LICENSEE: Northern States Power Company (NSP) September 18, 1996

FACILITY: Prairie Island Nuclear Generating Plant

SUBJECT: MEETING WITH NSP TO DISCUSS PRAIRIE ISLAND NUCLEAR GENERATING PLANT'S SUBMITTAL FOR AN AMENDMENT REGARDING SOLUBLE BORON CREDIT

On August 27, 1996, the staff met with representatives from NSP, Westinghouse and the Westinghouse Owners Group to discuss issues pertaining to the Prairie Island Nuclear Generating Plant's submittal for an amendment regarding soluble boron credit. Prairie Island is requesting this amendment as the lead plant for the Westinghouse Owners Group. Attachment 1 contains a list of meeting attendees. Representatives from Westinghouse and NSP made presentations pertaining to the soluble boron credit submittal. Attachment 2 is a copy of the overhead slides used during the presentations.

The licensee and Westinghouse presented a discussion stating why they believe that the amendment submittal can be noticed as a no significant hazards determination. They specifically addressed the fact that the margin of safety would not be reduced because the $K_{eff}$ limit will remain 0.95. However, the staff stated that the amendment cannot be noticed as a no significant hazards determination because the staff must now perform a review of a boron dilution event, which is an event that had not been previously considered. Although the licensee contends that a boron dilution accident in the Prairie Island spent fuel pool is implausable because not enough water exists onsite to create the event, the staff must still perform a technical review of the accident as part of the licensee's submittal. The staff plans to review dilution events on a plant-specific basis.

The review schedule was also briefly discussed during the meeting. The staff is currently performing its review of the Westinghouse generic topical report, which supports Prairie Island's amendment. The staff expects to have the Prairie Island plant-specific review completed by early 1997. Several other plants are interested in submitting similar amendment requests, based on the review and approval of Prairie Island's amendment.

Original signed by:

Beth A. Wetzel, Project Manager
Project Directorate III-1
Division of Reactor Projects - III/IV
Office of Nuclear Reactor Regulation



Docket Nos: 50-282 and 50-306

Attachments: As stated

cc w/att: See next page

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|---|---|---|---|---|---|---|---|---|---|---|---|
| NAME | BWetzel | | CJamerson | | JHannon | | | | | | |
| DATE | 9/16/96 | | 9/13/96 | | 9/17/96 | | | | | | |

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MEETING ATTENDEES

| Name | Organization |
|---|---|
| M. Reinhart | NRC |
| B. Wetzel | NRC |
| R. Jones | NRC |
| E. Weiss | NRC |
| L. Kopp | NRC |
| G. Eckholt | NSP |
| T. Breene | NSP |
| W. Newmyer | Westinghouse |
| J. Andrachek | Westinghouse |
| W. Cross | Southern Technical Services |
| N. Chapman | Bechtel |
| P. Sharp | FP&L |
| M. McBurnett | HL&P |
| J. Stringfellow | SNC |

ATTACHMENT 1

# WOG Spent Fuel Pool Boron Credit Meeting

August 27, 1996

ATTACHMENT 2

# WOG SFP Boron Credit Meeting

- Credit for Boron in SFP is an Unreviewed Safety Question
  - Submitted for NRC review and approval
- Margin of Safety
  - Boron Credit not currently licensed
  - Margin for Spent Fuel Racks without Boron Credit
  - Margin for Spent Fuel Racks with Boron Credit
- Evaluation of Boron Dilution
- Unanalyzed Conservatisms on Keff
- Conclusions

# Why Boron Credit in the SFP?

- Boron Credit Applied to SFP Racks Delays/Eliminates Need to Re-rack or Provide On-site Storage By:

  - Allowing Higher Fuel Assembly Enrichments
  - Removing Empty Cell Checkerboard Restrictions
  - Allowing Continued Use of SFP Racks with Boraflex

# Margin of Safety

- No Credit for Soluble Boron is Currently Licensed for Normal Storage in Spent Fuel Racks
- Without Credit for Boron - Keff Limit is 0.95
- With Credit for Boron - Keff Limit is 0.95 (With Small Percentage of Spent Fuel Pool Soluble Boron Concentration)

# Margin of Safety - Prairie Island SF Racks

- Current Licensed Storage Configuration
  - Keff = 0.94480

- Proposed Boron Credit Storage Configuration
  - Keff = 0.94769 with 250 ppm

- Both Storage Configuration show Keff $\leq$ 0.95

# Dilution of SFP Boron

- No Credible Boron Dilution of the SFP can increase Keff above 0.95

- Criticality prevented by Maximum Feasible Keff less than 1.0

- Example Case:
  - 232,000 gallon SFP (PRA Composite Plant)
  - 2000 ppm initial soluble boron concentration
  - SFP Dilution with constant SFP volume

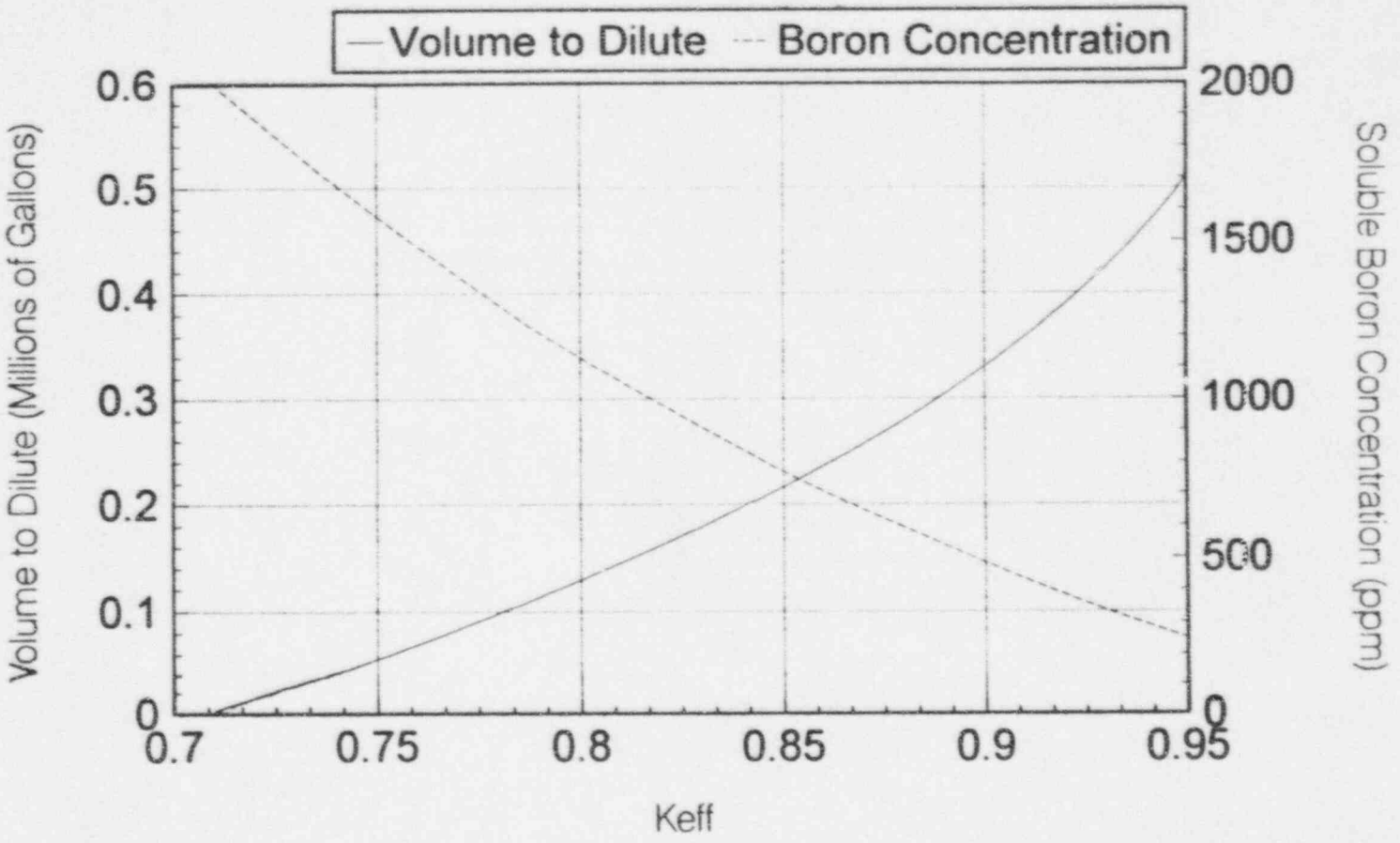
# Dilution of SFP Boron
# Keff = 0.95

- Significant amount of soluble boron required to dilute Keff to 0.95

  - 511,000 Gallons of Water Needed to Dilute

  - 28 Hours Required to Dilute at 300 gpm

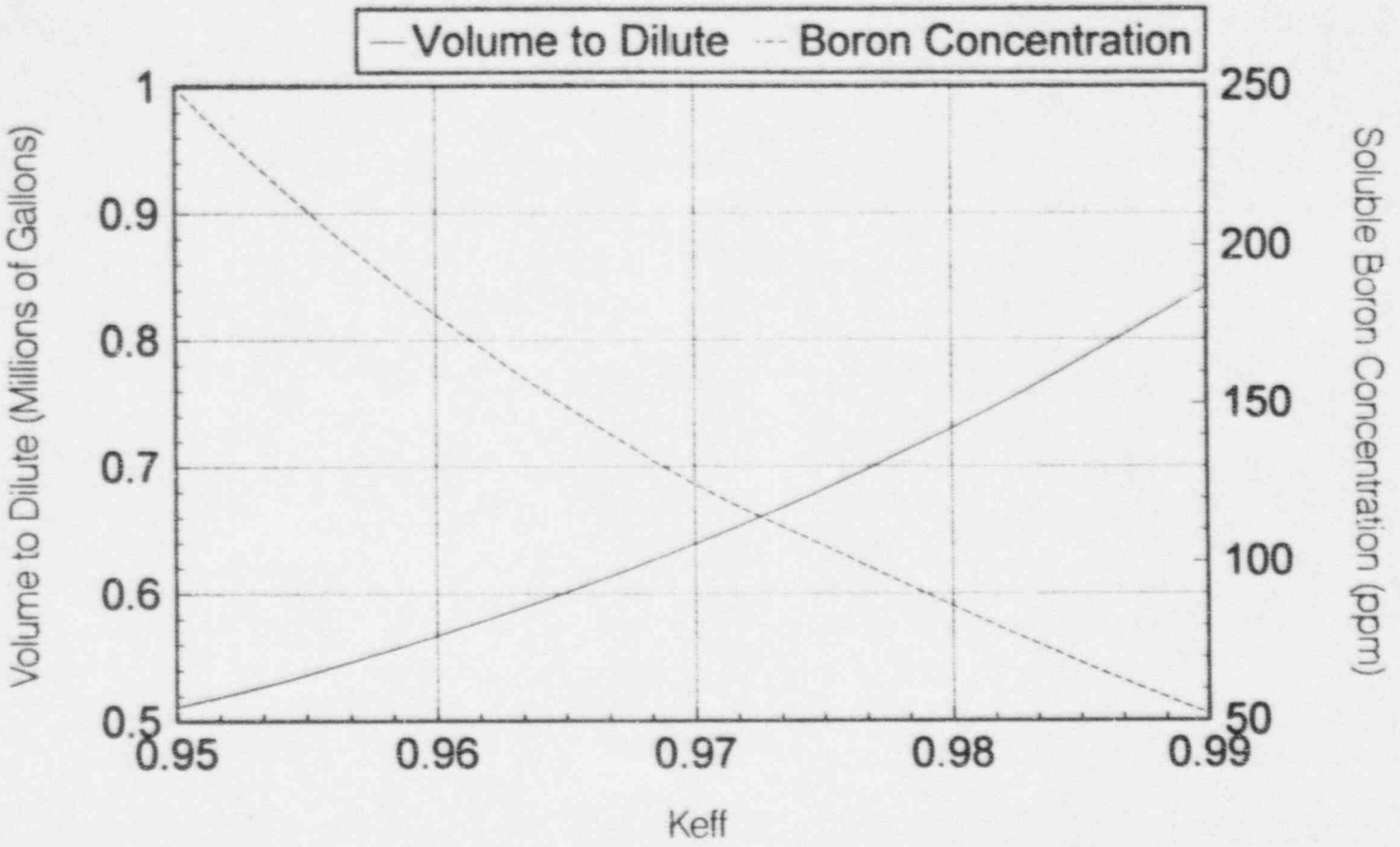
# Volume to Dilute versus Keff



# Dilution above Keff = 0.95

| Keff | Gallons to Dilute to Keff from 2000 ppm | Gallons to Dilute 0.10 Delta K | Hours to Dilute 0.10 Delta K at 300 gpm | Cumulative Hours Since Keff = 0.95 | Cumlative Hours Since 2000 ppm |
|---|---|---|---|---|---|
| 0.95 | 511000 | | | | 28 |
| 0.96 | 570000 | 60000 | 3.3 | 3.3 | 31.3 |
| 0.97 | 640000 | 70000 | 3.9 | 7.2 | 35.2 |
| 0.98 | 730000 | 90000 | 5 | 12.2 | 40.2 |
| 0.99 | 830000 | 100000 | 5.6 | 17.8 | 45.8 |

# Volume to Dilute versus Keff



# Unanalyzed Conservatisms on Keff

- No Credit is taken in the criticality analysis for:
  - Remaining Boraflex
  - Assembly Grids, Sleeves, Nozzles
  - U-234 or U-236
  - Presence of Uncredited Burnable Neutron Absorbers
  - Decay of Fissile Fission Products over time
  - Buildup of Neutron Absorbing Material over time
  - Actual Fuel Assembly Enrichment or Burnups
    - Limit is calculated - Assembly must meet that limit

# Conclusions

- Credit for Boron in the SFP is an USQ
- Keff limit of 0.95 is maintained with Boron Credit
- No Credible Boron Dilution can Increase Keff Above 0.95
- Several unquantified conservatisms still exist on Keff
- Therefore, this does not represent a significant hazard as defined by 10CFR50.92