radioactive waste systems and for the calculation of releases of radioactivity from nuclear power reactors. I am also responsible for determining the adequacy of instrumentation provided for maintaining the radioactive discharges from nuclear power plants and for providing technical bases for guides and standards. I have participated in generic studies of the relationship between reactor operation and radioactive waste generation and in the preparation of staff reports related to effluent control technology and effluent monitoring.

OUTLINE

This testimony of Philip G. Stoddart contains the NRC Staff's further partial response to that portion of ECNP Contention 1(d) concerning radiation monitors.

The purpose of this testimony is to demonstrate that, as is asserted by ECNP Contention 1(d) to be necessary, the means for monitoring radiation during accidents at TMI-1 are capable of on-scale measurement of radiation.

Conclusions to be drawn from this testimony:

-- Certain radiation monitors at TMI-1 are specifically designed to function on-scale under normal operating and anticipated transient conditions and are expected to be off-scale under accident conditions.

-- Those monitor types that are of importance in evaluating accidents, the monitors in the gaseous effluent pathways and the area monitors in the containment, will be supplemented by high-range monitors designed to function under accident conditions.

-- The containment high-range area radiation monitors at TMI-1, unlike the monitor at TMI-2, are not shielded, are of a different design, and will be capable of on-scale accurate measurement of in-containment radiation in the event of an accident. (The gaseous effluent pathway monitors are addressed in Mr. Stoddart's previously filed partial response to ECNP Contention 1(d)).

-- The means for monitoring radiation during accidents at TMI-1 are capable of on-scale measurement of radiation.