

UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of )  
COMMONWEALTH EDISON COMPANY ) Docket Nos. 50-295  
(Zion Station, Units 1 and 2) ) 50-304

NRC STAFF TESTIMONY ON BOARD  
QUESTIONS 4(a) AND 4(b)

by

Dean M. Kunihiro

The Licensing Board has requested response to specific questions regarding certain security impacts of the proposed spent fuel modifications at the Zion Station, Units 1 and 2. These questions and my response are set forth below.

- (4)(a) Will the proposed modifications of the spent fuel pool and/or operation of the Zion Station with increased spent fuel pool storage capacity:
- (1) increase the potential risk of threats to special nuclear material or to Station facilities?

It is not readily apparent that the increased storage capacity of spent fuel and/or the related operations will increase the potential risk of threats to the Zion Station. Only if one assumes that the increase of spent fuel inventory presents a more attractive target for any potential threat will there be a corresponding increase in the potential risk of threats. In my opinion, the likelihood of this being a valid assumption is extremely low. Since the additional storage of spent fuel elements does not increase the attractiveness of the Zion facility, as it relates to theft or sabotage of special nuclear material, it is my judgment that the proposed spent fuel pool modification will not increase the potential risk of threats.

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- (2) increase the potential risk of theft of special nuclear material from the Station?

No. To begin with the quality of the material does not lend itself to being desirable enough to "steal." Consequently, the added inventory would not increase the potential risk of theft.

- (3) increase the potential risk of industrial sabotage to the Station or to the special nuclear material?

No. Since the greatest inventory of dispersible radioactive material exists only immediately after refueling (30-60 days), and since the additional storage capacity will not increase this amount of dispersible radioactive material, in my judgment there will be no more radioactive material inventory that can theoretically be dispersed by a given sabotage scenario. Therefore there will be no greater potential risk of industrial sabotage to the Station or to the special nuclear material than exists presently.

- (4) decrease the level of physical protection of the facilities or special nuclear material at the Station?

No. The level of protection is not decreased since the level of protection is not a function of the quantity of spent fuel in storage.

- (4)(b) As a result of the proposed modification of the spent fuel pool and the proposed operation of the Station with increased spent fuel capacity, will it be necessary to modify the Physical Security Plan, Safeguards Contingency Plan . . . for the Station?

No. The currently approved Security Plan treats the spent fuel pool as a vital area. The increased quantity of irradiated fuel which may be stored in the spent fuel pool as a result of the proposed amendment does not require an increase in the level of security protection under NRC regulations. The level of security protection required is independent of the quantity of irradiated fuel contained in the spent fuel pool. The type of material to be stored in the spent fuel pool, as a result of the proposed amendment, is the same as that presently being stored. In addition, the proposed amendment does not change the security requirements or the structural design of the external barriers of the pool.

#### PROFESSIONAL QUALIFICATIONS

by

Dean M. Kunihiro

My experience in nuclear safeguards began in 1976 when I was appointed to the Office of Nuclear Material Safety and Safeguards as a Program Analyst in the Division of Safeguards. I remained in that position until January 1978 when I was appointed to my present position.

I am presently a Reactor Safeguards Analyst in the Division of Operating Reactors, Office of Nuclear Reactor Regulation, U.S. Nuclear Regulatory Commission. I am charged with the technical evaluation of the Security Plans submitted pursuant to 10 CFR 73.55 for 13 nuclear power reactor facilities. Among these facilities is the Zion Station, Units 1 and 2.

Prior to joining the Nuclear Regulatory Commission, I served in the U.S. Army for 9 years in a variety of assignments to include combat infantry duty in Viet Nam, and radiobiology research with the Defense Nuclear Agency.

I have a Bachelor of Science degree from the United States Military Academy (1967) and a Master of Science degree in Physics from the Naval Postgraduate School (1972). I am a past member of the Health Physics and Radiation Research Societies.

UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of  
Commonwealth Edison Company  
Zion Station, Units 1 and 2

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Docket Nos. 50-295  
50-304

SUPPLEMENTAL TESTIMONY OF JOHN R. SEARS

ON BOARD QUESTION 4(b)

EMERGENCY PLANNING

I am presently a Nuclear Engineer in the Environmental Evaluation Branch, Division of Operating Reactors, Nuclear Regulatory Commission. My responsibility includes evaluating the adequacy of a licensee's plans for coping with emergencies for operating reactors. Until November 1976, I was a member of the Industrial Security and Emergency Planning Branch, Division of Project Management, where my responsibilities included the evaluation of an applicant's plans for coping with emergencies, and also its plans for industrial security protection of its reactor site pursuant to §50.34(c) of 10 CFR Part 50.

I have reviewed the licensee's emergency plan which applies to all his generating stations and the specific plan for the Zion station.

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The Licensing Board has requested the parties to respond to the following regarding the emergency plan at the Zion Station, Units 1 and 2.

- (4)(a) As a result of the proposed modification of the spent fuel pool and the proposed operation of the Station with increased spent fuel storage capacity, will it be necessary to modify . . . the Emergency Plan for the Station?

As explained herein, this question must be answered in the negative. The Generating Station Emergency Plan (GSEP) which is applicable to all of the licensee's nuclear generating stations, including Zion Station, and the Zion Station Emergency Plan (ZSEP), a separate plan for the Zion Station, were reviewed and evaluated by the staff in the U. S. Atomic Energy Commission Directorate of Licensing Safety Evaluation Report (SER) dated October 6, 1972. Section 13.3 of the SER (copy attached) described the basic elements of these plans and stated that they meet the requirements of 10 CFR Part 50, Appendix E. It was further concluded that the plans provide reasonable assurance that appropriate protective measures can and will be implemented promptly and effectively in the unlikely event of an accident having a potential effect on the health and safety of the public. Detailed procedures to implement these emergency plans are inspected and evaluated by field inspectors of the NRC Office of Inspection and Enforcement:

I have personally reviewed these plans. The plans are designed to cope with the consequences of a spectrum of accidents, including the design basis loss-of-coolant accident and design basis fuel handling accident in the spent fuel pool, that could result in radiological releases from the Station. The NRC staff's evaluation of the potential offsite doses due to the spectrum of accidents is listed in Table 15.0 of the SER. The doses for the design basis loss-of-coolant accident and fuel handling accident are presented below.

	<u>Two-Hour Exclusion Boundary (415M)</u>		<u>Course of the Accident, LPZ (1600M)</u>	
	<u>Thyroid (Rem)</u>	<u>Whole Body (Rem)</u>	<u>Thyroid (Rem)</u>	<u>Whole Body (Rem)</u>
Loss of Coolant	123	6	147	5
Fuel Handling	<1	2	7	<1

The fuel handling accident analyzed for the SER assumed complete damage to, and release of activity from, a fuel assembly (204 fuel rods) dropped to the bottom of the spent fuel pool immediately after its removal from the core. Even if 5 fuel assemblies were to be similarly damaged and the activity released, the consequences would be less than that resulting from the design basis loss-of-coolant accident. The proposed expansion does not significantly affect the assumptions underlying the postulated fuel handling accident or its consequences due primarily to decay of the gaseous activity in the stored assemblies.

Consequently, no changes to the GSEP or ZSEP are required as a result of the proposed modification of the spent fuel pool and the proposed operation of the Station with increased spent fuel storage capacity.

Simulator, the Zion Nuclear Power Plant Simulator and at R. sselaer Polytechnic Institute's pool reactor. Seven of the supervisory and operating personnel have had previous nuclear training and experience in the U. S. Navy. Operators who are not required to be licensed, such as technicians and repairmen, will have attended classes or received on-the-job training in those areas required by their respective functions and responsibilities. All personnel will receive training in Radiation Protection. We conclude that the program for training Zion Station operating personnel is adequate.

### 13.3 Emergency Planning

The Commonwealth Edison Company has prepared a comprehensive plan called the Generating Station Emergency Plan (GSEP), which is applicable to all of Commonwealth's nuclear generating stations, including the Zion Station. GSEP describes the applicant's emergency organization, and the assignments, authority and responsibilities of personnel assigned to that emergency organization. The major groups identified in GSEP that would respond to an emergency at the Zion Station are the Command Center, the Division and the Environs Groups. The functions of all three groups are defined in GSEP.

The GSEP describes the arrangements that have been made by the applicant with Federal, State, and local officials and agencies to cope with potential radiological emergencies. The State of Illinois

The Technical group will consist of approximately 31 technical engineers and technicians. The technical group is headed by the Technical Staff Supervisor, who exercises supervisory control over four technical areas: Radiation-Chemistry Environs, Thermal, Nuclear and Instrumentation. In addition, the applicant is in the process of increasing its corporate technical support by in-house transfers and by the employment of additional personnel.

The Fuel Loading group will consist of approximately seven fuel handlers supervised by the Fuel Handling Foreman who will have a limited Senior Reactor Operator's License. The Fuel Handling Foreman, under the direction of the Operating Engineer, is responsible for fuel preparation, loading, unloading, in-plant transporting and shipping.

The qualifications of the management and operating staff will meet the minimum acceptable levels as described in the American National Standard "Selection and Training of Nuclear Power Plant Personnel." ANSI N18.1-1971. We conclude that, subject to the successful completion of operator examinations and licensing, the staffing for operating both Units 1 and 2 is acceptable.

### 13.2 Training Program

The Zion Station supervisory and operating personnel have taken the Westinghouse Reactor Operating Training Program conducted at Waltz Mill and Saxton, Pennsylvania, and at Zion Station. Additional training was received at the Babcock & Wilcox Nuclear Power Plant



has the statutory responsibility and authority for protecting the health and safety of the public from ionizing radiation. The Illinois Department of Public Health is the responsible agency within the state organization for activating the State of Illinois Peacetime Radiological Response Plan, and is the key coordinating agency among the applicant, U. S. Coast Guard, Illinois State Police, Illinois Civil Defense, AEC, and other local, State and Federal agencies.

In addition to GSEP, the applicant has developed a separate, station emergency plan for the Zion Station. This plan, Zion Station Emergency Plan (ZSEP), is compatible with the GSEP. ZSEP describes the Zion Station emergency organization for coping with emergencies.

The plan covers a spectrum of emergency conditions which may arise and the procedures to be followed. Primary notification of offsite support agencies will be through the Commonwealth Load-Dispatcher, upon request from the ZSEP Director.

The means for determining the magnitude of a release is provided by the preparation of relative concentration factors, precalculated and plotted X/Q graphs for estimates of downwind doses, based on release rate and representative meteorological conditions. In addition, twelve environmental surveillance stations have been established, of which 9 are outside the plant site. Offsite monitoring equipment and emergency supplies are available in a mobile trailer parked at the Zion meteorological tower.

A small infirmary is located in the Zion Station service building with first aid kits and stretchers located throughout the Zion facility. First aid and decontamination procedures have been prepared. For additional medical help at the facility, two doctors, a nurse and a third physician as a consultant will be available on call for medical treatment at the station. Offsite medical support will be furnished by either Victory Memorial Hospital or St. Therese Hospital in Waukegan. The two hospitals in Waukegan have established procedures for the handling of radiation casualties and have agreed to accept and treat such patients. Transportation from the plant to the hospitals will be taken care of by the Zion Rescue Group or by the Safe-Way Ambulance Service in Waukegan.

Requirements for emergency training and retraining of personnel have been addressed in ZSEP, but stronger emphasis will be placed on these requirements in the Technical Specifications, which will require training and retraining of personnel as set forth in ANSI-N18.1 "Section and Training of Nuclear Power Plant Personnel." Emergency exercises will be conducted at the Zion Station on a quarterly basis.

Recovery and reentry considerations are discussed in both GSEP and ZSEP. GSEP sets forth the procedures that must be developed following an incident and the State of Illinois responsibility for offsite recovery. ZSEP prescribes allowable dose and contamination levels during recovery and reentry operations at the Zion Station.

We have concluded that the extensive preplanning for coping with potential accidents reflected in the GSEP and ZSEP, and the arrangements made for support from both private and governmental groups outside the applicant's organization meet the requirements of Appendix E of 10 CFR Part 50 and provides reasonable assurance that appropriate protective measures can and will be implemented promptly and effectively, in the unlikely event of an accident having a potential effect on the health and safety of the public.

JOHN R. SEARS

PROFESSIONAL QUALIFICATIONS

I am employed as a Nuclear Engineer in the Environmental Evaluation Branch of the Division of Operating Reactors, U. S. Nuclear Regulatory Commission, Washington, D. C. My responsibility includes evaluating the adequacy of a licensee's plans for coping with emergencies for operating reactors.

I attended New York City College, majoring in Mechanical Engineering. Prior to 1952, I was employed in field jobs in various aspects of mechanical engineering. In 1952 I joined Brookhaven National Laboratory as a Reactor Shift Supervisor on the Brookhaven Graphite Reactor. While at Brookhaven, I completed a series of courses given by the Nuclear Engineering Department in nuclear engineering. These courses were patterned on the ORSORT programs. In 1957 I was appointed Assistant Project Engineer on the Brookhaven Medical Research Reactor. I was a member of the design group, participated in critical design experiments, wrote specifications, coauthored the hazards report, was responsible for field inspection and contractor liaison, training operators and loaded and started up the reactor. About three months later, following the successful completion of proof tests and demonstration of the reactor in its design operating mode, I accepted a position as reactor inspector with the Division of Inspection, U. S. Atomic Energy Commission.

In 1960 I transferred, as a reactor inspector, to the newly-formed Division of Compliance. I was responsible for the inspection, for safety and compliance with license requirements, of the licensed reactors and the fuel

fabrication and fuel processing plants, which use more than critical amounts of special nuclear material, in the Northeast United States.

In September 1968 I transferred to the Operational Safety Branch, Directorate of Licensing. The Branch was reorganized in April 1974 as the Industrial Security and Emergency Planning Branch to place increased emphasis and attention upon these areas. I have participated as an instructor at the Emergency Response Planning Course at the Defense Civil Preparedness Agency Training Center at Battle Creek, Michigan. In November 1976 I transferred to my present position.