DCD-016

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

January 18, 1983

Dockets Nos. 50-312, 289 & 270

SUBJECT: SUMMARY OF MEETING WITH SMUD, GPU AND DPC CONCERNING THE FLUX REDUCTION PROGRAMS FOR RANCHO SECO, TMI-1 AND OCONEE 2 ON JANUARY 14, 1983

Introduction

The meeting was held in Bethesda, Maryland on January 14, 1983, at the request of the NRC staff to discuss the licensees' programs for ensuring that the screening criterion for Pressurized Thermal Shock (PTS) for each of the subject facilities would not be exceeded. The agenda, which was to be followed, is provided in Enclosure 1. The attendees of the meeting are identified in Enclosure 2. The material for the licensees' presentation is provided in Enclosure 3. The draft of the proposed staff letter to the licensees is provided as Enclosure 4.

Discussion

The licensees provided the current status of each plant as of December 31, 1981. The status included the peak fluence, the RT_{NDT} of the longitudinal weld nearest the peak fluence location assuming the peak fluence is at the weld (at least one weld is near to the peak fluence location), the rate of fluence increase at the peak fluence location assuming the current core configuration for Rancho Seco and the proposed core configuration for the next cycle (Cycle 6) for TMI-1, date when each plant would exceed the screening criteria assuming 80% capacity factor, and the expiration of the operating license. It was noted that in each case the expiration of the operating license would be before each plant accumulated 32 EFPY's of operation. Oconee 2 was predicted to be able to operate to the expiration of the license and 32 EFPY's without exceeding the screening criterion. Rancho Seco was predicted to have 14 calendar years of operation before reaching the screening criterion and TMI-1 was predicted to reach the screening criterion in approximately 20 years.

Rancho Seco, in scoping studies, was predicted to be able to extend the operating time of the plant another 5 to 6 EFPY's before reaching the screening criterion by implementing an in-in out core in the next cycle (Cycle 8). Rancho Seco is committed to the in-in-out core in Cycle 8; however, details would not be available for at least 9 months. TMI-1 has not committed to the in-in-out core yet.

The licensees believe that other alternatives are available for delay of reaching the screening criterion. These include: (1) replacement of fluence calculations at the welds, (2) refinement of RT_{NDT} shift correlation for B&W welds, (3) improvement of chemistry for weld material and (4) determination of the real toughness of the vessel materials.

Conclusions

The individual licensees (SMUD, GPU and DPC) indicated that they would document in letters within approximately three weeks, the information which was presented at the meeting in response to the draft proposed staff letter and provide a schedule of submittals of information which could not be provided in detail with the letters. They indicated that they would not commit to alternatives which would challenge safety or vessel operating limits. B&W will provide two reports which will provide material property date for all B&W plants. The staff would propose a letter which would acknowledge what the licensees would send and what was needed.

"ORIGINAL SIGNED BY:"

Guy S. Vissing, Project Manager
Operating Reactors Branch #4
Division of Licensing

Enclosures:
1. Agenda
2. List of Attendees
3. Licensees' Presentation Material
4. Draft of Proposed Staff Ltr. to Licensees

cc w/enclosures:
See next page

OFFICE							
SURNAME	GVissing						
DATE	1/18/82						

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MEETING SUMMARY DISTRIBUTION

Licensee: GPUN, SMUD & DPC

* Copies also sent to those people on service (cc) list for subject plant(s).

Docket File
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IE
SShowe (PWR) or CThayer (BWR), IE
Meeting Summary File-ORB#4
RFraley, ACRS-10
Program Support Branch

ORAB, Rm. 542
BGrimes, DEP
SSchwartz, DEP
SRamos, EPDB
FPagano, EPLB

Meeting Participants Fm. NRC:

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P. N. Randall
E. L. Conner
J. C. McKinley
J. Milhoan
H. L. Ornstein
R. Woods
E. D. Throm
L. Lois
R. Rantala
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Felix Litton

Enclosure 1

AGENDA FOR PTS MEETING WITH GPU, SMUD & DPC CONCERNING FLUX REDUCTION PROGRAMS FOR TMI-1, RANCHO SECO & OCONEE 2

1/14/83

- Current Status of Plant
  - Fluence
  - RT_{NDT}
  - RT_{NDT} rate of increase
  - date when will exceed screening RT_{NDT}
- Flux Reduction Option Considered
  - description
  - resulting flux reduction
  - advantages and disadvantages, particularly power limits
  - discussion of limit that causes power limit
    - hot channel factor
    - DNBR
    - other
  - assessment of desirability (from overall plant safety viewpoint) of relaxation of that limit.
- Alternatives to Flux Reduction for Delaying or Avoiding Reaching the Screening Criteria
  - archival materials research
  - other
- Other Aspects of PTS Program
- Discussions/Summary

Enclosure 2

ATTENDANCE LIST FOR MEETING WITH SMUD, GPU AND DPC CONCERNING FLUENCE REDUCTION PLANS FOR RANCHO SECO, TMI-1 AND OCONEE 2 ON JANUARY 14, 1983

NRC

G. S. Vissing
R. W. Klecker
R. Rantala
P. N. Randall
G. C. Lainas
J. A. Van Vliet
John F. Stolz
E. L. Conner
D. L. Basdekas
J. C. McKinley
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J. Milhoan
Carl Johnson
H. L. Ornstein
Karl Kniel
Roy Woods
Frank Schroeder
E. D. Throm
Daniel Fieno
Lambros Lois

GPU

Jerry Delezenski
Ed Wallace
John Janiszewski
Gordon Bond
A. P. Rochino

DPC

Bill Reckley
Robert Gill

AP&L

Daniel Spond

FPC

E. H. Davidson

SMUD

T. H. Cogburn

B&W

C. L. Whitmarsh
Frank Walters
C. J. (Skip) Hudson
Art Lowe

NUS Corp.

David Powell

NRC Calendar

Lynn Connor

Enclosure 3

PRESENTATION TO NRC STAFF

BY B&W OWNERS GROUP

PLANNED FLUX REDUCTION TECHNIQUES THAT BENEFIT PTS FOR RANCHO SECO TMI-1 OCONEE-II

SPEAKER - TOM COGBURN, SMUD

JANUARY 14, 1983

BETHESDA, MD

OBJECTIVE

PROVIDE NRC STAFF WITH INFORMATION ON PTS FLUX REDUCTION PROGRAMS AND ALTERNATIVES

- CURRENT STATUS OF PLANTS AS OF 12/31/81
- VESSEL FLUENCE REDUCTION
- ALTERNATIVE TO FLUX REDUCTION
- B&W OWNERS GROUP PROGRAMS TO LESSEN PTS IMPACT

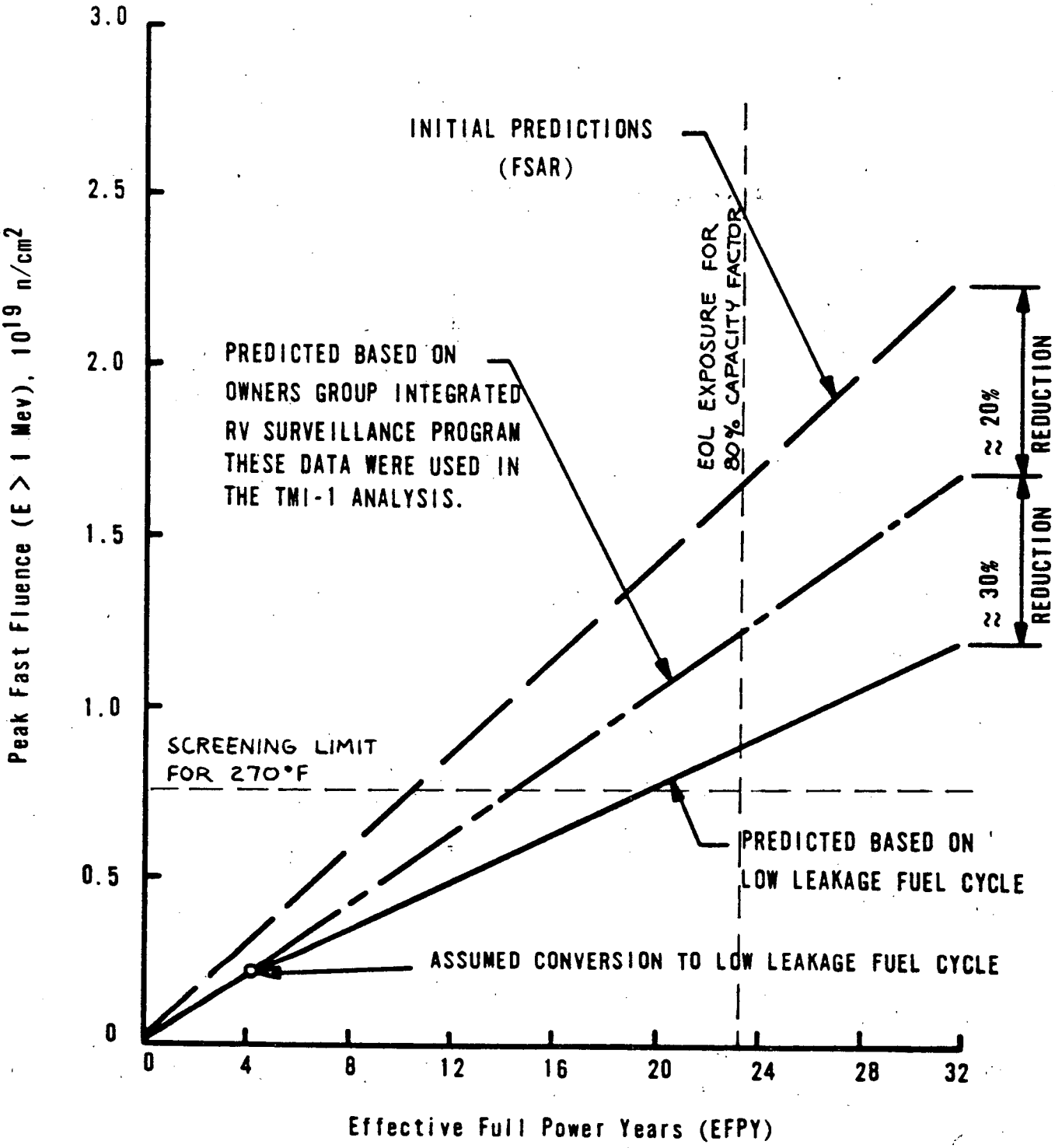
CURRENT STATUS OF PLANTS
AS OF
DECEMBER 31, 1981

	RANCHO SECO	TMI-1	O-II
FLUENCE - $N_{VT} \times 10^{19}$	.21	.18	.217/.287[1]
RT_{NDT} ^{o}F	206	209	216
RATE OF FLUENCE INCREASE $X10^{19}$ PER EFPY[1]	.046/.058	.039/.053	.036/.061
DATE WHEN WILL EXCEED SCREENING CRITERIA	1997	2003[2]	2010
EXPIRATION OF O. L.	2008	2008	2007

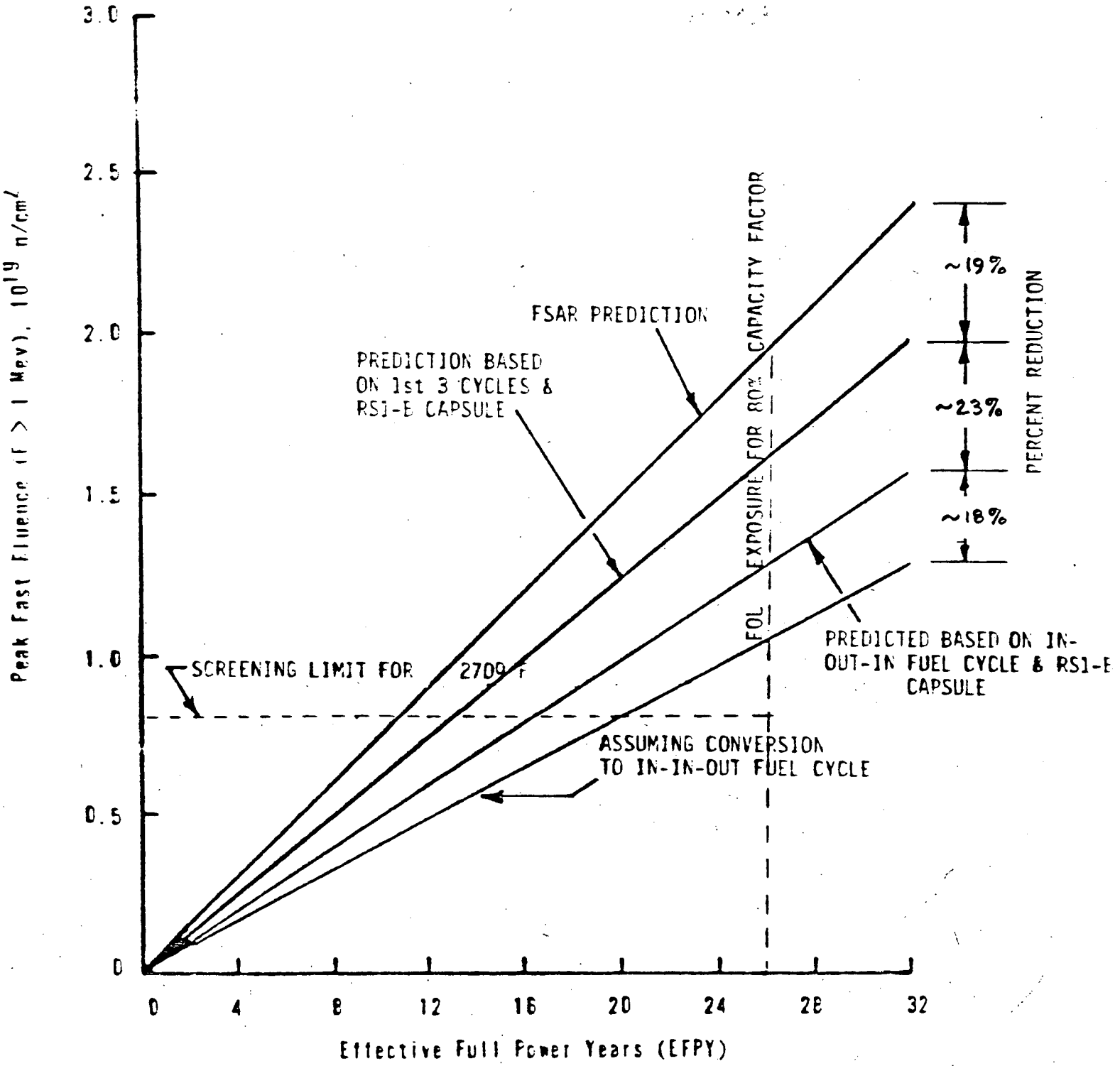
(1) LICENSEE VALUE/NRC VALUE

(2) ASSUMES 18 MONTH IN-OUT-IN LOW LEAKAGE FUEL CYCLE STARTS IN CYCLE 6

Reductions in Peak Reactor Vessel Fluence in TMI-1



Reductions in Peak Reactor Vessel Fluence in Rancho Seco



VESSEL FLUENCE REDUCTION THROUGH FUEL CYCLE MANAGEMENT

IN-OUT-IN SHUFFLE OF FRESH FUEL

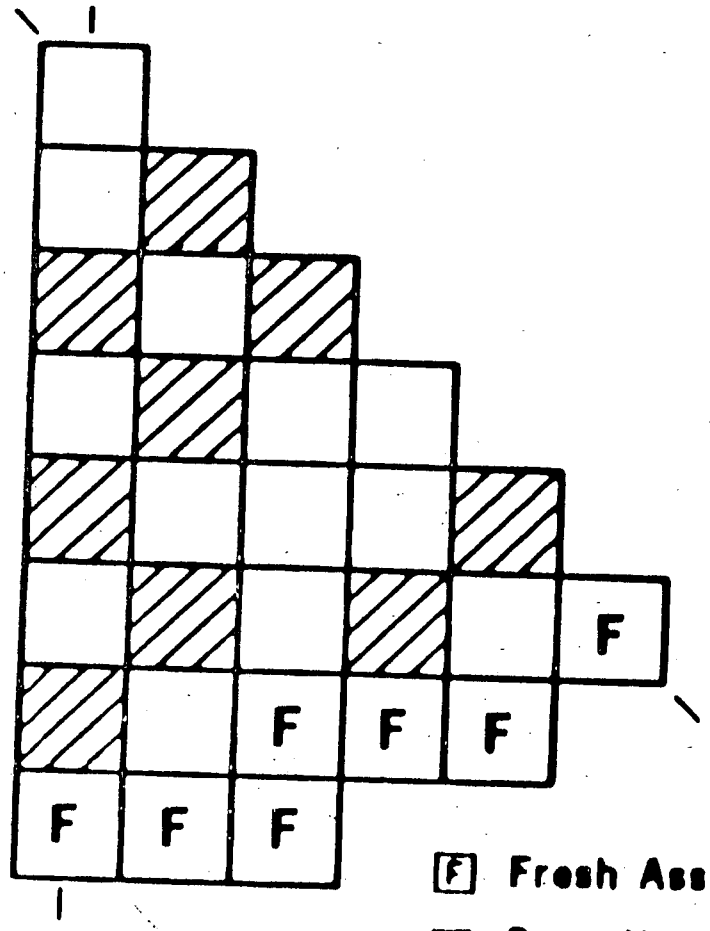
- LBP USED FOR PEAKING CONTROL
- ~30% REDUCTION IN PEAK FLUENCE
- NO IMPACT ON DNBR, LHR, PLANT SAFETY

IN-IN-OUT SHUFFLE OF FRESH FUEL

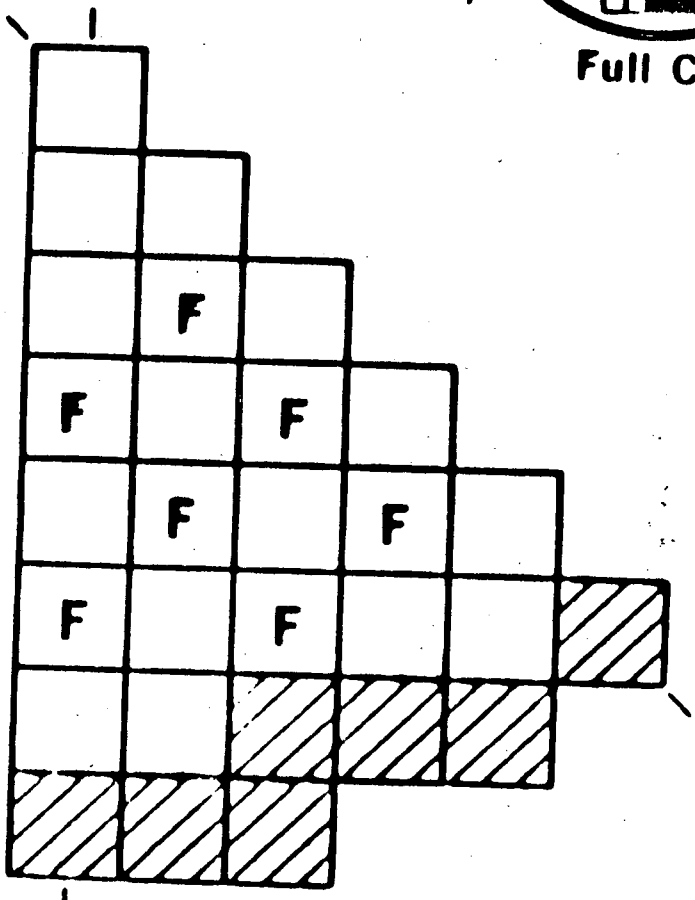
- SMALL INCREASE IN PEAKING OVER IN-OUT-IN
- ESTIMATED REDUCTIONS IN PEAK FLUENCE OF ~20%
- EXPECT IMPACT ON CORE THERMAL PARAMETERS CAN BE OFFSET WITH IMPROVED ANALYSIS TECHNIQUES AND/OR SOME RESTRICTION OF REACTOR MANEUVERING CAPABILITY
- PLANT SPECIFIC ANALYSIS WOULD BE REQUIRED TO ASSURE FLUX REDUCTION AT OTHER THAN PEAK LOCATION

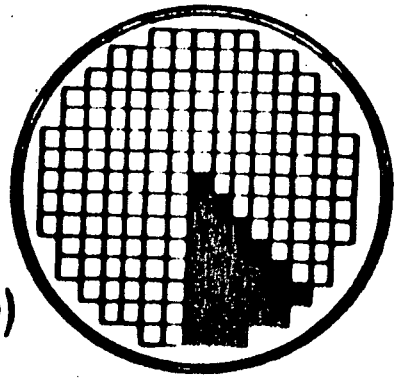
Typical Fuel Assembly Loading Patterns

Typical Out-In Loading (1/8 Core)



Typical Low Leakage In-Out-In Loading (1/8 Core)





Full Core

FLUENCE REDUCTION TECHNIQUES

GLOBAL FLUENCE REDUCTION

OUT - IN (BASE)

IN - OUT - IN (IMPLEMENTATION)

IN - IN - OUT (EVALUATION IN PROCESS)

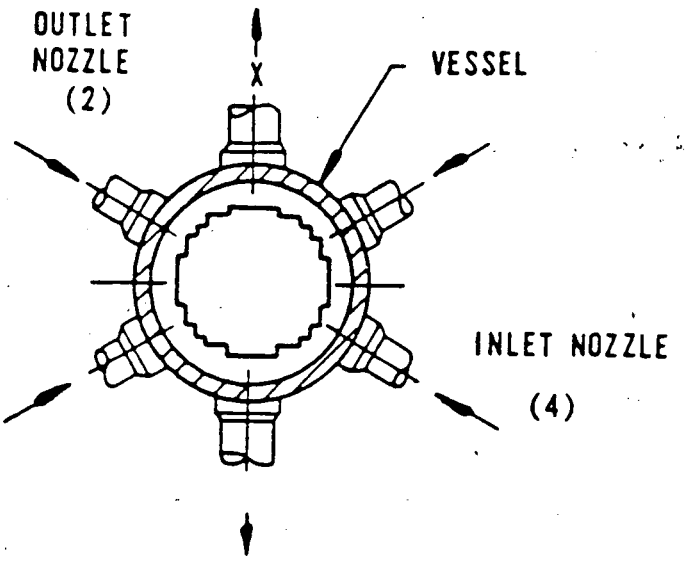
LOCAL FLUENCE REDUCTION

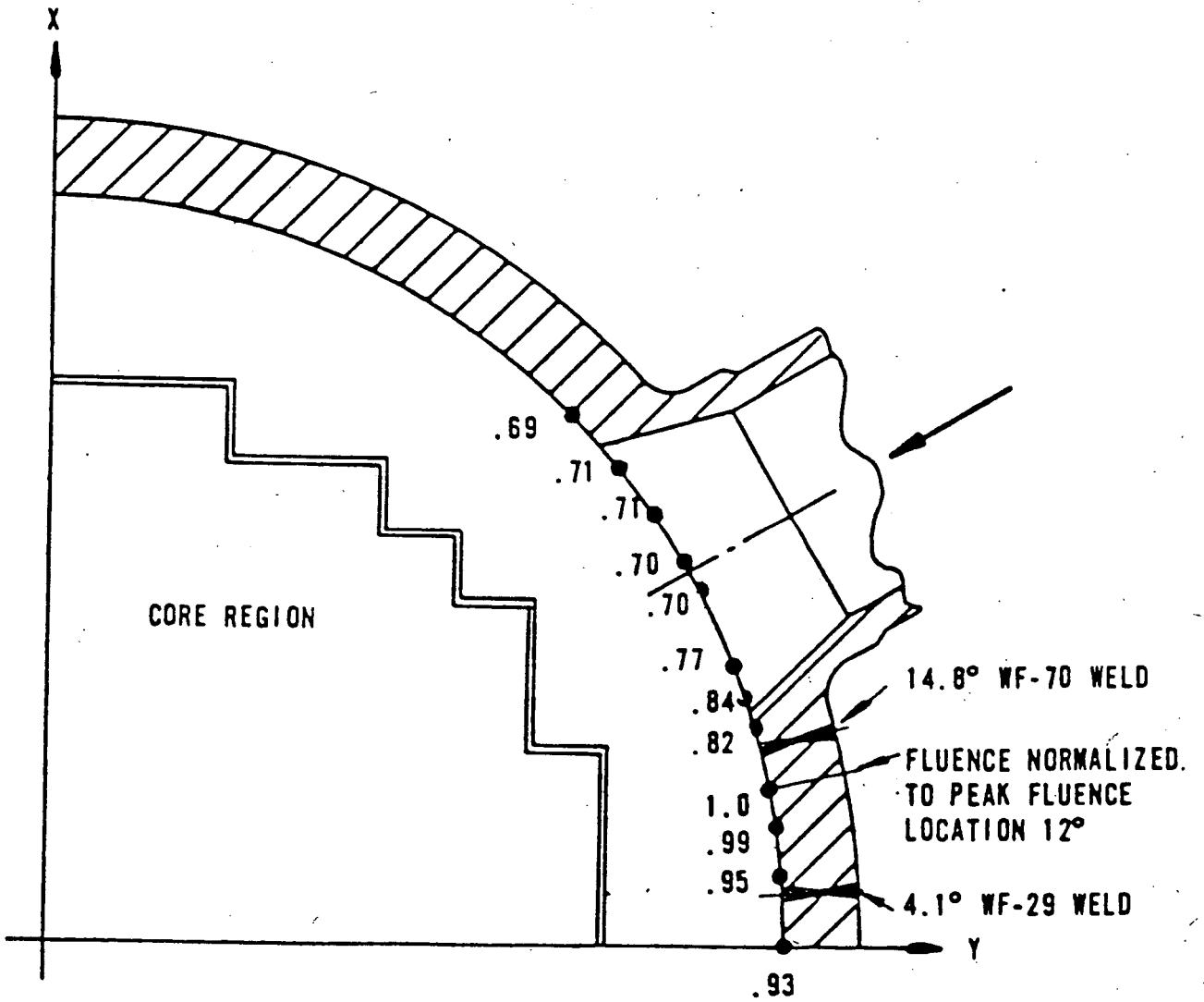
DEPLETED ASSEMBLIES

DUMMY ASSEMBLIES

RANCHO SECO

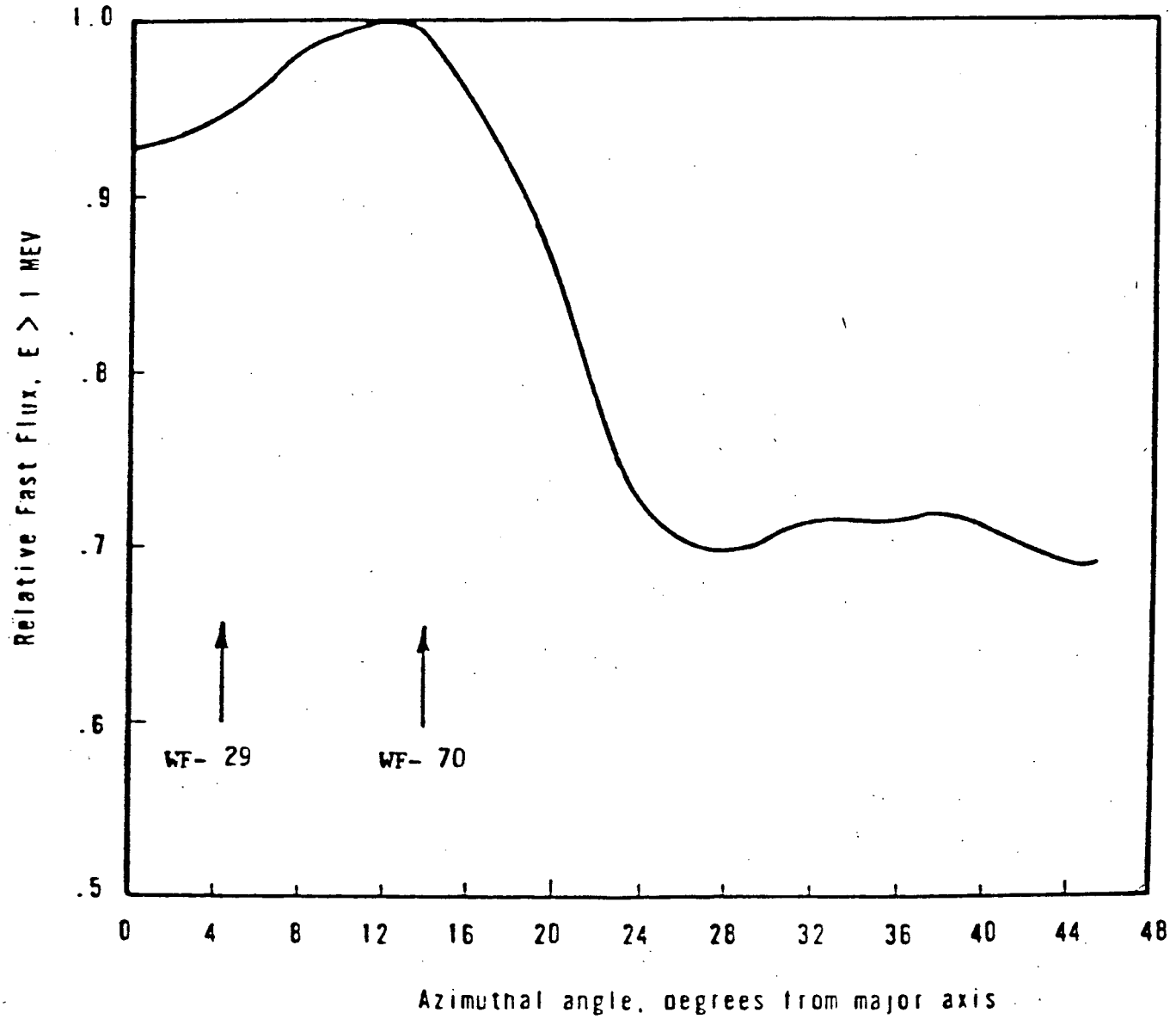
Longitudinal Weld Locations to Azimuthal Fluence Profile





RANCHO SECO

Azimuthal Flux Profile Normalized to Peak Flux
Location for Cycles 1 Through 3 Average



ALTERNATIVES TO FLUX REDUCTION
FOR DELAY OF REACHING SCREENING CRITERIA

- REFINEMENT OF UNCERTAINTIES IN INITIAL RT_{NDT} VALUES
- IMPROVEMENT OF CHEMISTRY FOR CRITICAL MATERIALS
  BAW-1511P, OCTOBER 1980
  BAW-1500
- REFINEMENT OF VESSEL FLUENCE CALCULATIONS TO FURTHER REDUCE UNCERTAINTY
- DEVELOPMENT OF RT_{NDT} SHIFT CORRELATION FOR B&W WELD METAL

B&W OWNERS GROUP PROGRAMS TO LESSEN PTS IMPACT

MARGIN ASSESSMENT PROGRAMS

- PLANT SPECIFIC PTS ANALYSES
- EPRI MIXING TEST/ANALYSIS METHODS
- IMPROVED FRACTURE MECHANICS TECHNIQUES
- IMPROVED FRACTURE TOUGHNESS CORRELATIONS
- UTILIZE PERTINENT RESEARCH DATA FROM OTHER INDUSTRY PROGRAMS

RISK REDUCTION PROGRAMS

- ENHANCED ISI
- OPERATING PROCEDURES CHANGES (ATOG)
- PTS TRAINING
- PLANT MODIFICATIONS
- OPERATING EXPERIENCE FEEDBACK (TAP)

SUMMARY

- TIME TO EXCEED SCREENING CRITERIA IS > 14 YEARS
- FLUX REDUCTION (IN-OUT-IN FUEL CYCLE) IN PLACE AT R-S AND OCONEE 2
- FLUX REDUCTION (IN-OUT-IN) PLANNED FOR NEXT TMI-1 REFUELING
- FURTHER FLUX REDUCTION (IN-IN-OUT FUEL CYCLE) UNDER CONSIDERATION FOR R-S AND TMI-1
- NEW RT_{NDT} CORRELATION FOR B&W RV MATERIALS
- OTHER PROGRAMS IN PROGRESS TO FURTHER REDUCE PTS RISK

"Final Draft" letter for discussion at flux reduction meetings 1/83

R. Woods

Enclosure 4

Draft 10 CFR 50.54(f) letter to category of licensees who have a plant where a flux-reduction factor between 2 and 5 would allow operation to end-of-plant life without exceeding RT_{NDT} screening criterion.

Dear :

At the December 9, 1982 meeting of the Nuclear Regulatory Commission, the staff presented results of its Pressurized Thermal Shock (PTS) studies as described in SECY 82-465. The Commission subsequently directed the staff to develop a Notice of Proposed Rulemaking that would establish an RT_{NDT} screening criterion, require licensees to submit present and projected values of RT_{NDT}, require early analysis and implementation of such flux reduction programs as are reasonably practicable to avoid reaching the screening criterion, and require plant-specific PTS safety analyses before plants are within three calendar years of reaching the screening criterion. The staff's proposed screening values are an RT_{NDT} of 270°F for plates and axial welds, and 300°F for circumferential welds. The Commission also noted and concurred that the staff should meet with licensees of plants for which near-term flux reductions of factors of two to five would ensure that the screening criterion would not be exceeded throughout service life, to determine the licensees' plans for such programs, and propose issuance of 10 CFR 50.54(f) letters to such licensees, if appropriate, following the meetings. Based on the information currently available to us, we believe your plant(s), (name), is (are) in that category.

Accordingly, pursuant to 10 CFR 50.54(f) you are requested to furnish, no later than March 1, 1983, the following information regarding your plans for such flux reduction.

(1) Provide your assessment of the fluence experienced to date by the welds and plates in your pressure vessel, the rate of increase expected assuming future fuel cycles to which you are already committed, and a detailed description of the bases for the above (including surveillance capsule data and analysis methods, and generic methods or correlations used).

(2) Using the above fluence information, provide your assessment of the RT_{NDT} presently existing in your pressure vessel welds and plates utilizing the methodology outlined in Appendix E to Enclosure A of SECY-82-465, and the expected future rates of increase, and the expected dates when the applicable proposed screening criterion will be exceeded.

(3) Provide a description of the flux reduction options that you have considered for your plant. Include for each option:

(a) Description of fuel management and/or fuel removal and/or fuel replacement with dummy elements, showing core maps for future cycles;

(b) Quantitative assessment of resulting flux reduction to critical welds and plates;

(c) Parametric study showing future RT_{NDT} values resulting from both the earliest practicable implementation of the option, and from the latest possible implementation of the plan that will still avoid exceeding the RT_{NDT} screening criterion at end-of-life;

(d) Discussion of advantages and disadvantages of the option, particularly emphasizing power reductions caused by the option. With respect to power reduction, discuss the magnitude of the reduction and the particular limit (e.g., hot channel factor, DNBR, etc.) causing the power reduction. Also analyze how much relief would be necessary (with respect to the particular limit) to allow full power operation, and assess whether such relief would be an improvement to overall plant safety (considering LOCA, PTS, transients, etc.).

(4) Discuss any alternatives you may be considering to flux reduction that will result in delaying or avoiding exceeding the RT_{NDT} screening criterion. These would include topics such as archival materials research, plans to sample and analyze as-built materials, etc.

We require that the above information be provided by March 1, 1983 as we wish to have all feasible flux reductions implemented as early as possible in order to achieve maximum safety benefit. We may request a meeting with you to discuss your options and plans after we have reviewed the above requested information.

OMB clearance is not required for this request under P.L. 96-511 since it is being transmitted to nine or fewer addresses.

Harold R. Denton, Director
Office of Nuclear Reactor Regulation

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