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ComEd

April 13, 1998

United States Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D.C. 20555 - 0001

Byron Nuclear Power Station, Units 1 and 2
Facility Operating Licenses NPF-37 and NPF-66
NRC Docket Numbers: 50-454 and 50-455

Braidwood Nuclear Power Station, Units 1 and 2
Facility Operating Licenses NPF-72 and NPF-77
NRC Docket Numbers: 50-456 and 50-457

Subject: Additional Information on Improved Technical Specifications Submittal

References: 1) G. Stanley and K. Graesser (Commonwealth Edison) letter to USNRC, "Conversion to the Improved Standard Technical Specifications," dated December 13,1996.

2) T. J. Tulon (Commonwealth Edison) to USNRC letter dated October 10, 1997, providing additional information on Improved Technical Specification Submittal.

The purpose of this letter is to document the additional information used by the NRC Staff in their review of Section 3.5.5 of the Byron and Braidwood Improved Technical Specifications (ITS) submittal. The information, provided in the attachments to this letter, support the NRC review of that portion of the ITS identified as Beyond Scope Change #9 in the Split Report portion of the Reference 1 submittal.

The information contained in the attachments is in addition to that provided in Reference 2 and addresses additional staff questions on Figure 3.5.5.1, "Seal Injection Flow Limits." The information contained in Attachments A and B was provided to NRC Staff in telecons conducted between the Staff and Commonwealth Edison on November 26, 1997, and January 29, 1998.

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Please address any comments or questions regarding this matter to our Nuclear Licensing Department.

Sincerely,

H. Gene Stanley
PWR Vice President

Attachments: A - Information Provided in November 26, 1997, Telecon
B - Information Provided in January 29, 1998, Telecon

cc: Regional Administrator-RIII
Byron Project Manager-NRR
Braidwood Project Manager-NRR
Senior Resident Inspector-Braidwood
Senior Resident Inspector-Byron
Office of Nuclear Safety-IDNS

Attachment A
Information Provided in November 26, 1997 Telecon

NRC Question 1

What is the normal charging flow rate range (gpm)?

The normal charging flow rate is 87 gpm.

NRC Question 2

What is the charging flow rate during the worst case small break LOCA (gpm)?

For the SBLOCA analysis, Westinghouse uses an RCS pressure versus ECCS flow curve as an input. One of the components to this curve is the flow delivered to the RCS due to the charging (CV) pumps.

For the worst case SBLOCA analysis, one CV pump is assumed to operate (in addition to one SI pump), with one branch line spilling to containment. The spill line flow is conservatively maximized. The CV pump injects directly to the RCS with no interaction with other ECCS pumps prior to the RCS.

The CV pump flow credited in the SBLOCA analysis is contained in "RSA-B-94-09, Table 16" (attached). This page gives both the three-line injection flow and the spill line flow versus RCS pressure. A conservative density of 60 lb_m/ft^3 was assumed in the calculation.

NRC Question 3

What is the charging flow rate during the worst case large break LOCA (gpm)?

For the LBLOCA analysis, the flow from the CV pump is not a major contributor to the total ECCS flow. This is true since the RCS pressure is low enough (below 100 psia) for the RHR pump to be providing flow by the time the ECCS system starts injecting. The CV pump flow is calculated in a manner similar to the SBLOCA described above. Again, a conservative density of 60 lb_m/sec was assumed in the calculation. The minimum CV pump flow credited in the LBLOCA analysis is:

CV Pump Flow Credited in LBLOCA Analysis

RCS Pressure (psia)	Three-line Injection Flow (lb_m/sec)	Spill Line Flow (lb_m/sec)
25	43	18
80.5	42	19
136	41	19
580	33.9	23

NRC Question 4

Can the "new" seal injection flow rate "steal away" too much from the charging flow rate reducing it below what is credited in the LOCA analyses?

The proposed Figure 3.5.5-1 is based on conditions intended to minimize the flow resistance coefficients in the seal injection lines. The appropriate uncertainties are applied in the conservative direction.

This minimization of seal injection line flow resistance coefficients ensures that the seal injection cannot "steal away" more flow from the injection flow path than is appropriately conservative. This analysis method calculates the minimum resistance coefficients so that, under different operating conditions (i.e., a degraded pump curve), the appropriate seal injection flow can be calculated. Essentially, in the calculation of ECCS flow used in the LOCA analyses, the maximum amount of seal injection flow is "stolen away" from the injection flow, which is conservative. Therefore, this effect is addressed in the calculation of CV pump flow for the LOCA analysis.

Table 16 Flow from One Charging Pump for Minimum Safeguards Injection - Spill to Containment at 0 psig

Three Line Inj. Flow (lbm/sec)	RCS Pressure (psia)	Spill Line Flow (lbm/sec)
0.00	1908.80	31.35
0.63	1853.10	31.35
0.79	1797.40	31.35
3.07	1741.70	30.86
4.77	1686.00	30.39
6.43	1630.30	29.93
8.05	1574.60	29.47
9.63	1518.90	29.03
11.17	1463.20	28.58
12.68	1407.50	28.15
19.41	1351.80	28.24
20.68	1296.10	27.85
21.89	1240.40	27.45
23.05	1184.70	27.05
24.19	1129.00	26.64
25.33	1073.30	26.24
26.45	1017.60	25.84
27.51	961.90	25.43
28.44	906.20	25.00
29.37	850.50	24.57
30.29	794.80	24.13
31.20	739.10	23.69
32.12	683.40	23.24
33.04	627.70	22.80
33.98	572.00	22.36
34.92	516.30	21.92
35.85	460.60	21.47
36.77	404.90	21.02
37.70	349.20	20.56
38.76	293.50	20.12
40.07	237.80	19.82
40.97	182.10	19.36
41.86	126.40	18.89
42.75	70.70	18.41
43.63	15.00	17.93

Attachment B
Information Provided in January 29, 1998 Telecon

Provided is a table of the Charging pump flows for the LOCA analysis. Columns are included for all the possible flow paths (injection, spill, seal injection, and miniflow). The columns labeled "RCS Pressure," "3-Line Injection Flow," and "Spill Line Flow" are data that is available from "Table 16" that was provided to the NRC for the November 26th telecon (See Attachment A). This table shows that NO seal injection is credited in the LOCA analysis.

The next table shows the minimum composite charging pump curve from all 8 Byron / Braidwood curves. These values compared to the total charging pump flow calculated for the LOCA analysis in the "CV Pump Curve" figure shows that the pump can provide enough flow to cover all the flow rates assumed in the ECCS calculation for LOCA analyses.

The ITS Figure 3.5.5.1 is based on the same data used in the ECCS calculation for LOCA. In other words, the K factor (discussed in Reference 2) used in the ITS figure is calculated using the same bounding data as that used for the K factor calculation in the LOCA ECCS calculation.

Note also that the ITS figure is only an extension of the current TS. The current TS allows 40 gpm of seal injection flow at nominal conditions (roughly 100 psi dP). This is a point on the ITS figure. This figure simply extends this point to provide operational flexibility. This has been the historical seal injection basis for the LOCA ECCS calculations.

Finally, as an added conservatism, NO seal injection flow is credited in the LOCA analysis. However, some portion of the total seal injection flow goes to the RCS. While this flow path is modeled separately in the LOCA ECCS calculation, none of this flow is credited in the actual LOCA analysis. So the actual amount of seal injection flow that is not credited in the LOCA analysis is greater than if all possible flow to the RCS was credited. Therefore, The analysis uses conservative methods with respect to treatment of seal injection flow.

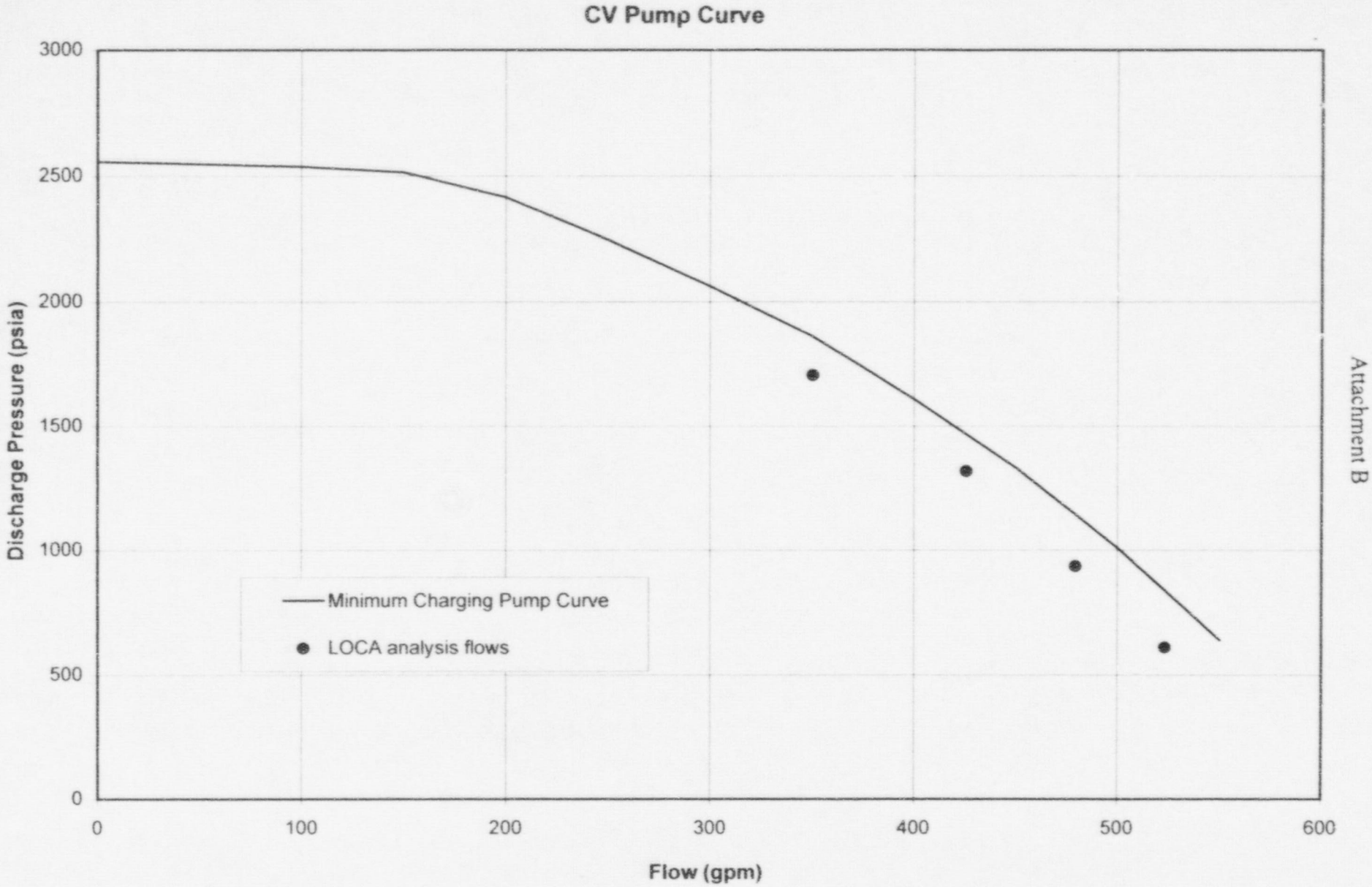
Attachment B

ECCS Calculation for LOCA Analysis
(corresponds to Table 16 of RSA-B-94-09)

RCS Pressure (psia)	CV Pump Discharge Pressure (psia)	3-line Injection Flow (lb_m/sec)	Spill Line Flow (lb_m/sec)	Seal Injection Flow RCS (lb_m/sec)	Seal Injection Flow #1 Seal (lb_m/sec)	Miniflow (lb_m/sec)	Total Flow (lb_m/sec)	Total Flow (gprn)
1686	1705	4.77	30.39	0.83	1.69	9.16	46.84	350.4
1129	1318	24.19	26.64	4.59	1.48	0	56.90	425.6
572	936	33.98	22.36	6.49	1.24	0	64.07	479.2
15	611	43.63	17.93	8.38	0	0	69.94	523.2

Minimum Charging Pump Curve (composite of all 8 Byron/Braidwood pumps)

Flow (gpm)	differential head (ft)	differential pressure (psid)	discharge pressure (psia)
0	5874	2541	2556
50	5852	2532	2547
100	5829	2522	2537
150	5778	2500	2515
200	5546	2400	2415
250	5157	2231	2246
300	4730	2046	2061
350	4272	1848	1863
400	3685	1594	1609
450	3041	1316	1331
500	2296	993	1008
550	1444	625	640



Attachment B