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SUBJECT: Forwards addl info on proposed license amend re boric acid concentration reduction, per NRC 880310 request.

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L-88-168

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

Gentlemen:

Re: St. Lucie Unit 1
Docket No. 50-335
Request for Additional Information -
Boric Acid Concentration Reduction

Per letter L-88-37 dated January 22, 1988, Florida Power & Light Company (FPL) submitted a proposed license amendment concerning boric acid concentration reduction at St. Lucie Unit 1. A telephone conference call was held between FPL and the St. Lucie NRC Project Manager on March 10, 1988 to discuss questions relating to this submittal. The purpose of this letter is to provide FPL's response to certain of these questions as discussed during the conference call.

Should there be further questions, please contact us.

Very truly yours,

W. F. Conway
Acting Group Vice President
Nuclear Energy

WFC/MSD/gp

Attachment

cc: Dr. J. Nelson Grace, Regional Administrator, Region II, USNRC
Senior Resident Inspector, USNRC, St. Lucie Plant

MSD.RAI

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ST. LUCIE UNIT 1
BORIC ACID CONCENTRATION REDUCTION

FPL RESPONSE TO NRC REQUEST FOR ADDITIONAL INFORMATION

I. Containment Sump and Spray pH Evaluation

The following abstract is provided to delineate the methodology employed to evaluate the effect that reduced boric acid concentrations would have on the Containment Sump and Spray pH:

As part of the boric acid concentration reduction program, the existing Florida Power & Light Containment Sump and Spray pH calculation was revised to reflect the new operating parameters for the Boric Acid Makeup (BAM) Tanks as specified by Combustion Engineering (Reference CE Letter No. F-CE-10325 dated October 27, 1987). Based on the results of the revised calculation, the operating concentration range for Sodium Hydroxide (NaOH) in the Chemical Storage Tank (CHST) is amended to reflect lower boric acid concentrations as delineated in proposed Technical Specification 3.6.2.2.

To analyze the worst case pH conditions, the calculation involved an iterative process whereby the maximum and minimum boric acid concentrations and water volumes for all available borated water inventories were considered. The calculation was separated into two parts: 1. Containment Sump pH Evaluation; and 2. Containment Spray pH Evaluation.

The Containment Sump pH Evaluation determined the high and low sump pH considering worst case mixing of available borated water inventories. The Containment Spray pH Evaluation determined the high and low containment spray nozzle pH during both injection and recirculation modes. The Containment Spray pH Evaluation required the analysis of the following conditions: off-site power available, no failures; off-site power available, single containment spray pump available; and loss of off-site power, single diesel generator available. When the calculation was revised for this task, all parts were reworked to determine potential impact on the operating pH limits.

Based on the results of the Containment Spray pH Evaluation, the pH at the containment spray nozzles was found to exceed the maximum allowed pH of 11.0. This condition was found to exist during the beginning of recirculation for each of the three cases identified above. In order to maintain containment spray pH within the allowable range of 8.5 - 11.0, the CHST NaOH concentrations were adjusted and iterations performed until tank concentrations were consistent with the required pH values at the spray nozzles. The proposed modification to Technical Specification 3.6.2.2, Chemical Storage Tank NaOH concentrations, (from 30% - 32% to 28.5% - 30.5% by weight) reflect thecalculation results.

II. Reactor Auxiliary Building Temperature Measurement

QUESTION:

In regards to the surveillance required when the Reactor Auxiliary Building air temperature is less than 55 F and considering the physical size of the multi-level building, please discuss the location(s) where the air temperature(s) will be taken and the relationship between the location(s) and the location(s) of all components of the BAMU system.

RESPONSE:

As delineated in Figure 1, the affected heat traced piping/components which comprise the Boric Acid Makeup system (i.e. the boric acid makeup tanks, boric acid makeup

piping, and piping to the suction of the charging pumps) are located in relatively close proximity on the minus 0.5 ft. elevation of the Reactor Auxiliary Building. The exception is the boric acid makeup tanks, which have tank tops at elevation 32.75 ft. as shown on Figure 2.

In addition, the Reactor Auxiliary Building Ventilation System is designed to maintain a uniform temperature throughout the building (Reference: Final Safety Analysis Report Section 9.4.2.2.1). Based upon the above, the Reactor Auxiliary Building air temperature measurement will be taken at the Boric Acid Makeup Station as shown on Figure 1.

III. Boric Acid Makeup Tank Concentration

QUESTION:

Proposed Technical Specification 3.1.2.8.a. requires a boric acid weight percent range of 3.2 % to 3.5 %. Proposed T.S. 3.1.2.8.b. requires a similar range. Please explain these two proposed Technical Specifications in relationship to (1) the proposed bases statements per the proposed Page B3/4 1-2 Insert, (2) proposed Figure 3.1-1, (3) FPL's boric acid concentration reduction safety evaluation, and (4) Combustion Engineering Report CEN-353.

RESPONSE:

As delineated in proposed Technical Specification Figure 3.1-1, proposed Page B3/4 1-2 Insert, and the Combustion Engineering Report CEN-353, the reduction of boric acid concentration to 2.5% to 3.5% by weight requires borated water volumes of 13,300 (2.5% wt.) to 8350 (3.5% wt.) gallons. The boric acid makeup tanks are capable of holding 9450 gallons each (the high level alarm is set at 97.5% of the 9700 gallon tank capacity). In order to maintain the required borated water inventory in one boric acid makeup tank and comply with the proposed Technical Specifications, the boric acid concentration must be no lower than 3.2% by weight.

Technical Specifications 3.1.2.8.a. and 3.1.2.8.b. are written to delineate the boric acid concentration requirements (3.2% to 3.5%) when only one boric acid makeup tank is credited with being in service.

IV. Boric Acid Concentration Reduction Uncertainties

QUESTION:

Page 3 of the Florida Power & Light boric acid reduction safety evaluation specifies the uncertainties considered. Please provide: 1) a brief discussion of the uncertainties utilized for scram worth, moderator temperature coefficient and Doppler coefficient; and 2) an explanation for the omission of boron measurement uncertainties from the analysis.

RESPONSE:

A combined bias and uncertainty of 10% was applied to the scram worth data supplied to Combustion Engineering from Florida Power & Light. This combined bias and uncertainty is consistent with the licensing methodology used by Florida Power & Light's Unit 1 fuel vendor (ANF) to calculate shutdown margin. The scram worth is additionally conservative because it is assumed that the most worthy control element assembly is stuck out of the core during the scram.

A conservative correction was applied to the moderator cooldown curve supplied to Combustion Engineering from Florida Power & Light. Since Combustion Engineering did

not generate the moderator temperature coefficient (MTC) curve, a conservative correction was applied to this curve to make it consistent with the methods used by Combustion Engineering when generating a cooldown curve for the most negative technical specification MTC limit of -0.00028 delta rho/ F.

The application of a bias of 15 % and an uncertainty of 15% to the Doppler coefficients is consistent with the licensing methodology used for analog plants. These factors were used inthe analysis.

A boron measurement uncertainty was included in the Louisiana Power & Light physics data when the natural circulation scenario assumed that the boronometer concentration would be used to verify reactor coolant system (RCS) boron concentration. A very conservative boronometer measurement uncertainty (50 ppm) was added to the RCS boron requirements. A review of the cooldown scenario shows that the addition of a boronometer measurement uncertainty to the RCS boron requirements is unnecessary. The cooldown scenario in CEN 353(F) identifies the minimum volume of boric acid makeup tank water will ensure that the RCS is adequately borated. The boronometer readings will not be used during the cooldown as a criteria to reduce the amount of boric acid makeup tank water delivered to the RCS during this cooldown. In conclusion, boronometer measurement uncertainties need not be included in the boration requirement curves for either plant.

V. FIGURE 3.1-1

QUESTION:

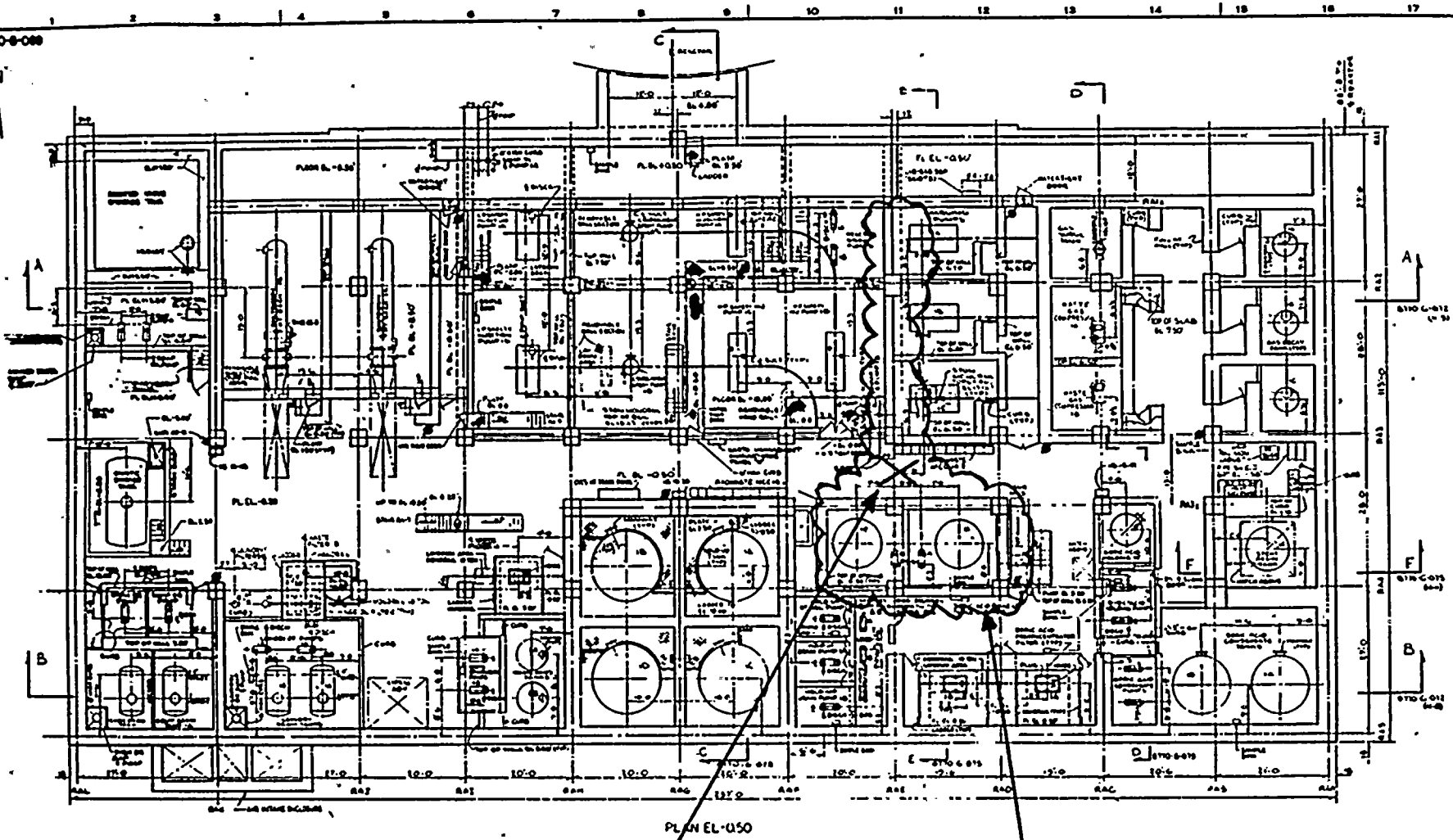
In regard to proposed Figure 3.1-1, please explain why it is necessary to have at the bottom of the figure the expression" 1720 ppm in the RWT."

RESPONSE:

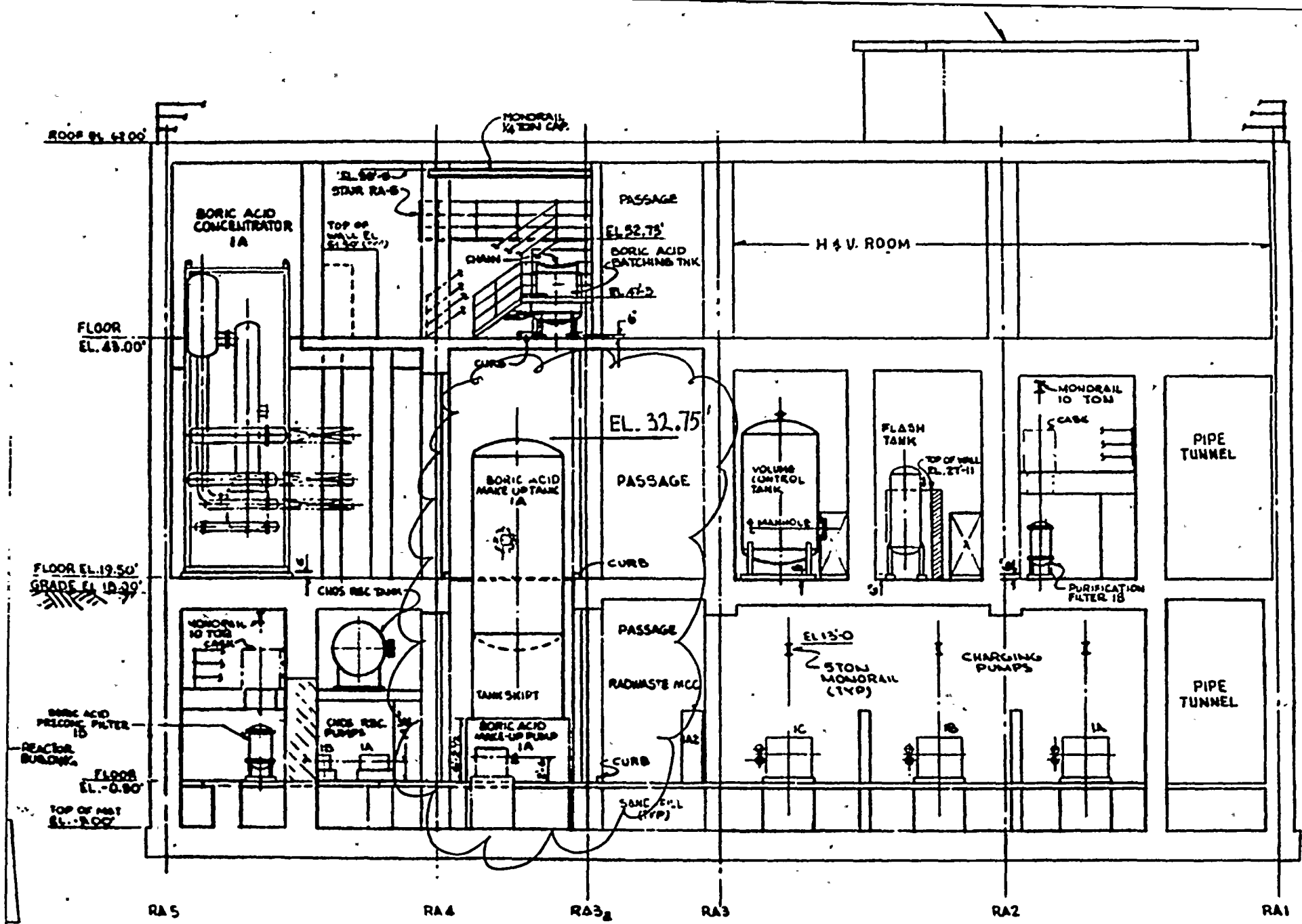
We have reviewed Figure 3.1-1 and have determined that the expression "1720 ppm in the RWT" at the bottom of the figure is not necessary. Therefore, we propose to remove this expression (See attached revised Figure 3.1-1).

VI. Boration System Bases

During a telephone call on March 16, 1988 between the Nuclear Regulatory Commission St. Lucie Project Manager and Florida Power & Light, a follow up question was discussed regarding boric acid addition volumes as delineated in Technical Specification Bases Pages B3/4 1-2 and B3/4 1-3. The boron addition capability for Modes 5 and 6, as discussed on Bases Page B3/4 1-3, included conservatisms outlined in CEN-353(F), "Boric Acid Concentration Reduction Effort." However, the boron addition capability for Modes 1-4, discussed on Bases Page B3/4 1-2, do not include the conservatisms outlined in CEN-353(F). In order to provide consistency in the Bases discussion, we propose to revise the boron ranges for Modes 1-4 to include the appropriate conservatisms.(See attached revised insert Page B3/4 1-2).



REACTOR AUXILIARY BUILDING GENERAL ARRANGEMENT
FIGURE 1



SECTION E-E
DWG 8770-G-070 (K-12)
G-071 (K-14)

REACTOR AUXILIARY BUILDING-SECTIONS
FIGURE 2

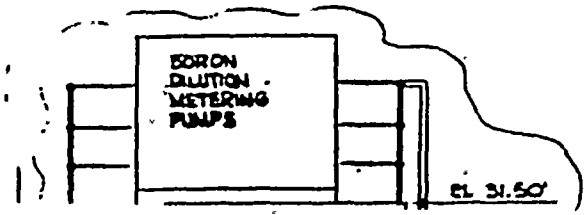
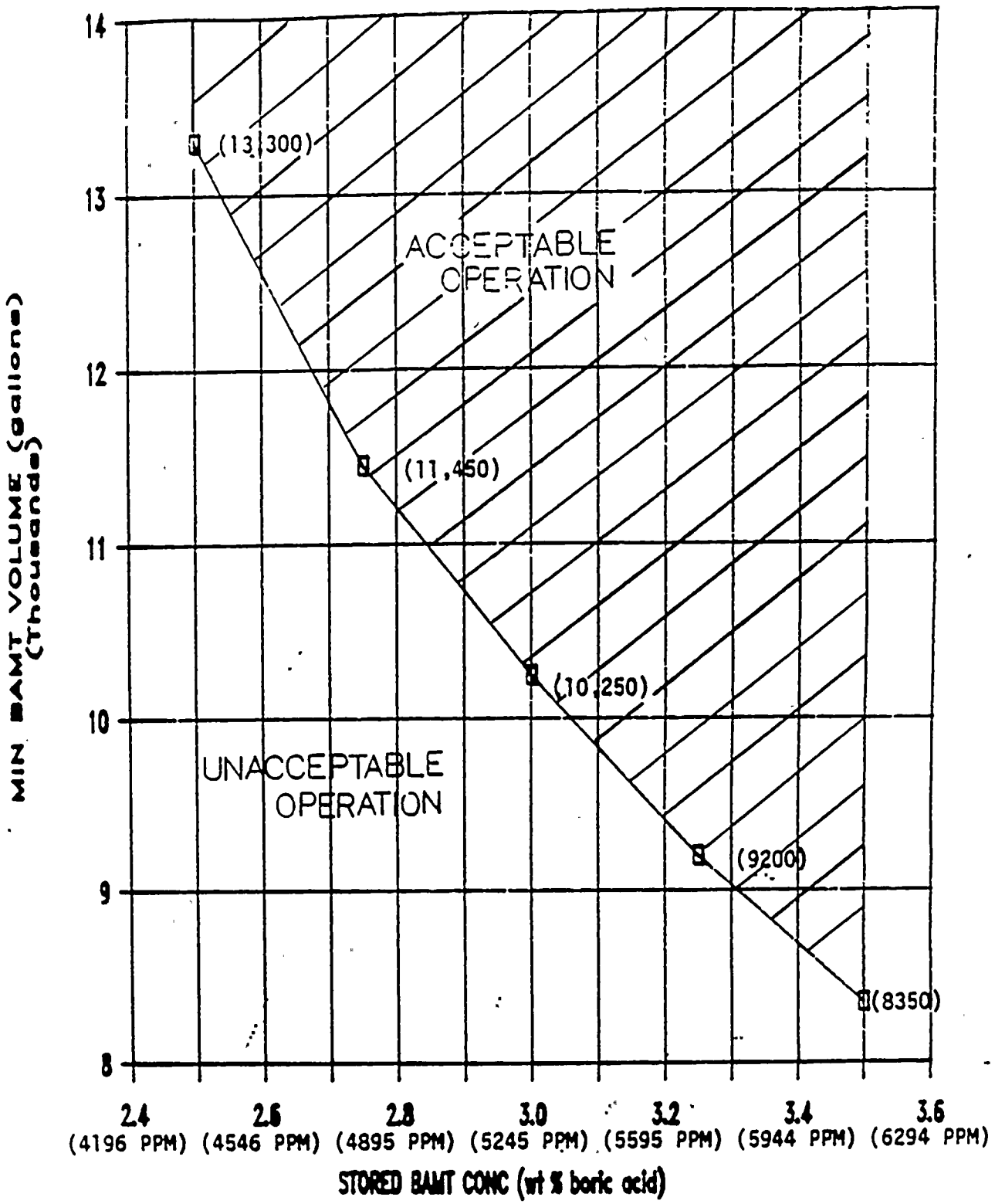


FIGURE 3.1-1 ST.LUCIE 1 MIN BAMT VOLUME VS STORED BAMT CONCENTRATION



This requirement can be met for a range of boric acid concentrations in the Boric Acid Makeup Tanks (BAMTs) and Refueling Water Tank (RWT). This range is bounded by 8350 gallons of 3.5 weight percent (6119 ppm boron) boric acid from the BAMTs and 14,000 gallons of 1720 ppm borated water from the RWT to 13,300 gallons of 2.5 weight percent (4371 ppm boron) boric acid from the BAMTs and 9,000 gallons of 1720 ppm borated water from the RWT. A minimum of 45,000 gallons of 1720 ppm boron is required from the RWT if it is to be used to borate the RCS alone.