

# REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

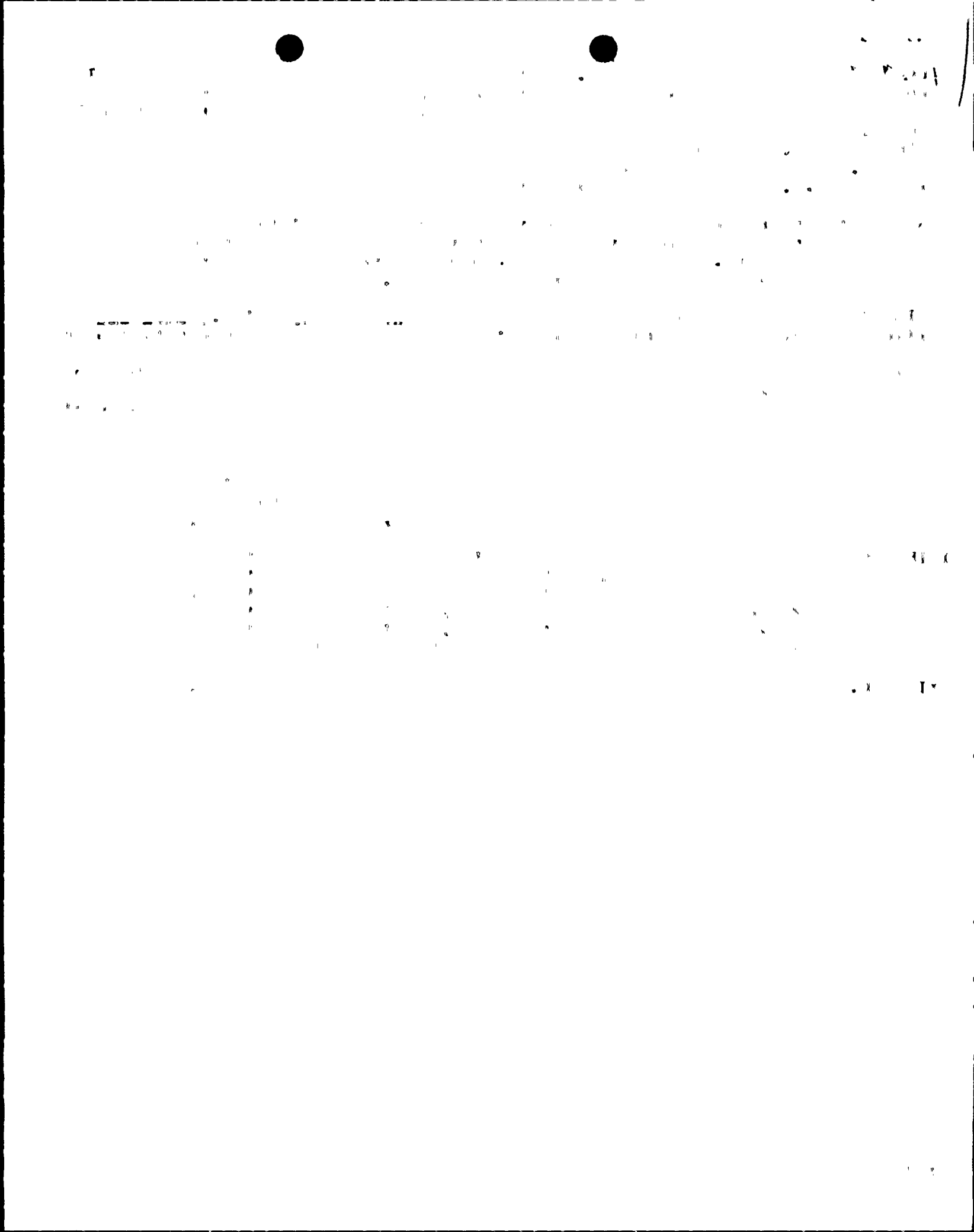
ACCESSION NBR:8506240503 DUC.DATE: 85/06/18 NOTARIZED: NO DOCKET #  
 FACIL:50-250 Turkey Point Plant, Unit 3, Florida Power and Light C 05000250  
 50-251 Turkey Point Plant, Unit 4, Florida Power and Light C 05000251  
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 RECIP.NAME RECIPIENT AFFILIATION  
 THOMPSON,H.L. Division of Licensing

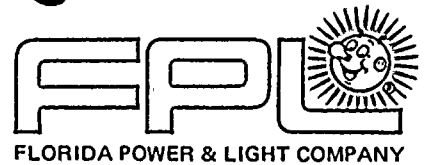
SUBJECT: Forwards response to Generic Ltr 85-02 re resolution of unresolved safety issues concerning steam generator tube integrity.Recommendations on Category C-2 steam generator tube insps will be submitted by 850916.

DISTRIBUTION CODE: A058D COPIES RECEIVED:LTR 1 ENCL 1 SIZE: 8  
 TITLE: OR/Licensing/Generic Submittal: Steam Generator Tube Integrity (Water

NOTES: 05000250  
 OL:07/19/72  
 OL:04/14/73 05000251

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June 18, 1985  
L-85-238

Mr. Hugh L. Thompson, Jr.  
Director, Division of Licensing  
Nuclear Regulatory Commission  
Washington, D.C. 20555

Dear Mr. Thompson:

Re: Turkey Point Units 3 and 4  
Docket Nos. 50-250 and 50-251  
Generic Letter 85-02

The following attachment contains information pertaining to programs that are currently in place at Florida Power and Light Company's (FPL) Turkey Point Unit Nos. 3 and 4, which FPL credits for providing continued assurance that the probability for a steam generator tube rupture (SGTR) remains acceptably low. This information, which has been requested by Generic Letter 85-02, specifically addresses those program areas for which a (NRC) staff Recommended Action has been made.

With respect to the Request for Information concerning Category C-2 Steam Generator Tube Inspections, FPL is currently meeting or exceeding the requirements of our Technical Specifications. We are formally developing our recommendations, on that item and will forward them to you in a separate transmittal by September 16, 1985.

Should you require additional information on this subject, please contact us.

Very truly yours,

J. W. Williams, Jr.  
Group Vice President  
Nuclear Energy Department

JWW/SAV/bc

Attachment

cc: Harold F. Reis, Esquire  
PNS-LI-85-241

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PDR ADDCK 05000250  
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RESPONSE TO NRC GENERIC LETTER 85-02  
ON STAFF RECOMMENDED ACTIONS STEMMING  
FROM NRC INTEGRATED PROGRAM FOR THE  
RESOLUTION OF UNRESOLVED SAFETY  
ISSUES REGARDING STEAM GENERATOR  
TUBE INTEGRITY

TURKEY POINT UNITS 3 AND 4

1.a PREVENTION AND DETECTION OF LOOSE PARTS (INSPECTIONS)

Staff Recommended Action

Visual inspections should be performed on the steam generator secondary side in the vicinity of the tube sheet, both along the entire periphery of the tube bundle and along the tube lane, for purposes of identifying loose parts or foreign objects on the tubesheet, and external damage to peripheral tubes just above the tubesheet. An appropriate optical device should be used (e.g., mini-TV camera, fiber optics). Loose parts or foreign objects which are found should be removed from the steam generators. Tubes observed to have visual damage should be eddy current inspected and plugged if found to be defective.

These visual inspections should be performed: (1) for all steam generators at each plant at the next planned outage for eddy current testing, (2) after any secondary side modifications, or repairs, to steam generator internals, and (3) when eddy current indications are found in the free span portion of peripheral tubes, unless it has been established that the indication did not result from damage by a loose part or foreign object.

For PWR OL applicants, such inspections should be part of the preservice inspection.

For steam generator models where certain segments of the peripheral region can be shown not to be accessible to an appropriate optical device, licensees and applicants should implement alternative actions to address these inaccessible areas, as appropriate.

Licensees should take appropriate precautions to minimize the potential for corrosion while the tube bundle is exposed to air. The presence of chemical species such as sulfur may aggravate this potential, and may make exposure to the atmosphere inadvisable until appropriate remedial measures are taken.



RESPONSE:

FPL's program for the prevention and detection of loose parts includes inspections on the secondary side of the steam generators, in the vicinity of the tube sheet and tube bundle periphery, following any secondary side modifications or repairs to the steam generator internals. In addition, whenever eddy current indications are found on the periphery of the tube bundle near the top of the tube sheet, the need to perform a visual inspection is evaluated based upon the characteristics of the eddy current signals received and other appropriate criteria.

1.b PREVENTION AND DETECTION OF LOOSE PARTS (QUALITY ASSURANCE)

Staff Recommended Action

Quality assurance/quality control procedures for steam generators should be reviewed and revised as necessary to ensure that an effective system exists to preclude introduction of foreign objects into either the primary or secondary side of the steam generator whenever it is opened (e.g., for maintenance, sludge lancing, repairs, inspection operations, modifications). As a minimum, such procedures should include: (1) detailed accountability procedures for all tools and equipment used during an operation, (2) appropriate controls on foreign objects such as eye glasses and film badges, (3) cleanliness requirements, and (4) accountability procedures for components and parts removed from the internals of major components (e.g., reassembly of cut and removed components).

RESPONSE:

A program currently exists at Turkey Point Units 3 and 4 to maintain access control for all areas, piping, vessels, components, etc. where positive control of personnel/tools is required. Access control is implemented and maintained in accordance with provisions of Construction Quality Control procedures. Access control, which includes the use of a detailed access control log to control entry and exit of personnel, tools, radiation protection equipment and other miscellaneous items or materials is established upon request of the appropriate work center.

2.a INSERVICE INSPECTION PROGRAM (FULL LENGTH TUBE INSPECTION)

Staff Recommended Action

The Standard Technical Specifications (STS) and Regulatory Guide 1.83, Part C.2.f, currently define a U-tube inspection as meaning an inspection of the steam generator tube from the point of entry on the hot-leg side completely around the U-bend to the top support of the cold-leg side. The staff recommends that tube inspections should include an inspection of the entire length of the tube (tube end to tube end) including the hot leg side, U-bend, and cold leg side.

This recommended action does not mean that the hot leg inspection sample and the cold leg inspection sample should necessarily involve the same tubes. That is, it does not preclude making separate entries from the hot and cold leg sides and selecting different tubes on the hot and cold leg sides to meet the minimum sampling requirements for inspection.



Consistent with the current STS requirement, supplemental sample inspections (after the initial 3% sample) under this staff recommended action may be limited to a partial length inspection provided the inspection includes those portions of the tube length where degradation was found during initial sampling.

RESPONSE:

FPL's current inservice inspection program for steam generators exceeds the Technical Specification requirements (Technical Specifications define a (S.G.) tube inspection as an inspection of the steam generator tube from the point of entry (hot leg side) completely around the U-bend to the top support of the cold leg) by providing for inspection of the full length of the tube (end-to-end) whenever possible, and within the bounds of the inspection window and critical path of the unit. In the event that such constraints preclude a full length inspection of all of the tubes in the sample, and providing that examination in accordance with the Technical Specifications does not exclude examining the area of concern, FPL would consider the inspection to have been completed satisfactorily. FPL believes it's current steam generator inservice inspection program meets the intent of the NRC's staff recommended action for reducing in-core melt and non-core melt release probabilities. However FPL believes that the flexibility provided by our program should be retained and does not significantly increase the probability of tube failures in the Turkey Point steam generators.

2.b INSERVICE INSPECTION PROGRAM (INSPECTION INTERVAL)

Staff Recommended Action

The maximum allowable time between eddy current inspections of an individual steam generator should be limited in a manner consistent with Section 4.4.5.3 of the Standard Technical Specifications, and in addition should not extend beyond 72 months.

RESPONSE

Technical Specifications for Turkey Point Units 3 and 4 require eddy current inspection frequencies of individual steam generators that are consistent with Section 4.4.5.3 of the Standard Technical Specifications. The current inservice inspection program for steam generators has consistently resulted in inspection frequencies well within the maximum intervals afforded by the Technical Specifications and which also would fall within the time intervals provided in the staff recommended action.

3.a SECONDARY WATER CHEMISTRY PROGRAM

Staff Recommended Action

Licensees and applicants should have a secondary water chemistry program (SWCP) to minimize steam generator tube degradation.

The specific plant program should incorporate the secondary water chemistry guidelines in SGOG Special Report EPRI-NP-2074, "PWR Secondary Water Chemistry Guidelines," October 1982, and should address measures taken to





minimize steam generator corrosion, including materials selection, chemistry limits, and control methods. In addition, the specific plant procedures should include progressively more stringent corrective actions for out-of-specification water chemistry conditions. These corrective actions should include power reductions and shutdowns, as appropriate, when excessively corrosive conditions exist. Specific functional individuals should be identified as having the responsibility/authority to interpret plant water chemistry information and initiate appropriate plant actions to adjust chemistry, as necessary. The referenced SGOG guidelines above were prepared by the Steam Generator Owners Group Water Chemistry Guidelines Committee and represent a consensus opinion of a significant portion of the industry for state-of-the-art secondary water chemistry control.

#### RESPONSE:

In order to mitigate steam generator corrosion problems, FPL adopted and implemented a comprehensive Steam Generator Protection Plan (SGPP) which included materials and design improvements for the secondary plant at Turkey Point Units 3 and 4.

In addition, Florida Power and Light Company (FPL) has implemented a Secondary Water Chemistry Program (SWCP) at the Turkey Point nuclear plant that incorporates the secondary water chemistry guidelines contained in the EPRI Steam Generator Owner's Group "PWR Secondary Water Chemistry Guidelines", Revision 1, June 1984. FPL's SWCP is implemented through its corporate Nuclear Plant Chemistry Parameters Manual. Specific plant procedures which are based on the Nuclear Plant Chemistry Parameters Manual, PWR Secondary Water Chemistry Guidelines, and other related technical references, and which contain progressively more stringent corrective actions including power reduction and shutdowns, for out-of-specification water chemistry conditions, have been established. The responsibility and authority for interpreting chemistry information and initiating corrective action are provided in Turkey Point Nuclear Plant procedures.

#### 3.b CONDENSER INSERVICE INSPECTION PROGRAM

##### Staff Recommended Action

Licensees should implement a condenser inservice inspection program. The program should be defined in plant specific safety-related procedures and include:

1. Procedures to implement a condenser inservice inspection program that will be initiated if condenser leakage is of such a magnitude that a power reduction corrective action is required more than once per three month period; and
2. Identification and location of leakage source(s), either water or air;
3. Methods of repair of leakage;
4. Methodology for determining the cause(s) of leakage;
5. A preventive maintenance program.



## RESPONSE:

Florida Power and Light Company (FPL) does not concur with the staff recommendation for safety related procedures. FPL believes that the programs that are currently in place at Turkey Point Units 3 & 4 are effective for rapid identification and correction of condenser leakage, and that they serve to provide reasonable assurance that the probability of a SGTR is not significantly increased due to condenser leakage. We base this on the following:

The Secondary Water Chemistry Program (SWCP) contains stringent limits on the control of air and water leakage. In the event that the limits are exceeded, actions are initiated to quickly locate and reduce or eliminate the source of the leakage. In order to ensure rapid recognition and response to these conditions, the condensers are continuously monitored for signs of air or water leakage.

The condensers at Turkey Point are tubed 100% with titanium, a superior corrosion resistant alloy. FPL's experience with the titanium tubes has been excellent. Since installation, very few tube leaks have occurred in the titanium tubes. FPL's experience with titanium tubes dates back to 1976, when the first set of titanium tubes were placed in service at the Turkey Point Nuclear Plant.

In the event that a tube leak occurs during operation, procedures are initiated to locate and isolate the leak. Written instructions have been provided to the nuclear plants on methods for both interim and long term repair of the tube leak, and the requirements for initiating the analyses to determine the failure mechanism. To date, the few failures that have occurred in FPL's titanium tubes have been attributed to mechanical failure.

In addition to the above, FPL's Condenser Inspection Program includes hydrostatic testing of all of the condenser tubes, and secondary side inspections during each refueling outage.

#### 4. PRIMARY TO SECONDARY LEAKAGE LIMIT

##### Staff Recommended Action

All PWR's that have Technical Specifications limits for primary to secondary leakage rates which are less restrictive than the Standard Technical Specifications (STS) limits should implement the STS limits.

## RESPONSE:

Turkey Point Units 3 and 4 Technical Specifications implement the STS for Westinghouse Pressurized Water Reactors for Reactor Coolant System leakage. The Technical Specifications limit Reactor Coolant System leakage to 1 gpm total primary-to-secondary leakage through all steam generators not isolated from the Reactor Coolant System and 500 gallons per day through any one steam generator not isolated from the Reactor Coolant System.



## 5. COOLANT IODINE ACTIVITY LIMIT

### Staff Recommended Action

PWRs that have Technical Specifications limits and surveillance for coolant iodine activity that are less restrictive than the Standard Technical Specification (STS) should implement the STS limits. Those plants identified above that also have low head high pressure safety injection pumps should either: (1) implement iodine limits which are 20% of the STS values, or (2) implement reactor coolant pump trip criteria which will ensure that if offsite power is retained, no loss of forced reactor coolant system flow will occur for steam generator tube rupture events up to and including the design basis double-ended break of a single steam generator tube, and implement iodine limits consistent with the STS.

### RESPONSE:

Turkey Point Units 3 and 4 Technical Specifications implement the STS coolant iodine limit of  $\leq 1.0$  uCi/g Dose Equivalent I-131 (DEQI -131). FPL is currently in the process of developing Emergency Operating Procedures at Turkey Point which are based upon the efforts of the Westinghouse Owners Group (WOG), and which contain generic instructions for limiting primary to secondary leakage and minimizing radiological releases following steam generator tube failures in one or more steam generators.

RCP trip criteria have been developed and incorporated into the emergency response procedures that provide for continued RCP operation except when required to ensure successful safety injection operation based upon selected plant parameters reaching critical set points.

Present analyses continue to consider SGTR (including double ended breaks) and non-LOCA design basis accidents in the development of RCP trip parameters which will provide reasonable assurance of continued RCP operation (forced reactor coolant system flow) if off-site power is available.

## 6. SAFETY INJECTION SIGNAL RESET

### Staff Recommended Action

The control logic associated with the safety injection pump suction flow path should be reviewed and modified as necessary, by licensees, to minimize the loss of safety function associated with safety injection reset during an SGTR event. Automatic switchover of safety injection pump suction from the boric acid storage tanks (BAST) to the refueling water storage tanks should be evaluated with respect to whether the switchover should be made on the basis of low BAST level alone without consideration of the condition of the SI signal

### RESPONSE:

Normal alignment of the safety injection pump suction flow path at Turkey Point Units 3 and 4 is from the Refueling Water Storage Tanks (RWST). Resetting safety injection does not have an affect on the suction flow path to the safety injection pumps from the RWST.



REQUEST FOR INFORMATION CONCERNING CATEGORY C-2  
STEAM GENERATOR TUBE INSPECTIONS

Information Requested

The enclosed draft NUREG-0844 Section 2.2.1.2 describes certain limitations which the staff believes to be inherent in the present Technical Specification steam generator ISI requirements pertaining to Category C-2 inspection results. Licensees and applicants are requested to provide a description of their current policy and actions relative to this issue and any recommendations they have concerning how existing Technical Specification steam generator ISI requirements pertaining to Category C-2 inspection results could be improved to better ensure that adequate inspections will be performed. This description should include a response to the following questions:

1. What factors do, or would, the licensee or applicant consider in determining (a) whether additional tubes should be inspected beyond what is required by the Technical Specifications, (b) whether all steam generators should be included in the inspection program, and (c) when the steam generators should be reinspected.
2. To what extent do these factors include consideration of the degradation mechanism itself and its potential for causing a tube to be vulnerable to rupture during severe transients or postulated accident before rupture or leakage of that tube occurs during normal operation.

RESPONSE:

FPL's current in service inspection program for steam generators meets or exceeds the criteria provided in the Standard Technical Specifications. We are formally developing our recommendations concerning Category C-2 Steam Generator Tube inspections and will forward them to you by September 16, 1985.



