



Commonwealth Edison
1400 Opus Place
Downers Grove, Illinois 60515

July 13, 1993

Dr. Thomas E. Murley
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Attn: Document Control Desk

Subject: Comments on Preliminary Draft of NUREG/CR-4674,
"Precursors to Potential Severe Core Damage
Accidents: 1992, A Status Report"
Quad Cities, Docket #50-254 and 50-265
LaSalle County, Docket #50-373 and 50-374

- References:
1. C. Patel (USNRC) to D. Farrar (CECo), dated June 15, 1993, Request for Comments on Preliminary Draft of NUREG/CR-4674, "Precursors to Potential Severe Core Damage Accidents: 1992, A Status Report.
 2. Quad Cities, Unit 1, Licensee Event Report No. 254/92-004
 3. LaSalle County, Unit 2, Licensee Event Report No. 374/92-012

Dear Dr. Murley:

By letter dated June 15, 1993, Commonwealth Edison (CECo) was requested on comment on NUREG/CR-4674 (reference 1). This draft contains an accident sequence precursor (ASP) analysis that involved Licensee Event Reports (LERs) from Quad Cities Station and LaSalle County Station (references 2 and 3).

Attached are comments submitted by CECo's corporate Probabilities Risk Assessment (PRA) Group, Quad Cities Station and LaSalle County Station. Should you have any questions regarding these comments, please direct them to this office.

Sincerely,

Mary Beth Depuydt
for Mary Beth Depuydt
Nuclear Licensing Administrator

Attachments:

- A. PRA Group Comments
- B. Quad Cities Comments
- C. LaSalle County Comments

cc: J. Martin, Regional Administrator - RIII
C. Patel, Project Manager, Quad Cities - NRR
J. Kennedy, Project Manager, LaSalle - NRR
T. Taylor, Senior Resident Inspector - Quad Cities
D. Hills, Senior Resident Inspector - LaSalle
Office of Nuclear Safety - IDNS

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ATTACHMENT A
PRA GROUP COMMENTS ON NUREG/CR-4674

A. Quad Cities LERs 254/92-004 and 254/92-002

1. The success criterion used for the Automatic Depressurization System (ADS) in NUREG/CR-4674 is 3 out of 5 relief valves open as is stated in the Quad Cities FSAR. Work performed for the Quad Cities IPE has shown that 1 of 5 relief valves open will depressurize the reactor sufficiently to allow low pressure systems to inject and prevent core damage. This success criterion was confirmed by analysis using the Modular Accident Analysis Program (MAAP) and reduces the ADS failure probability to that of 5 out of 5 valves. Since the failure probability is dominated by the common cause and operator action terms, the numerical value of p(ADS) with all 5 valves operable is unchanged at 0.02. However, in the case of a stuck open relief valve, the failure probability of ADS is zero, since one open valve is all that is required.
2. The analysis in NUREG/CR-4674 does not consider the Safe Shutdown Makeup System (SSMP), which is a motor-driven, high pressure injection pump with a flow capacity similar to that of RCIC and that has multiple power supplies and suction sources. SSMP has an advantage over RCIC in that it does not lose its motive power source at low reactor pressures. The effect of including SSMP in the analysis essentially adds another success path parallel to that of the RCIC/CRD combination. A failure probability for SSMP of 0.028 and the attendant operator action of 0.082 (typical values from the Quad Cities IPE) yield a failure probability of 0.11 for SSMP. This indicates that by including the SSMP success path, the conditional core damage frequency in the NUREG could be lowered by as much as a factor of 10.
3. The sequences in Figure B.9 show that either shutdown cooling (SDC) or suppression pool cooling (SPC) are required for prevention of core damage. MAAP analyses have indicated that sufficient capacity resides in the condensate storage tank (CST) at normal levels for RCIC/CRD or SSMP to inject to the vessel for greater than 24 hours, even with a stuck open relief valve (failure of node SRV-C). A time period of 24 hours is sufficient to allow for other inventory makeup sources or systems to be aligned to the reactor. In addition, injection sources from outside the containment such as CRD are not affected by suppression pool temperature or other containment parameters. Although the containment will eventually fail without the heat removal, MAAP shows that this will not occur during the first 30 hours. The effect of this is to remove the requirement for SDC or SPC success from RCIC/CRD sequences.

ATTACHMENT A
PRA GROUP COMMENTS ON NUREG/CR-4674
(continued)

B. LaSalle LER 374/92-012

1. No basis is provided for the assumed non-recovery probabilities for RCIC (0.12) and feedwater (0.34). These values seem quite high when compared to those in comparable studies. For example, in NUREG/CR-4832, "Analysis for the LaSalle Unit 2 Nuclear Power Plant: Risk Methods Integration and Evaluation Program (RMIEP)" a value of 0.0044 is given for failure to recover feedwater in 25 minutes (Table 5.15, page 5-28).

The Dresden and Quad Cities IPEs used a value of 0.0025 for failure to restart a reactor feed pump following a high level trip, and the Quad Cities IPE used a value 0.0012 for failure to initiate RCIC following failure of automatic initiation. Use of any of these alternative non-recovery probabilities would significantly reduce the conditional core damage frequency stated for this event in NUREG/CR-4674.

2. The dominant core damage sequence (sequence 11) is not highlighted on Figure B.43, as is stated in the first paragraph of section B.21.5.
3. In the last paragraph of section B.21.5, "Augmented Infection Team" should probably read "Augmented Inspection Team".

ATTACHMENT B
QUAD CITIES COMMENTS ON NUREG/CR-4674

1. Page B-33: Section B.7.3, Additional Event-Related Information

Paragraph two, first sentence states, "...operability of three of the five safety relief valves is required for automatic depressurization system (ADS) success.

The current LOCA basis analysis for Quad Cities assumes four out of five relief valves for ADS success.

2. Page B-33: Section B.7.3, Additional Event-Related Information

Paragraph two, third sentence states, "...RCIC plus one control rod drive (CRD) pump will provide sufficient makeup to prevent core damage in the event of a stuck-open relief valve, without ADS.

Quad Cities is unable to determine the basis for this statement.

ATTACHMENT C
LASALLE COMMENTS ON NUREG/CR-4674

1. Page B-356: B.21.1 Summary, fifth sentence should read "...were closed manually, and this action resulted in TDFP shutdown".
2. Page 356: B.21.1, paragraph four, last sentence should read, "The actual differential pressure substantially exceeded the allowable limit, and *the* open *MSIV* auto-closed." as there was only one MSIV open at the time.
3. Page B-356: B.21.4, first sentence should probably read "The event was modeled as an LOF with a *failed* RCIC".
4. Page B-357: second paragraph, fifth sentence should read: "Closure of the MSIVs resulted in shutdown of the TDFPs, due to loss of steam supply, and loss of the main condenser as a heat sink."
5. Page B-365, second paragraph, second sentence should read: "... and decayed to nearly a zero amplitude in approximately 3 to 4 seconds."