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50-251 Turkey Point Plant, Unit 4, Florida Power and Light C 05000251
AUTH.NAME AUTHOR AFFILIATION
UHRIG,R.E. Florida Power & Light Co.
RECIP.NAME RECIPIENT AFFILIATION
VARGA,S.A. Operating Reactors Branch 1

SUBJECT: Forwards response to NRC 820121 request for addl info re proposed license amend for removal of boron injection tank. Info provided re LOFTRAN analyses,proposed hardware mods & reactivity feedback results.

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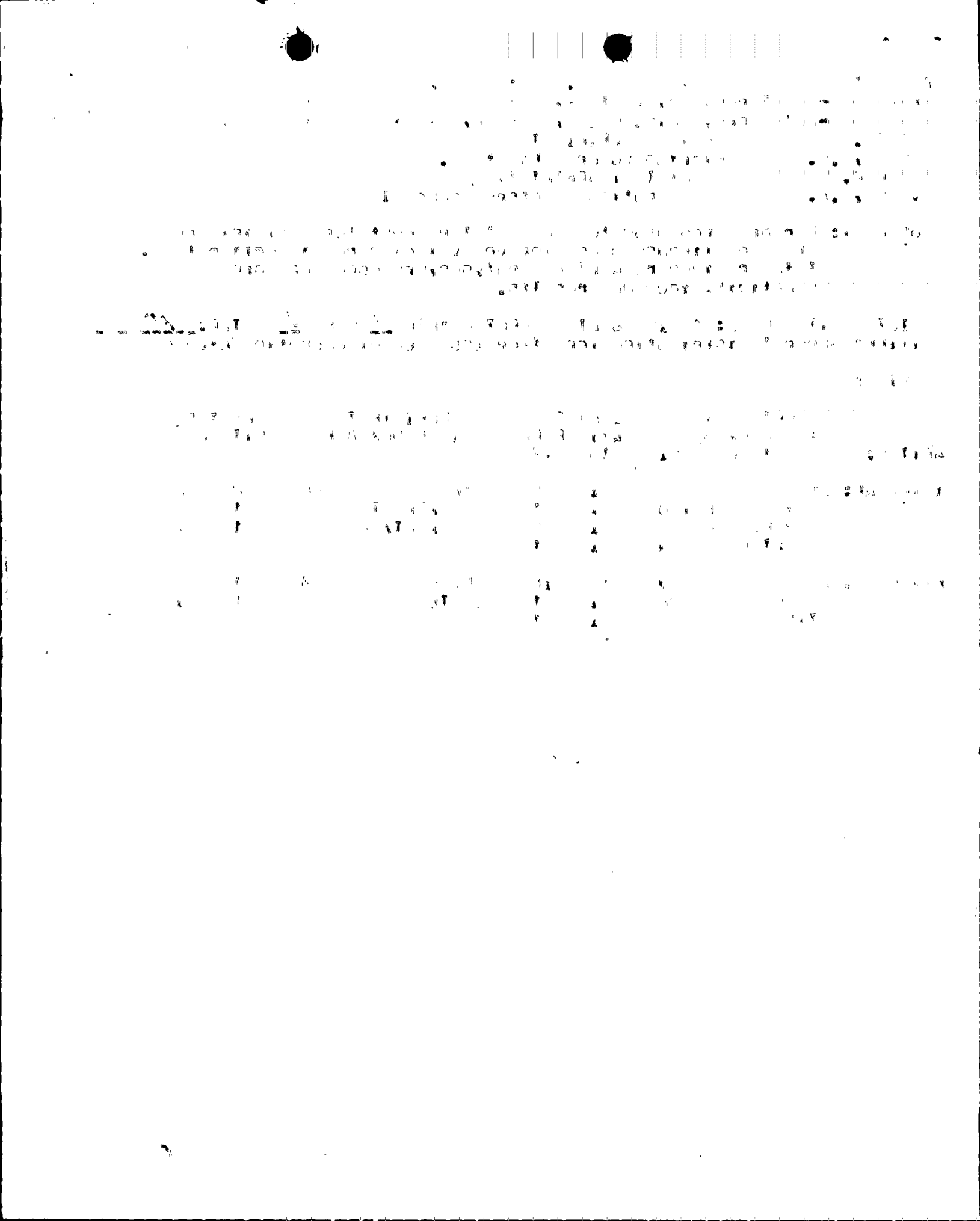

P.O. BOX 529100 MIAMI, FL 33152

FLORIDA POWER & LIGHT COMPANY

February 10, 1982
L-82-49

Office of Nuclear Reactor Regulation
Attention: Mr. Steven A. Varga, Chief
Operating Reactors Branch #1
Division of Licensing
U. S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Mr. Varga:

Re: Turkey Point Units 3 & 4
Docket Nos. 50-250 & 50-251
Proposed License Amendment
Removal of Boron Injection Tank

This letter responds to your request for additional information dated January 21, 1982 regarding the subject license amendment.

On February 1, 1982 and on February 8, 1982, we provided verbal responses to your Mr. Jack Guttman. Attached to this letter are our formal responses.

Should questions remain after your review of these responses, please contact us at your earliest convenience.

Very truly yours,

Robert E. Uhrig

Robert E. Uhrig
Vice President
Advanced Systems & Technology

REU/SHS/cab

Attachment

cc: J. P. O'Reilly, Region II
Harold F. Reis, Esquire

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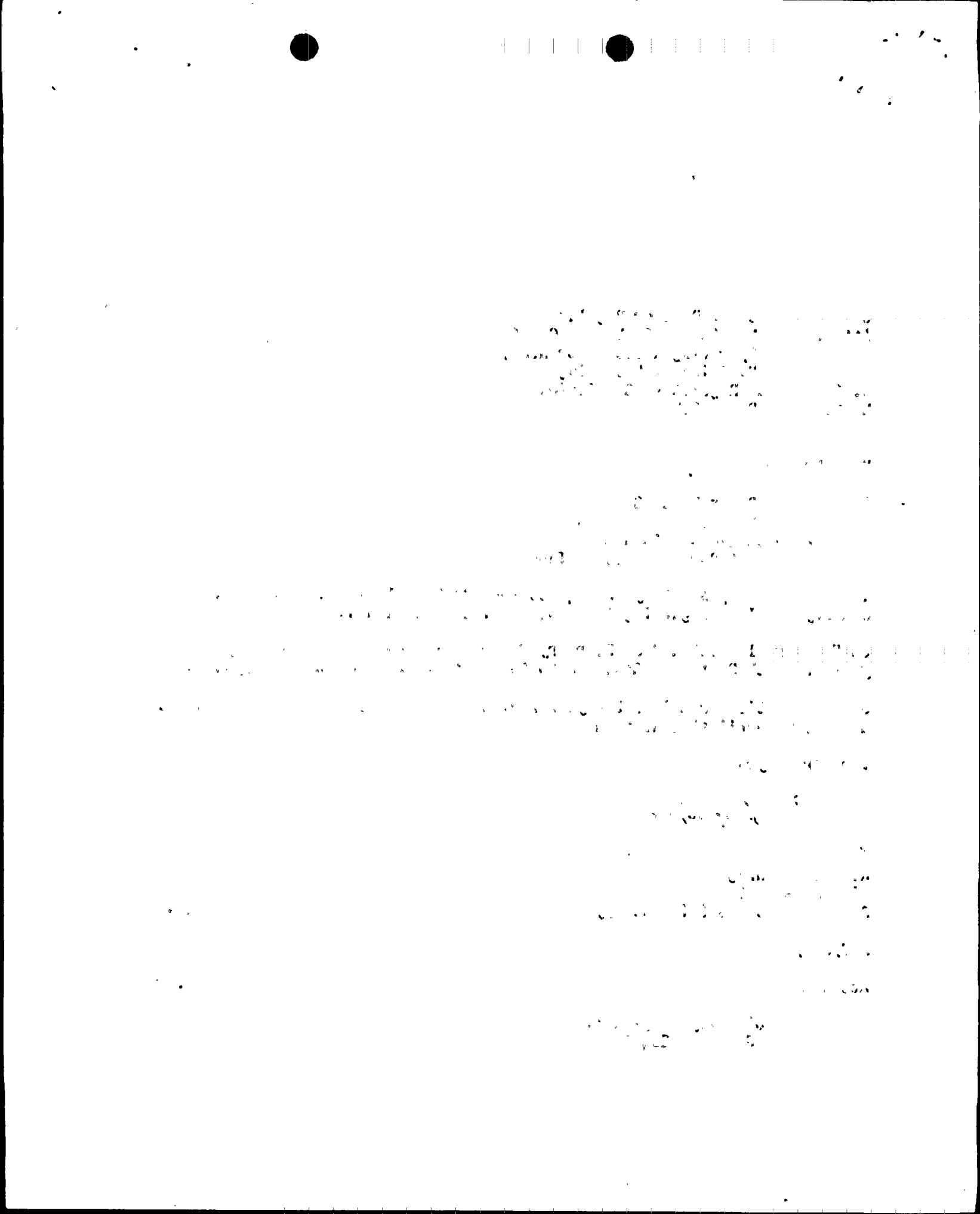

ATTACHMENT

Q 1: Page 2.1.6-3 - References the K_{eff} versus temperature reactivity utilized in the LOFTRAN code. The K_{eff} referenced was for 1000 psi. Confirm that the LOFTRAN analyses utilized other tables at the appropriate pressures during the postulated events.

A 1: In LOFTRAN, the reactivity is computed as a function of power, coolant density, boron concentration, etc. The K_{eff} is not an input to LOFTRAN. Therefore, the effect of pressures, other than 1000 psi, is considered when the effect on reactivity caused by moderator conditions are evaluated. This item is discussed in detail in WCAP-7878, section 5.2 and 5.3.

Q 2: What were the limiting single failures used in the analyses? (e.g., Pg. 2.1.6-4 states 2 SI pumps were assumed operational).

A 2: The single failure assumption made in the safety analysis report was the failure of one safeguards train (minimum safeguards) to deliver borated safety injection water to the reactor coolant system. As stated in section 14.2.5 of the FSAR, minimum safety injection capability corresponding to two out of four safety injection pumps in operation is considered. For more detail, see WCAP-9226. This single failure was assumed for both the case with and without the boric acid tank.

Q 3: Provide a schematic diagram of the system, as presently designed, and another with the proposed hardware modifications (bypassing the BIT tank).

A 3: On 2/4/82 FPL telecopied copies of plant drawings showing the BIT system, as presently designed, and marked-up plant drawings showing the proposed modified configuration as well as an alternate, administratively modified, configuration. In a conference telephone call on 2/8/82, FPL answered NRC's questions on these drawings.

Q 4: Page 2.1.6-12 states -"The power transient shown in Figure 2.1.6-8 is conservative due to the underprediction of the feedback in the low flow condition." Discuss, in detail, the reasons as to why underprediction of the reactivity feedback results in a conservative prediction.

A 4: In low flow condition (see the answer to question 5), the cooldown is slower, resulting in stronger negative feedback. LOFTRAN underpredicts the negative temperature feedback. Hence, higher power levels are predicted compared to power levels calculated by 3-dimensional neutronics codes.

Q 5: Provide details as to why the steam line break event, with offsite power available, is limiting over the same event with offsite power not available. It is our understanding that LOFTRAN utilizes the broken loop cold leg temperature when evaluating the moderator temperature reactivity feedback. Since the primary coolant residence time through the steam generator is extended during the loss-of-offsite power event, the moderator temperature at the stuck rod sector of the core could result in a more limiting condition for DNBR considerations. Describe why this event is not limiting and how LOFTRAN conservatively evaluates the consequences of this event.

A 5: LOFTRAN uses a weighted temperature in evaluating the moderator temperature reactivity feedback. This is explained in the response to question 6.

On the steam break event, with loss of offsite power, the reactor coolant pumps start to coast down, resulting in reduced primary coolant flow. The lower reactor coolant flow decreases the heat transfer coefficient in the steam geneator and slows the cooldown. This is reflected in the core returning critical later in the transient. The lower flow also increases the negative feedback around the power generating stuck rod locations resulting from a moderator temperature reduction. The lower power that can be supported in the power generating stuck rod location under low flow conditions make this case less limiting than the case with offsite power.

Q 6: It is our understanding that LOFTRAN thermal-hydraulically homogenizes (assumes perfect mixing) the reactor coolant entering the vessel from the broken and intact recirculation loops. This assumption provides identical hot leg temperatures for all loops. Of concern is that the broken loop cold leg temperature may be non-conservatively elevated since the broken loop hot leg temperature could be appreciably lower than analyzed. Should this be the case, then the moderator temperature at the stuck rod location would be non-conservatively analyzed. Justify your analytical model with regard to the above concern.

A 6: Because LOFTRAN is a multiloop PWR simulation code, provision has been made to allow coolant to mix among the loops in the reactor vessel inlet and outlet plena. Independent inputs for the inlet and outlet are available to vary the extent of mixing between no mixing and perfect mixing. The loop-associated core inlet and core average parameters must be combined into a single reactivity feedback input for use in the point kinetic core model. This is accomplished by a separate weighting factor which places relative importance on specified sectors of the core, thus enabling LOFTRAN to predict reactivities which are in agreement with multi-dimensional neutron design codes.

To show the modeling capability of LOFTRAN, the exit temperature in the cold leg and entrance temperature of the hot leg, for both faulted and unfaulted loops, are presented in Figs. 1 and 2, respectively. Figure 3 presents the basic fluid system model utilized by LOFTRAN (refer to WCAP-7878).

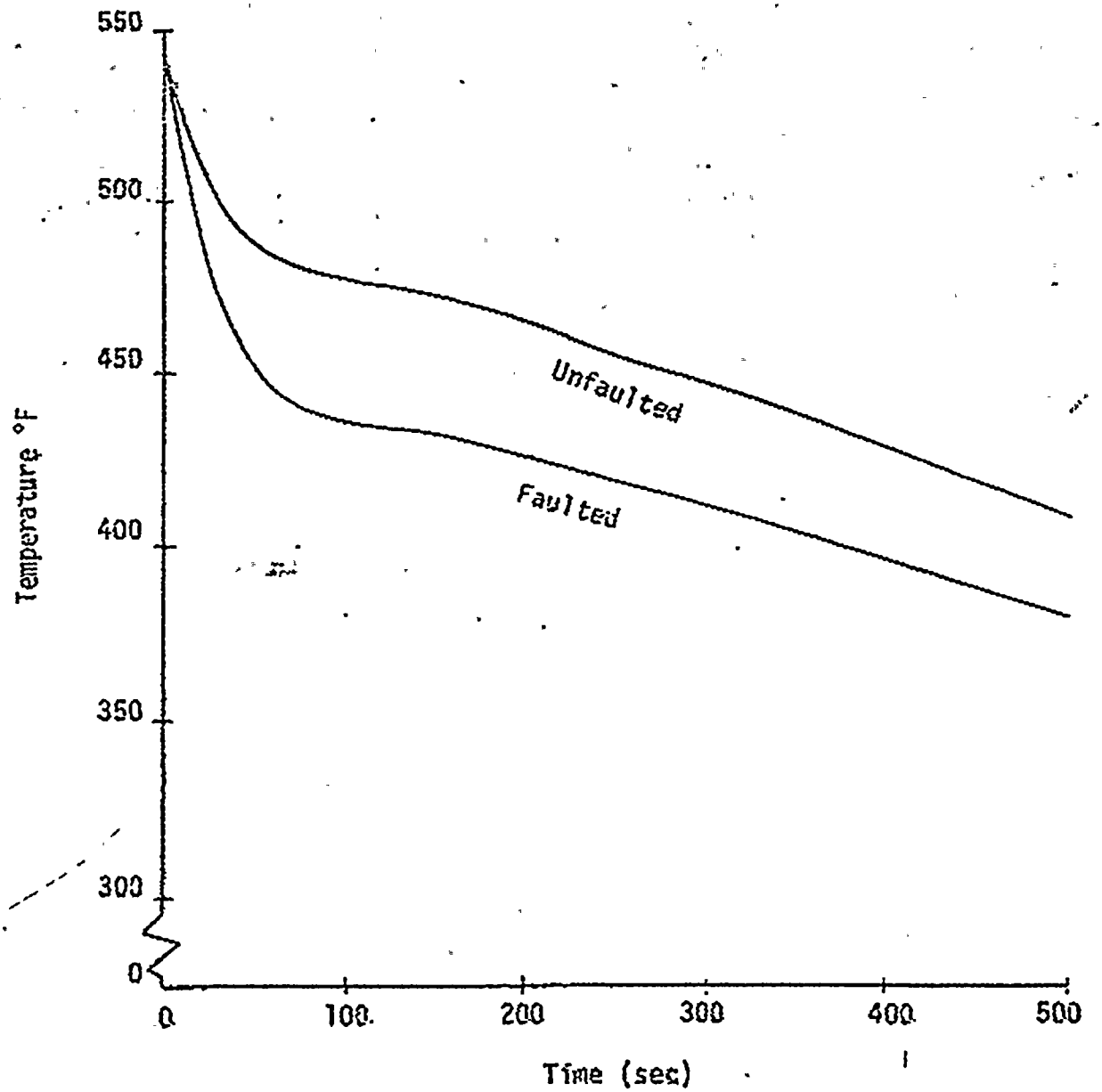

Fig. 2 Hot Leg Entrance Temperature For Typical Steam Line Break

JHLT

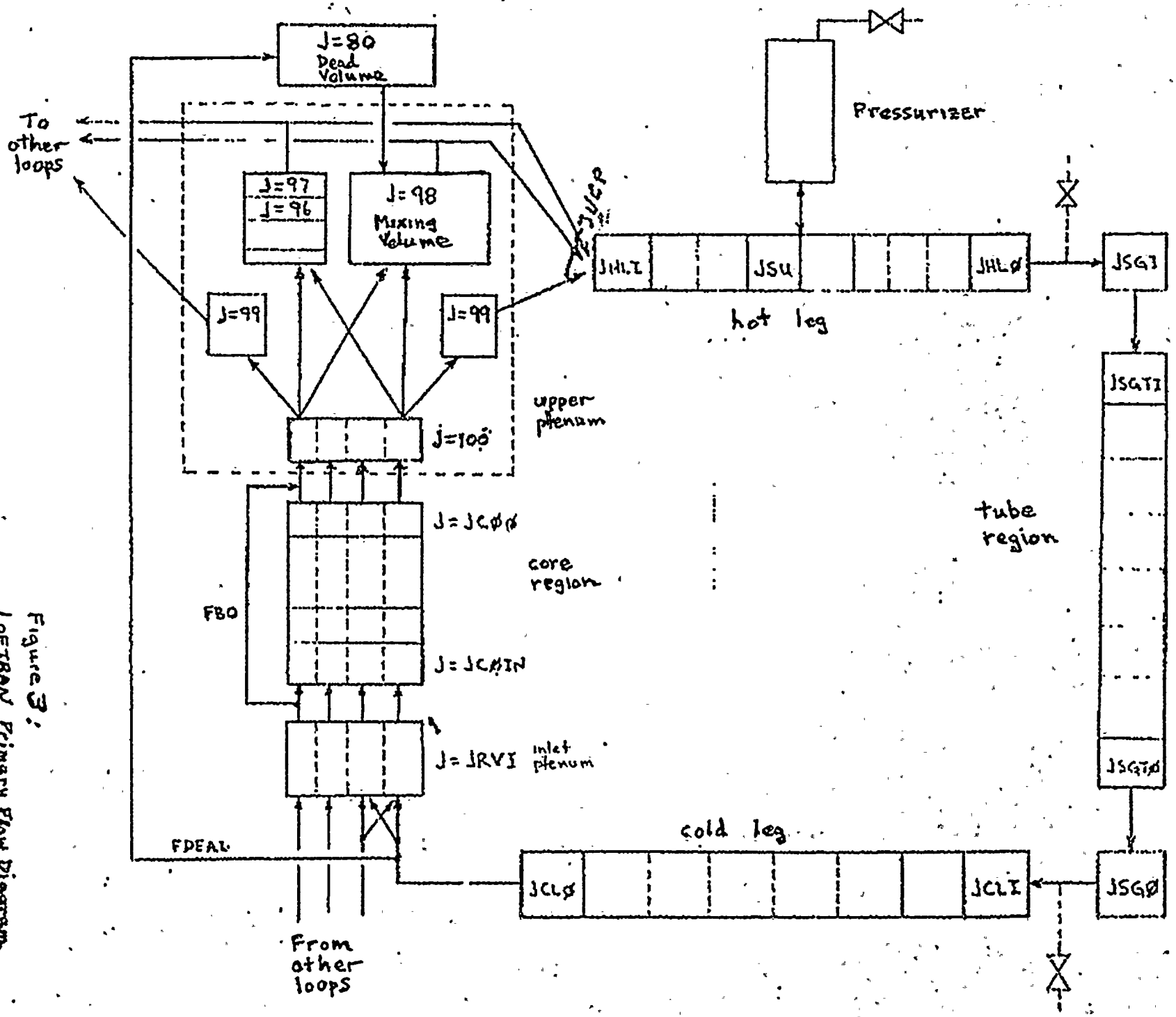

Figure 3: LOFTRAN Primary Flow Diagram

3. Emergency Containment Filtering System

Two of three filter units have capacity to meet the MHA analysis.(7)(8)

4. Component Cooling System

One pump and two heat exchangers meet the requirements of the MHA analysis.(10)

5. Intake Cooling Water System

One pump meets the requirements of the MHA analysis.(6)

References:

(1) FSAR 6.2.2

(2) FSAR 14.2.5

(3) FSAR 14.3.2

(4) FSAR 14.1.9

(5) FSAR 6.2.3

(6) FSAR 14.3.4

(7) FSAR 6.3

(8) FSAR 14.3.5

(9) FSAR 6.4

(10) FSAR 9.3

(11) The requirement for use of the BIT tanks for Mitigation of the Main Steam Line Break accident has been removed following installation of the Model 44F Steam Generators. The required supporting analyses can be found in L-81-502, dated 11/30/81. The temperature requirement above 145° F is no longer applicable. Therefore, the heat tracing requirement is not necessary. There is no Boron Concentration requirement in the BIT.

FLORIDA POWER & LIGHT COMPANY

INTER-OFFICE CORRESPONDENCE

LOCATION General Office
DATE FEB 10 1982

TO R.E. Uhrig

FROM J.W. Williams, Jr.

SUBJECT: TURKEY POINT UNITS 3 & 4
BIT REMOVAL TECH SPEC

COPIES TO R.J. Acosta
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J.A. Labarraque
H.N. Paduano/932.1TP
H.E. Yaeger/J.K. Hays
J. Yespica
PRN-LI-82-54

A letter in response to NRC questions on the above subject is attached for your review and forwarding to the NRC.

J.W. Williams, Jr.

PLP/mbd

Attachment

STATE OF FLORIDA)
) ss.
COUNTY OF DADE)

Robert E. Uhrig, being first duly sworn, deposes and says:

That he is Vice President of Florida Power & Light Company, the herein;

That he has executed the foregoing document; that the statements made in this said document are true and correct to the best of his knowledge, information, and belief, and that he is authorized to execute the document on behalf of said

Robert E. Uhrig

Robert E. Uhrig

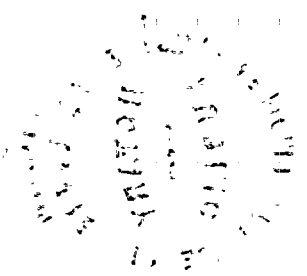
Subscribed and sworn to before me this

10 day of February, 1982

Cheryl L. Fredrick

NOTARY PUBLIC, in and for the County of Dade, State of Florida

My commission expires: Notary Public, State of Florida at Large My Commission Expires October 30, 1983 Bonded thru Manus Underwriting Agency



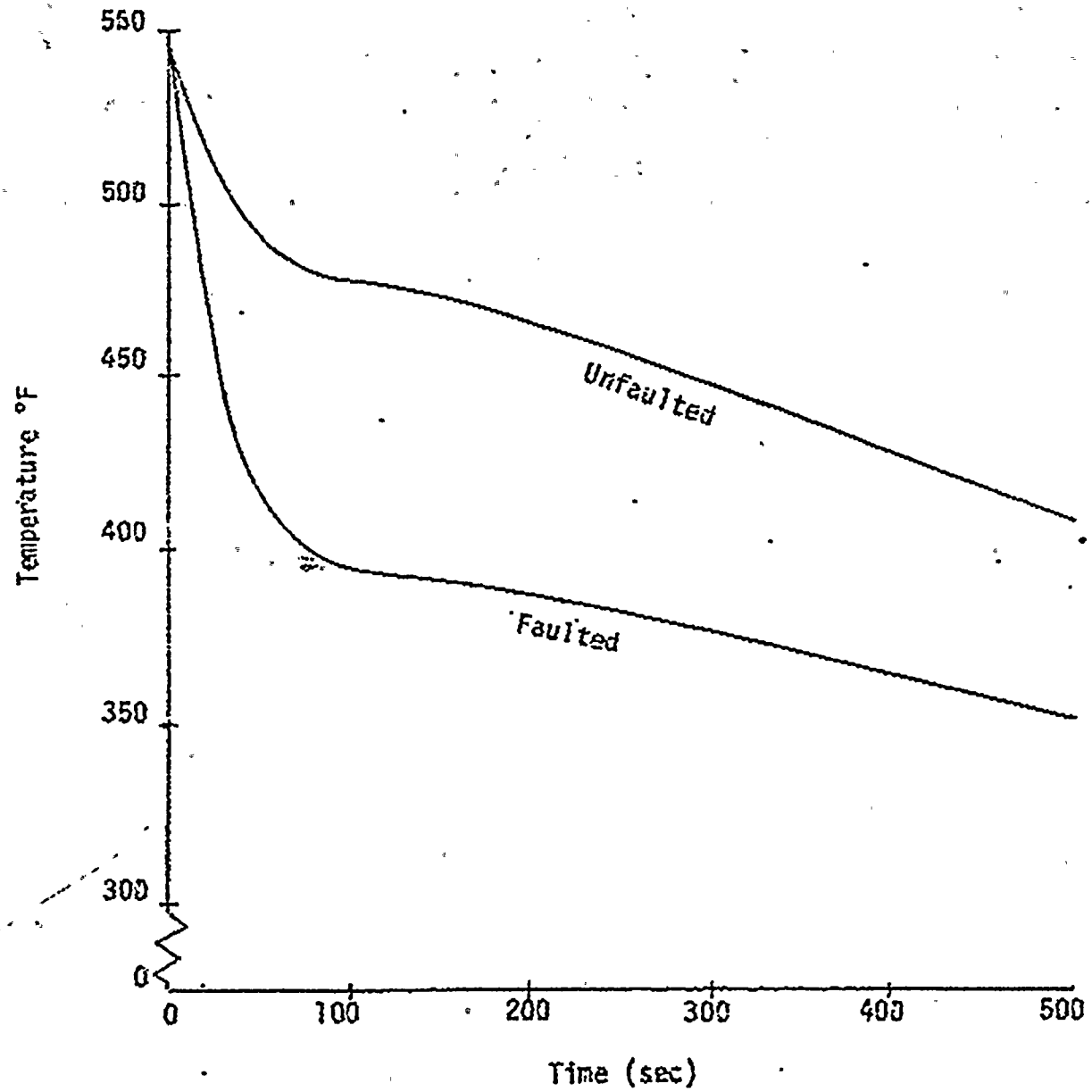


Fig. 1 Cold Leg Exit Temperature For Typical Steam Line Break

JCLO