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ComEd

January 22, 1997

JSPLTR 97-0012

U. S. Nuclear Regulatory Commission
Attn.: Document Control Desk
Washington, D. C. 20555-0001

SUBJECT: Dresden Nuclear Power Station Units 2 and 3
Emergency Application for Amendment to Facility Operating Licenses DPR-19 and DPR-25
Additional Information Regarding Amendment to Resolve Issues Related to ECCS Suction Strainer Pressure Drop
Docket Nos. 50-237 and 50-249

Reference: 1) Letter JSPLTR 97-0007 dated January 13, 1997 from J. Stephen Perry, ComEd, to U.S. Nuclear Regulatory Commission, "Amendment to Resolve Issues Related to ECCS Suction Strainer Pressure Drop."

2) Letter JSPLTR 97-0011 dated January 17, 1997 from J. Stephen Perry, ComEd, to U.S. Nuclear Regulatory Commission, "Additional Information Regarding Amendment to Resolve Issues Related to ECCS Suction Strainer Pressure Drop."

Pursuant to 10 CFR 50.90, ComEd proposes to amend Facility Operating Licenses DPR-19 and DPR-25 and requests NRC Staff review and approval of an emergency Technical Specification (TS) change and an Unreviewed Safety Question (USQ) resulting from ComEd's efforts to reconcile a recently discovered error in the head loss of its Emergency Core Cooling System (ECCS) suction strainers. Reference 1 provided our initial submittal requesting this change. In response to our initial submittal, a request for additional information (RAI) was received and reference 2 was the ComEd response to that request.

During telephone conversations on January 19, 1997, the NRC staff requested additional information regarding the proposed amendment. This letter provides attachments with our response.

A011

Pursuant to 10CFR 50.91(a)(5) ComEd requests emergency approval of this amendment request to support the return to service of Dresden Unit 3. Dresden Unit 3 will be ready to return to service after the current forced outage on or before January 22, 1997 and, considering the guidance provided in Generic Letter 91-18, approval of this emergency amendment is required prior to startup. The basis for this emergency amendment was detailed in references 1 and 2.

ComEd plans to submit a license amendment request no later than February 7, 1997 which will resolve all the identified concerns with post-LOCA ECCS and containment cooling capability.

To the best of my knowledge and belief, the statements contained above are true and correct. In some respect these statements are not based on my personal knowledge, but obtained information furnished by other Commonwealth Edison employees, contractor employees, and consultants. Such information has been reviewed in accordance with company practice, and I believe it to be reliable.

ComEd is notifying the State of Illinois of this application for amendment by transmitting a copy of this letter and its attachments to the designated state official.

ComEd appreciates the Staff's consideration regarding these efforts. If there are any questions regarding this issue, please contact Frank Spangenberg of my staff at (815) 942-2920, extension 3800.

Sincerely,

J. Stephen Perry
Site Vice President
Dresden Station

Subscribed and Sworn to before me

on this 22 day of

January, 1997.

Notary Public

OFFICIAL SEAL
SHERRY L BUTTERFIELD
NOTARY PUBLIC, STATE OF ILLINOIS
MY COMMISSION EXPIRES:05/23/00

Attachments:

1. Additional Information Regarding Conservatism in PCT Evaluations

2. Applicability of NPSH Curves in the UFSAR with the Quad Cities SER

cc: A. Bill Beach, Regional Administrator - RIII
Senior Resident Inspector -Dresden
J. F. Stang, Dresden Project Manager, NRR
Office of Nuclear Facility Safety - IDNS

Attachment 1

Additional Information Regarding Conservatism in PCT Evaluations

The purpose of this response is to provide additional information regarding the evaluation and assessment of peak clad temperatures (PCT) penalties with respect to the runout flow conditions predicted in Service Information Letter (SIL) 151 scenarios. This is being provided to respond to NRC staff questions occurring following review of the Dresden amendment submittal dated January 17, 1997 (Ref. 1 in the attached cover letter). Specifically, the staff has requested that additional information be provided to facilitate a qualitative assessment of PCT margins inherent in the methodology applied in the amendment.

Original Basis of SIL 151

This SIL was primarily focused on the potential for loss of long-term containment cooling due to the potential for damage to the low pressure coolant injection (LPCI) pumps under single failure assumptions that would cause LPCI pump injection to a broken recirculation piping discharge loop. The concern was that operation in cavitation conditions could cause loss of the LPCI pumps and subsequent loss of the containment heat removal function. The evaluations performed in response to this concern were reviewed and accepted by NRC staff in a safety evaluation report (SER) dated January 4, 1977. This SER concluded that for recirculation discharge line breaks with failure of the loop select logic causing multiple pump injection to the faulted loop, that "...your facilities' design provides sufficient safety margin to preclude LPCI pump damage following a LOCA due to either pump cavitation or pump motor overload." It is important to note that none of the evaluations at this time were concerned with core spray (CS) pump operation, other than as an input to the overall flows used in LPCI pump runout net positive suction head (NPSH) evaluations.

Current Assessments

In the current assessments, the principal concern being addressed is the potential for the high LPCI flow rates to affect the total CS pump flow. This concern surfaced as a result of review questions and investigations conducted during the recent Independent Safety Inspection. The design basis LOCA analysis for Dresden is the recirculation suction break with assumed single failure of the LPCI injection valve. This results in core recovery and reflood based on two CS pumps injecting. The original calculations employed runout flows at depressurized vessel conditions of 5650 gpm per pump. The most recently reported assessments (November 6, 1996, 10 CFR 50.46 submittal) were also based on 5650 gpm per pump flow rates. Based on hydraulic characterizations of the LPCI and CS runout flows under bounding assumptions for this SIL 151

(recirculation discharge line break) case, a CS flow rate of greater than 5300 gpm per pump is expected. A value of 5276 gpm per pump was utilized in an evaluation performed by the vendor, Siemens Power Corporation (SPC) for the limiting recirculation suction break and shown to result in a PCT of 2163 F.

Margin in LOCA PCT Approach

The approach described above contains significant conservatisms, beyond those applied in the generation of CS pump flows under cavitation conditions. The most significant of these is that the PCT evaluations are being performed on the basis of a recirculation suction piping break. As noted above, the only break location of concern to this runout flow condition is a break of the recirculation discharge piping. Discharge piping breaks are less limiting than the suction side breaks due to the more restrictive blowdown flowpath. New break spectrum studies currently being performed indicate that a PCT difference of approximately 100 F is anticipated between these break locations, with the recirculation suction piping location bounding. Therefore, the use of recirculation suction break models to assess PCT penalties for this scenario is clearly conservative and results in additional margin in the overall assessment.

Attachment 2

Applicability of NPSH Curves in the UFSAR with the Quad Cities SER

The purpose of this response is to provide additional documentation for the proposed use of 2 psig over pressure (16.7 psia) as an input for emergency core cooling system (ECCS) pump net positive suction head (NPSH) calculations during short term runout conditions in the initial 10 minutes following a design basis LOCA. As indicated in a previous response, the Quad Cities SER states that a few psi of containment over pressure will be needed to ensure adequate ECCS pump NPSH for a period of 8 hours following a design basis accident (DBA) LOCA. A comparison of key containment parameters for Dresden and Quad Cities has been provided, demonstrating that post-LOCA containment pressure response can be expected to be virtually identical for these units, particularly in the short term behavior. Additional questions have addressed the long term containment pressure NPSH curves in the Quad Cities UFSAR and the applicability of these curves to the original SER stated "few psi".

Long Term Response

The Quad Cities and Dresden long term containment response curves, UFSAR Figures 6.3-41, 6.3-42, and 6.3-80 (Dresden UFSAR figures attached), generated to support ECCS pump NPSH during the post-LOCA suppression pool heatup transient have been reviewed. These response curves indicate very little long term overpressure exists, based on a number of conservative assumptions. Specifically, the UFSAR discussion supporting these curves indicates that they are based on minimum initial levels of non-condensibles as well as containment leakages of 5% per day (i.e. more than 3 times the Dresden maximum allowable). Probably the most significant assumption applied in the generation of these curves was the assumption that the drywell temperature is calculated as being equal to the containment spray temperature, which is an implicit assumption of zero mixing of the break discharge fluid to the drywell. While these assumptions certainly do minimize the over pressure that would exist, especially in the long term analyses, the mechanisms for minimizing the pressure would not be active in the short term cases, with the exception of the minimum non-condensible assumptions.

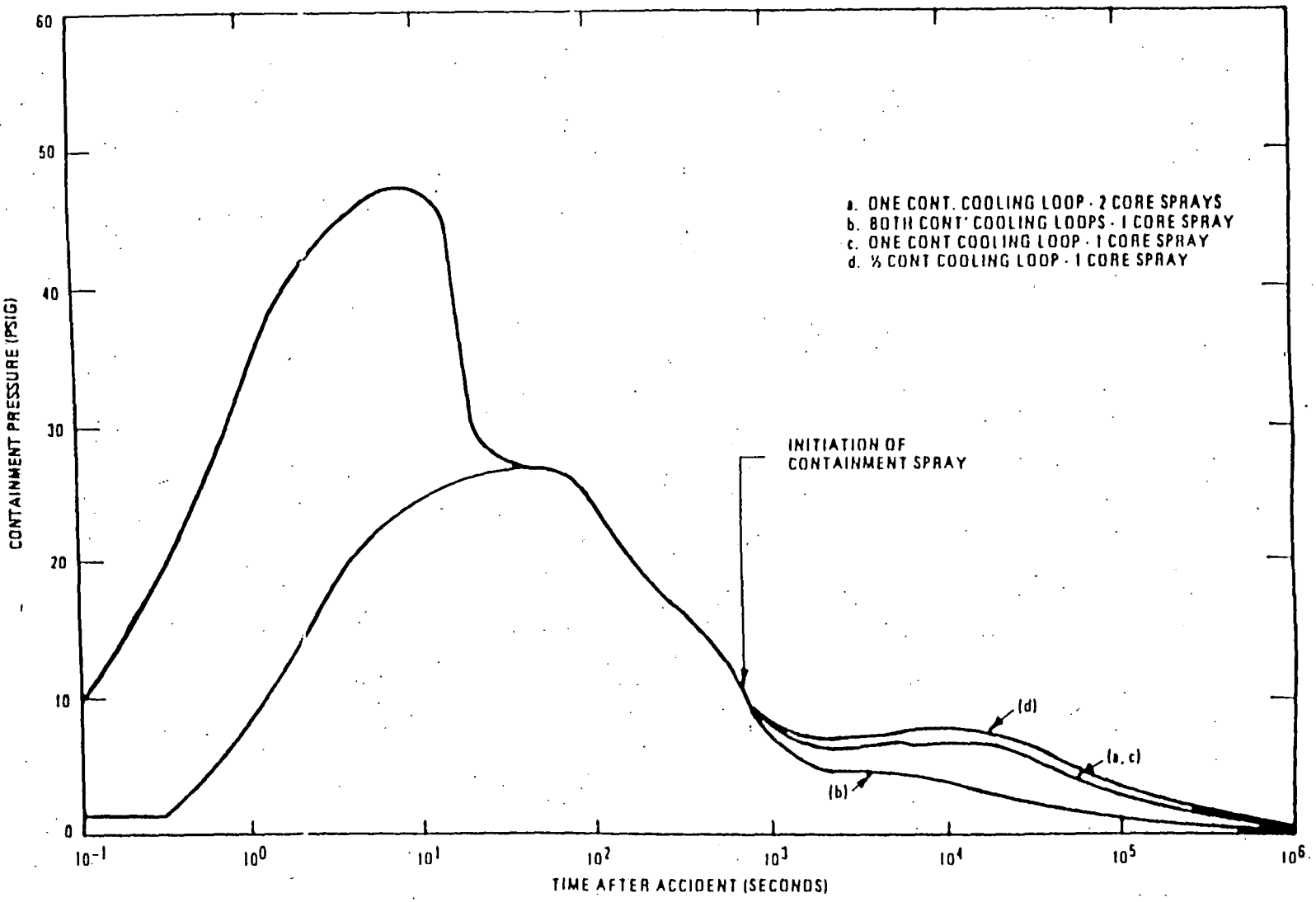
ComEd believes that these very conservative assumptions underly the SER wording of "several psi of overpressure", since the actual pressure would be anticipated to be several psi above that predicted in this manner. This has been observed in recent reanalysis previously mentioned, where long term pressures of approximately 3 psi are predicted for the same containment temperatures as originally calculated. In contrast, the UFSAR containment over pressure calculation Figures 6.2-19 and 6.2-16 for Dresden and Quad Cities respectively (attached), demonstrate that long term pressures of approximately 8 psig would exist. These pressures are based on a model that determines drywell temperature by adding 5 F to the temperature based on assuming the break fluid mixes completely with the drywell spray flow. Discussion with General Electric (NSSS vendor for Quad Cities and Dresden Stations) regarding the

break flow mixing assumptions used in containment analysis have indicated that best estimate values of mixing appear to be near 40%, and that 20% mixing is typically assumed in design applications where minimal mixing is desired.

Short Term Containment Pressure Response

As discussed above, the short term pressure response for both Dresden and Quad Cities are attached. As can be seen, the initial response is identical up to the end of blowdown. The Dresden pressure then decays more rapidly than the Quad Cities curves. The basis of this difference is unknown, since the original analysis has not been recoverable in either case. What is notable with respect to these curves is that a significant containment pressure is predicted throughout the initial 10 minutes, prior to initiation of containment spray. While these curves are intended to predict the maximum containment pressure to demonstrate compliance with containment pressure limits, it is clear that over pressure conditions will exist throughout this interval. Physically, significant overpressure should continue until the quench of the drywell steam occurs due to spray initiation. Prior to spray initiation, significant fractions of the initial non-condensibles are stored in the suppression pool airspace. Based on these curves, the minimum overpressure for the interval is between 10 and 20 psig. What has been proposed is the use of 2 psig over pressure for the ECCS pump NPSH calculations being performed in this time interval, at 200 seconds and at 600 seconds. The 200 second calculation point is the most significant with respect to PCT performance, since this is the time period when quench/reflood occurs, and at which the most core spray flow is desired. At the 200 second point, both Dresden and Quad Cities containment analyses support containment pressures in excess of 20 psig. New containment studies currently in progress demonstrate that with the most conservative break flow mixing, minimization of non-condensibles in the drywell airspace, as well as heat sink modeling consistent with Containment Systems Branch Technical Position CSB 6-1 guidance, that the pressure in this interval remains above 5.5 psig. Therefore the use of minimal amounts of over pressure in the short term is conservative, particularly in the case of the 200 second data point important to the ECCS performance evaluation.

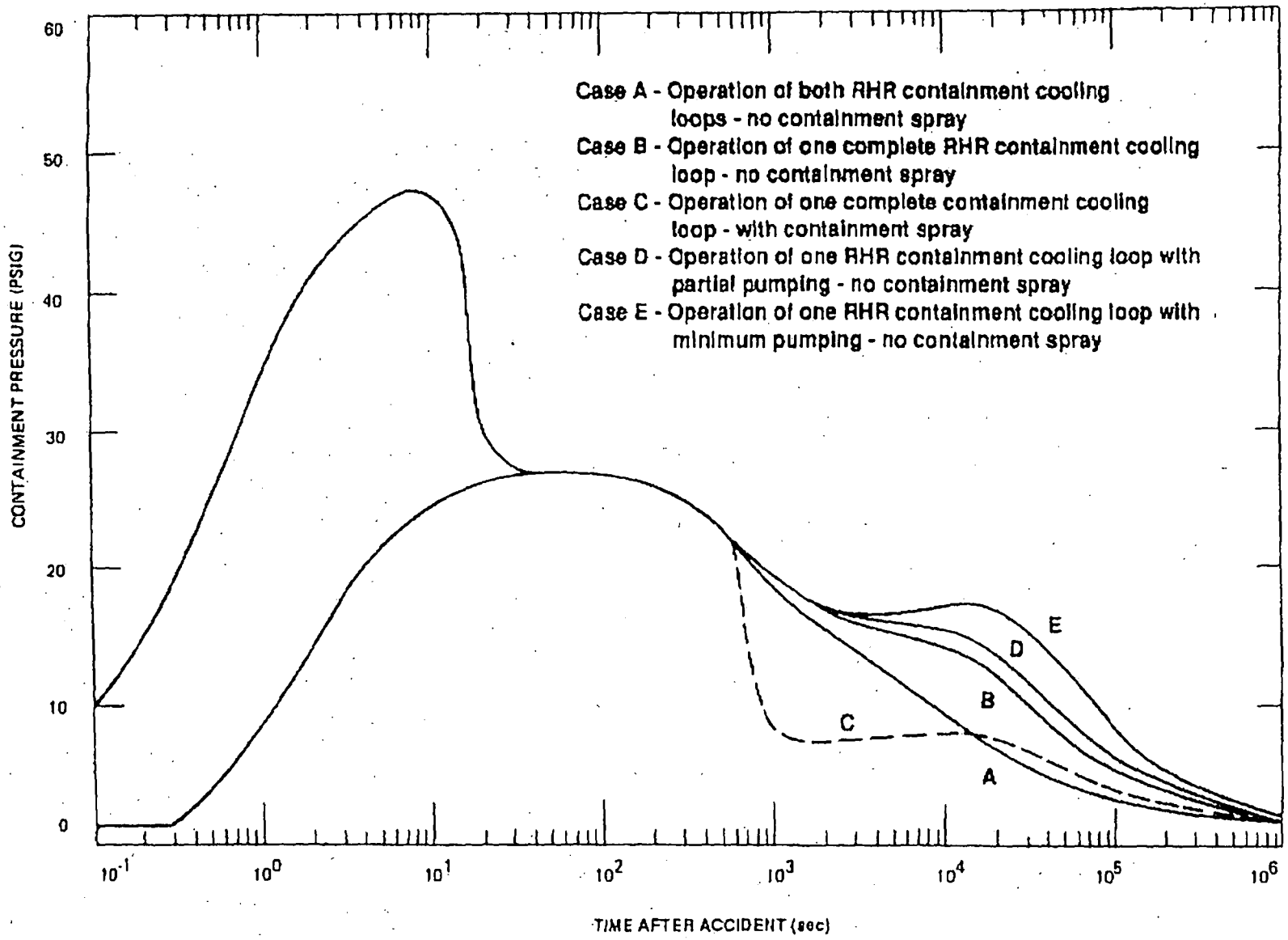
Additional factors that would ensure that the overpressure would not be less than 2 psig include the current tech spec requirement of maintaining the drywell at 1 psi greater pressure than the suppression pool. This requirement, used to provide mitigation of suppression pool loads, would cause a higher non-condensible mass than the original calculations assumed. In addition, it should be noted that subatmospheric conditions are precluded by the presence of the reactor building to suppression pool vacuum breakers. These factors as well as the fact that the guillotine failure of a recirc discharge line, with assumed single failure of the LPCI injection valve causing all LPCI flow to be directed to the faulted loop, is the only scenario leading to the severe runout conditions being evaluated, ensure that a minimum assumed overpressure for the short term evaluation of 2 psig is a conservatively low estimate of the actual conditions anticipated.



DRESDEN STATION
UNITS 2 & 3

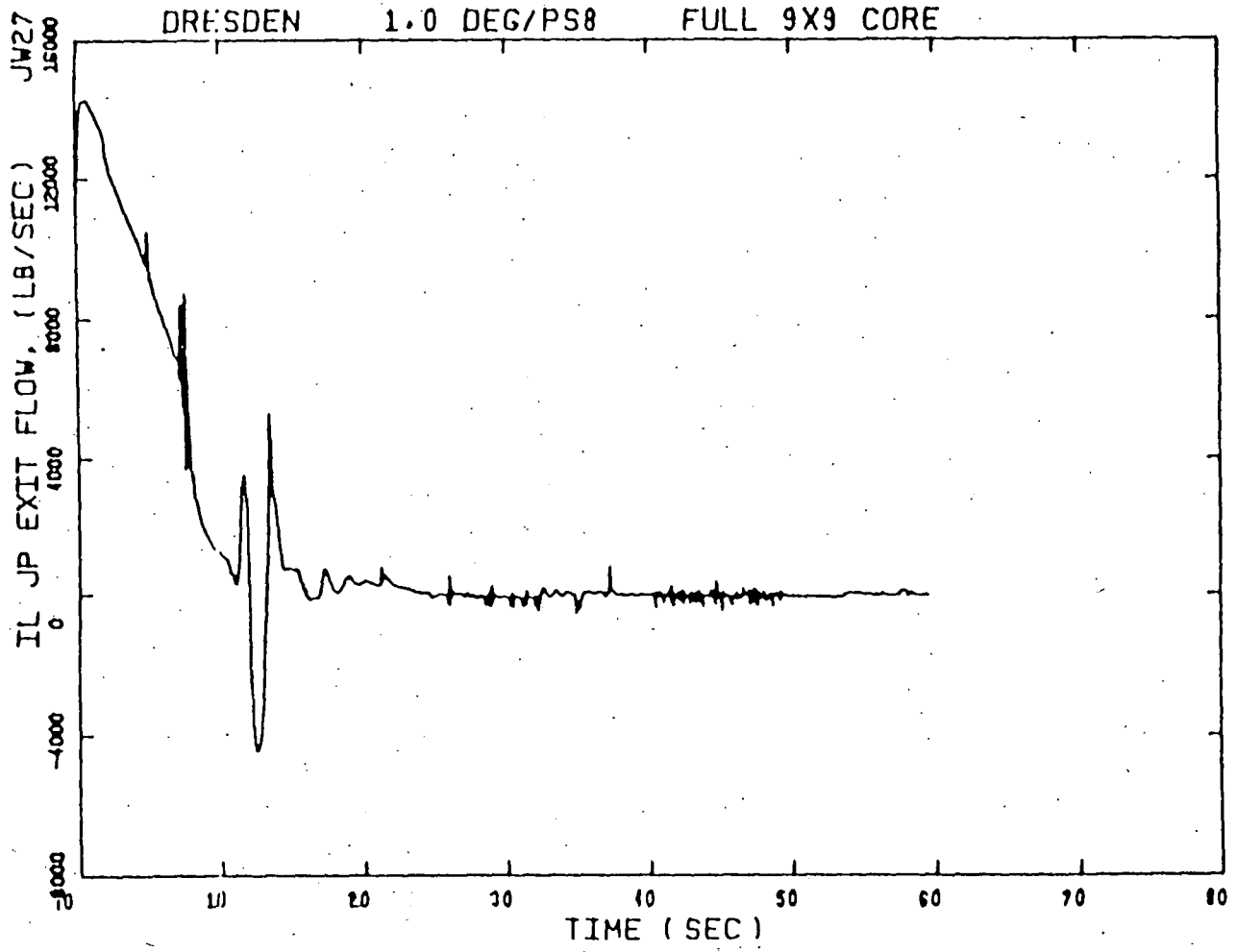
PRESSURE RESPONSE TO
LOSS-OF-COOLANT ACCIDENT

FIGURE 6.2-19

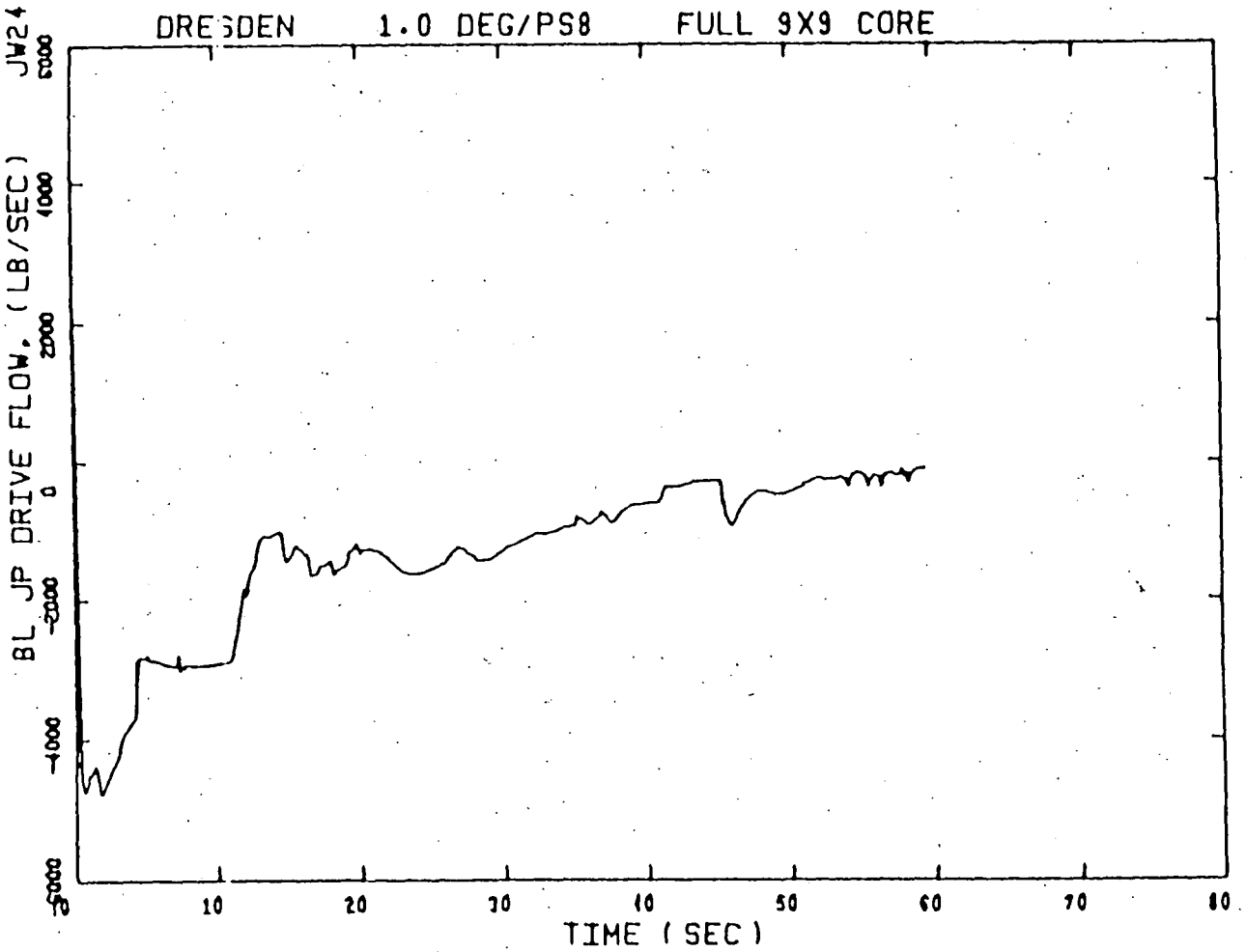


QUAD CITIES STATION
UNITS 1 & 2
CONTAINMENT PRESSURE RESPONSE FOLLOWING
DESIGN LOSS-OF-COOLANT ACCIDENT

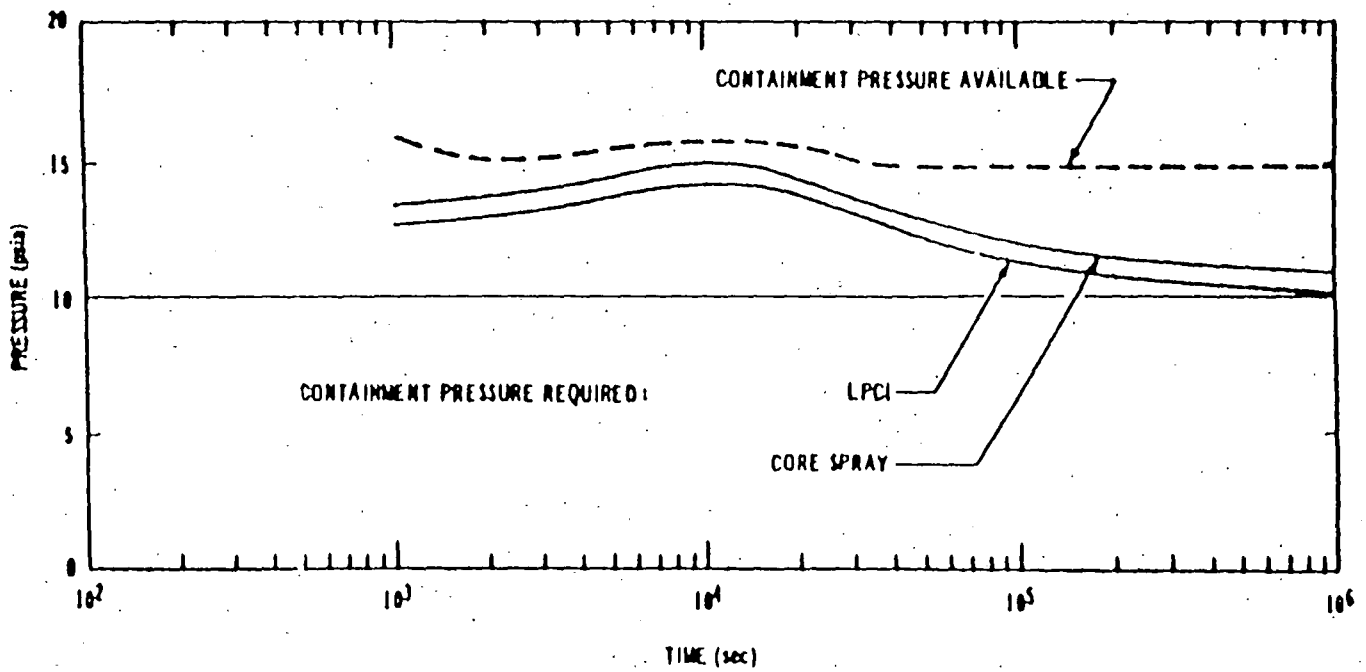
FIGURE 6.2-16



DRESDEN STATION UNITS 2 & 3
BLOWDOWN INTACT LOOP JET PUMP EXIT FLOW
FIGURE 6.3-41



DRESDEN STATION UNITS 2 & 3
BLOWDOWN BROKEN LOOP JET PUMP DRIVE FLOW
FIGURE 6.3-42



DRESDEN STATION UNITS 2 & 3
MINIMUM CONTAINMENT PRESSURE AVAILABLE AND CONTAINMENT PRESSURE REQUIRED FOR PUMP NPSH
FIGURE 6.3-80