UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION
BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of	)	
PENNSYLVANIA POWER & LIGHT COMPANY	)	
and	)	Docket Nos. 50-387 50-338
ALLEGHENY ELECTRIC COOPERATIVE INC.	)	
(Susquehanna Steam Electric Station, Units 1 and 2)	)	

AFFIDAVIT OF JOSEPH C. LEMAIRE
IN SUPPORT OF SUMMARY DISPOSITION
OF CONTENTION 7C

County of King)
: ss.
State of Washington)

Joseph C. Lemaire, being duly sworn according to law, deposes and says:

1. I am Manager, Plant Component Behavior Analysis, General Electric Company ("GE") and give this affidavit in support of Applicants' Motion For Summary Disposition of Contention 7C. I have personal knowledge of the matters set forth herein and believe them to be true and correct. A summary of my professional qualifications and experience is attached as Exhibit "A" hereto.

2. Contention 7C states that: "The nuclear steam supply system of Susquehanna 1 and 2 contains numerous generic design deficiencies, some of which may never be resolvable, and which, when reviewed together, render a picture of an unsafe nuclear installation which may never be safe enough to operate. Specifically: ... BWR core spray nozzles occassionally crack, a problem which reduces their effectiveness".

3. The BWR core spray system for the Susquehanna Steam Electric Station ("Susquehanna") consists of a number of distinct components, as illustrated schematically in Figure 1. External piping delivers high pressure core spray water upon demand to the pressure vessel. The transition between the piping and the vessel is made by means of a safe end welded directly to the reactor pressure vessel core spray nozzle. The safe end contains an internal weld to a thermal sleeve which is welded to the internal core spray line. This internal core

D503
S01

spray line delivers core spray water to the core spray sparger which provides uniform distribution of the core spray cooling water over the reactor core. The entire system is duplicated by means of a redundant and separate loop which contains the same components.

4. No cracking of core spray nozzles has ever been reported to General Electric Co., nor is GE aware of any such cracking. Cracking of these nozzles would not be expected in view of the relatively low cyclic thermal stresses in these nozzles and the successful overall performance of core spray nozzles throughout four hundred reactor years of service. Similar successful performance is expected at Susquehanna.

5. Other portions of the core spray system have experienced a low frequency of cracking in operating BWR's. External core spray line cracking has occurred in BWR's using high carbon type 304 stainless steel. The cracking in these cases was intergranular stress corrosion cracking (IGSCC), associated with sensitization in a weld heat affected zone. Since Susquehanna uses carbon limited ($\leq$0.030 w%) Type 304 stainless steel in the external core spray lines, cracking would not be expected as stated in my Affidavit in Support of Summary Disposition of Contention 7B.

6. Type 304 stainless steel core spray safe ends have experienced IGSCC similar to piping in weld heat affected zones or away from weld regions when sensitized by pressure vessel post weld heat treatment. At Susquehanna Alloy 600 is used in the core spray safe ends and thermal sleeves rather than type 304 stainless steel. Alloy 600 is more resistant to IGSCC and has never been reported to have cracked in core spray system safe ends or thermal sleeves of similar design.

7. Interior to the reactor pressure vessel, cracking has been verified in internal core spray system piping of one operating reactor which utilized high carbon Type 304 stainless steel. The cracking in this case was IGSCC, associated with sensitization in a weld heat affected zone and was very similar to the external core spray line cracking discussed above. Since Susquehanna uses Type 304L stainless steel in the internal core spray lines, cracking would not be expected as stated in my Affidavit in support of Summary Disposition of Contention 7B.

8. Core spray sparger cracking has been reported in three operating reactors using higher carbon ($>$.040 w%) (Type 304) stainless steel. Cracks are reported inside and outside of weld heat affected

zones in these cases. Since the sparger cracking has not resulted in loose parts, NRC has approved continued operation of these reactors with spargers in this condition. The core spray spargers at Susquehanna are low carbon (approximately .020 w%) Type 304L stainless steel, which is known to resist the sensitization-related mechanism of cracking due to its low carbon content.

9. In summary, cracking has not been reported in BWR core spray nozzles. Infrequent cracking has occurred in other portions of the core spray system, but only in materials substantially different from those used at Susquehanna.

Joseph C. Lemaire

Joseph C. Lemaire

Sworn to and Subscribed Before Me

This 28th Day of August 1981

L Dale Montgomery

NOTARY PUBLIC

Residing at Bothell, Washington 98011

LS:hmc/1559-61

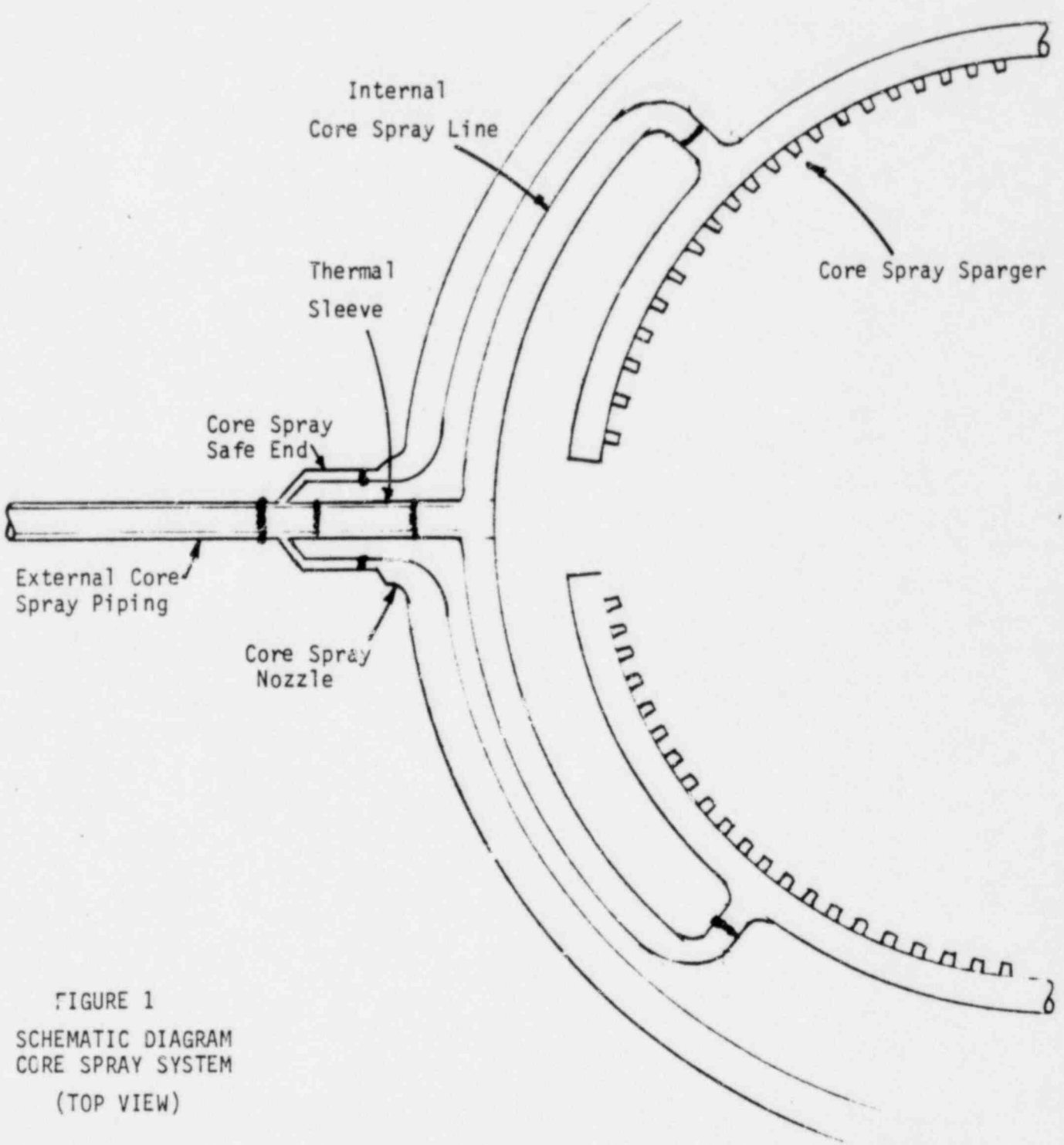

FIGURE 1

SCHEMATIC DIAGRAM
CORE SPRAY SYSTEM

(TOP VIEW)

BIOGRAPHICAL SKETCH - JOSEPH C. LEMAIRE

Joseph C. Lemaire is currently manager of Plant Component Behavior Analysis, a materials research component within the Nuclear Engineering Division of General Electric Company. He has been responsible for metallurgical failure analysis and environmental qualification of plant structural materials, including nuclear grade materials, at GE. Prior to joining General Electric in 1975, Mr. Lemaire was a nuclear propulsion metallurgist with the U.S. Energy Research and Development Agency, where he supervised nuclear fuel development activities. He holds a Bachelor of Science in Mechanical Engineering from the University of Denver (1970), a Master of Science in Metallurgical Engineering from Massachusetts Institute of Technology (1971), and a Master of Business Administration from Santa Clara University (1979). He is a member of the American Society of Metals (ASM) and the American Nuclear Society (ANS), and has published recent papers on the subject of corrosion technology at the ASM Metals and Welding Conferences and in Corrosion.

EXHIBIT A