

activities to resolve this generic issue, and (2) coordinating the research activities of National Laboratories that are assigned to evaluate the subtasks identified in the action plan.

I, Thomas G. Dunning, being duly sworn, do depose and state:

Q.3. By whom are you employed, and what is the nature of the work you perform?

A.3. I am employed as a Section Leader by the Instrumentation and Control Systems Branch (ICSB), Division of Systems Integration, Office of Nuclear Reactor Regulation, USNRC. A complete description of my professional qualifications is attached to this affidavit.

Q.4. What is the nature of the responsibilities you have regarding the Comanche Peak Steam Electric Station?

A.4. Section 7 of the Safety Evaluation Report ("SER") for the Instrumentation Control Systems for the Comanche Peak Steam Electric Station, Units 1 and 2 was prepared under my direction.

Q5. What is the subject matter of your affidavit?

A5. (Szukiewicz and Dunning) We will address the question raised by Dr. Jordan in a telephone conference call held on Thursday, April 7, 1983 (Tr. 33-34) which notes differences in the Staff's discussion of Unresolved Safety Issue A-47 in Appendix C of the Comanche Peak SER and in NUREG-0705. Dr. Jordan noted that NUREG-0705, "Identification of New Unresolved Safety Issues Relating to Nuclear Power

Plants," March 1981, refers to either single or multiple failures while the Staff in the Comanche Peak SER (NUREG-0797), Appendix C only refers to single failures. He questioned whether the "staff meant we should only refer to single failures now?"

Q6. Does the Staff consider both single and multiple failures or only single failures in the evaluation of the safety implications of control systems?

A6. (Szukiewicz) The Task Action Plan "Safety Implications of Control Systems (Task A-47)," September 1982, gives the details of the Staff's program for resolution of this Unresolved Safety Issue. The Task Action Plan addresses whether multiple failures or single failures are considered. Specifically, on page 7, the Task Action Plan states:

"Failures will be limited to independent single failures or multiple failures resulting from a common initiator. An additional independent single failure may also be included if, as part of a specific scenario analysis, it is apparent that such failure is highly likely and the attendant consequences significant."

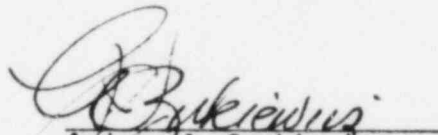
Thus, with the noted exception of including an additional independent single failure, only multiple failures that result from a single initiator will be considered. Multiple random failures of control systems will not be considered as part of this USI.

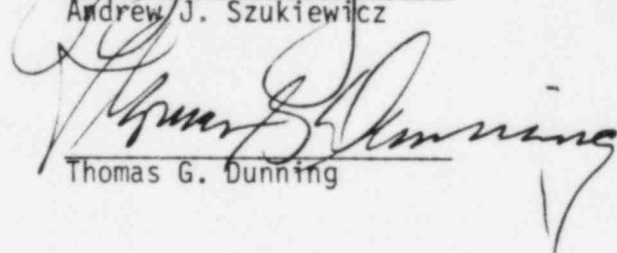
Q7. Did the Staff's review of Comanche Peak include consideration of single or multiple failures of control systems?

A7. (Dunning) In the Comanche Peak review, the Staff requested that the Applicants provide an analysis of the consequences of single

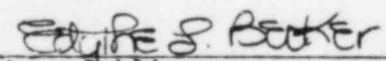
failures in control systems to demonstrate that these failures would not result in consequences outside the bounds of the safety analysis or beyond the capability of operators or safety systems. Specifically, the Staff requested that this analysis address the effects of single failures such as power supplies, instruments sensors, and senselines, which could affect two or more control systems. Therefore, the consequences of multiple system failures have been considered to the extent that they are a consequence of a single initiating event affecting the control systems. Based on the Staff review of the results of the Applicants' analysis, it was concluded that the consequences of single failures within control systems are bounded by the plant safety analysis.

The above statements and opinions are true and correct to the best of our knowledge and belief.


Andrew J. Szukewicz


Thomas G. Dunning

Subscribed and sworn to me
this 5th day of May, 1983


Notary Public

My Commission expires: 7/1/86

STATEMENT OF PROFESSIONAL QUALIFICATIONS

Andrew J. Szukiewicz

I have been with the U. S. Nuclear Regulatory Commission (NRC) since August 1973. Since March 1981, I have been the Task Manager of the Unresolved Safety Issue Task A-47, "Safety Implications of Control Systems" in the Generic Issues Branch, Division of Safety Technology, Office of Nuclear Reactor Regulation (NRR). I am responsible for (1) developing and implementing a Task Action Plan which defines the staff's activities to resolve this generic issue, and (2) coordinating the research activities of National Laboratories that will be assigned to evaluate the sub-tasks identified in the action plan.

From June 1979 to March 1981 I was the Task Manager of Unresolved Safety Issue A-24, "Environmental Qualification of Safety-Related Electrical Equipment," Division of Unresolved Safety Issues, Program Office of NRR. I was the principle author and coordinator of NUREG-0588 which developed the interim staff position on environmental qualification of safety-related electrical equipment.

From August 1973 to June 1979 I was a senior reactor engineer in the Instrumentation and Control Systems Branch. I performed operating license reviews of the Davis Besse Unit 1 and the Arkansas Nuclear One, Unit #2 instrumentation and control system designs and the instrumentation and control system reviews of the Construction Permit applications for the Greenwood Units 1 and 2 and the Bellefonte Units.

I have a Bachelor of Science degree (1965) in Electrical Engineering from the State University of New York at Buffalo (formerly the University of Buffalo).

From June 1965 to August 1973 I served as the Instrumentation and Control Systems Engineer for the Bailey Meter Company (subsidiary of the Babcock and Wilcox Company). I was assigned as systems start-up engineer for

instrumentation and control systems for large and medium size electric generating stations (1000 MW to 160 MW), both in the United States and overseas. My duties included supervising the commissioning and the tuning of the automatic control systems for minimum and maximum load varying operations for nuclear as well as fossil fuel type plants.

I am also a past member of the IEEE Standards Committee Working Group (1978 - 1979) on Environmental Qualifications of Safety Related Equipment, and participated in lectures and panel discussions (1980 - 1981) in IEEE sponsored continuing education programs on safety-related systems qualification.

THOMAS G. DUNNING

PROFESSIONAL QUALIFICATIONS

INSTRUMENTATION AND CONTROL SYSTEMS BRANCH

DIVISION OF SYSTEMS INTEGRATION

I have been employed by the Nuclear Regulatory Commission since November 1976. From June 1979 to the present time, I have been a Section Leader in the Instrumentation and Controls Systems Branch, Division of Systems Integration. Prior to my present assignment, I served as a Senior Engineering Systems Analyst in the Plant Systems Branch, Division of Operating Reactors. I have participated in the review of instrumentation, control, and electrical systems of numerous nuclear power stations and in the formulation of related standards and Regulatory Guides. I am duly registered as a Professional Engineer in Control Systems Engineering in the state of California, holding Certificate No. 752 conferred the 13th day of October 1976.

The Instrumentation and Control Systems Branch performs an indepth technical review of the design, fabrication, qualification, and operation of nuclear power plant instrumentation and control systems important to safety. This review includes a comprehensive assessment of the systems for all power reactors, for adherence to appropriate codes and standards implementing the Commission's requirement and encompasses the complete evaluation of the applicant's safety analysis reports, generic topical reports, and other design information. Further, the Branch develops the bases for Regulatory Guides for instrumentation and control systems designs; evaluates experience obtained during the construction and operation of nuclear power plants and relates this information to future evaluations and acceptance criteria; and participates in the development of Regulatory Guides and regulations pertaining to instrumentation and control systems and other systems in the Branch area of responsibility. As a Section

Leader, I supervise the work of six staff members in carrying out the responsibilities of the Branch.

I hold a Bachelor of Science degree in Electrical Engineering and a Master of Science degree in Nuclear Engineering which were conferred by the University of Wisconsin; Madison, Wisconsin. In addition, I have taken post graduate courses in controls systems analysis as well as specialized training in nuclear power plant design and operations, engineering analysis, and fire protection.

My nuclear engineering experience background derives from my current employment at the Nuclear Regulatory Commission and at General Atomic Company, San Diego, California from June 1960 to November 1976. While assigned to the Division of Operating Reactors I participated in the review and evaluations of instrumentation and control systems design changes for operating reactors. In addition, I was assigned as a group leader in a team review effort of fire hazards analysis reports, including onsite inspections for 13 operating reactors. During the 16 years plus at General Atomic, I held various positions in the area of instrumentation and control systems design for High Temperature Gas Cooled Reactors. I was involved in the preparation of specifications for radiation and process monitoring and control systems for the Peach Bottom Unit 1 nuclear plant and subsequently spent two years as a startup engineer at this facility. On the Fort St. Vrain project I was assigned as a Section Leader for the NSSS process control systems and was responsible for the analysis, design and specifications for control and protection systems. This work included safety analysis and equipment qualification of safety systems in support of operating license requirements. For one year I was assigned to the Fort St. Vrain site engineering office as lead instrumentation and controls engineer, responsible for all design changes to instrumentation, control and protection systems. I

subsequently held positions as Project Engineer for nuclear power plant projects.