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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 820211 request for addl. info re
 NUREG-0737, Item II.K.3.2, safety effect of power operated
 relief valve isolation sys. List of event tree initiating
 events considered included.

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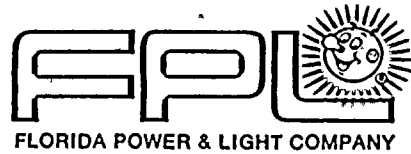
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No.	Name	Address	City	State	Occupation
1	John Doe	123 Main St	Springfield	Illinois	Teacher
2	Jane Smith	456 Oak Ave	Chicago	Illinois	Nurse
3	Robert Brown	789 Elm St	Peoria	Illinois	Engineer
4	Mary White	101 Maple Dr	Rockford	Illinois	Homemaker
5	James Green	202 Pine Ln	Decatur	Illinois	Farmer
6	Sarah Black	303 Cedar Ct	Urbana	Illinois	Student
7	William Gray	404 Birch Rd	Normal	Illinois	Businessman
8	Elizabeth King	505 Walnut St	Macomb	Illinois	Retailer
9	Thomas Lee	606 Spruce Ave	Edwardsville	Illinois	Lawyer
10	Patricia Hall	707 Ash Dr	Carrollton	Illinois	Accountant
11	Richard Young	808 Hickory Ln	Shiloh	Illinois	Construction Worker
12	Barbara King	909 Cypress St	Yorkville	Illinois	Librarian
13	Christopher Lee	1010 Dogwood Ave	Waukegan	Illinois	Software Developer
14	Michelle King	1111 Magnolia Dr	St. Charles	Illinois	Marketing Specialist
15	David King	1212 Sycamore Rd	Woodstock	Illinois	Artist
16	Christina King	1313 Juniper Ct	Wheat Ridge	Illinois	Event Planner
17	Matthew King	1414 Redwood Ln	Wheaton	Illinois	IT Support
18	Stephanie King	1515 Fir St	Wheat Ridge	Illinois	Graphic Designer
19	Andrew King	1616 Cedar Ave	Wheaton	Illinois	Project Manager
20	Olivia King	1717 Birch Dr	Wheaton	Illinois	Product Designer
21	Benjamin King	1818 Elm St	Wheaton	Illinois	Quality Assurance
22	Sophia King	1919 Maple Ln	Wheaton	Illinois	UX Researcher
23	Ethan King	2020 Pine Ct	Wheaton	Illinois	Systems Administrator
24	Ava King	2121 Oak Rd	Wheaton	Illinois	Business Development
25	Noah King	2222 Spruce Ave	Wheaton	Illinois	Operations Manager
26	Isabella King	2323 Walnut St	Wheaton	Illinois	Human Resources
27	Liam King	2424 Ash Dr	Wheaton	Illinois	Finance Analyst
28	Mia King	2525 Hickory Ln	Wheaton	Illinois	Marketing Coordinator
29	Lucas King	2626 Cypress Ct	Wheaton	Illinois	Product Tester
30	Charlotte King	2727 Dogwood Ave	Wheaton	Illinois	Customer Support
31	Henry King	2828 Magnolia Dr	Wheaton	Illinois	Quality Control
32	Aria King	2929 Sycamore Rd	Wheaton	Illinois	Project Coordinator
33	Sebastian King	3030 Redwood Ln	Wheaton	Illinois	Business Analyst
34	Madison King	3131 Fir St	Wheaton	Illinois	Marketing Assistant
35	Isaac King	3232 Juniper Ct	Wheaton	Illinois	Operations Assistant
36	Abigail King	3333 Redwood Ln	Wheaton	Illinois	Product Support
37	Wyatt King	3434 Cedar Ave	Wheaton	Illinois	Business Development
38	Skylar King	3535 Birch Dr	Wheaton	Illinois	Marketing Specialist
39	John King	3636 Elm St	Wheaton	Illinois	Product Designer
40	Chloe King	3737 Maple Ln	Wheaton	Illinois	Systems Administrator
41	Matthew King	3838 Pine Ct	Wheaton	Illinois	Business Development
42	Grace King	3939 Oak Rd	Wheaton	Illinois	Marketing Coordinator
43	David King	4040 Spruce Ave	Wheaton	Illinois	Product Tester
44	Lily King	4141 Walnut St	Wheaton	Illinois	Customer Support
45	Lucas King	4242 Ash Dr	Wheaton	Illinois	Quality Control
46	Olivia King	4343 Hickory Ln	Wheaton	Illinois	Project Coordinator
47	Benjamin King	4444 Cypress Ct	Wheaton	Illinois	Business Analyst
48	Sophia King	4545 Dogwood Ave	Wheaton	Illinois	Marketing Assistant
49	Ethan King	4646 Magnolia Dr	Wheaton	Illinois	Operations Assistant
50	Mia King	4747 Sycamore Rd	Wheaton	Illinois	Product Support
51	Lucas King	4848 Redwood Ln	Wheaton	Illinois	Business Development
52	Isabella King	4949 Fir St	Wheaton	Illinois	Marketing Specialist
53	Sebastian King	5050 Juniper Ct	Wheaton	Illinois	Product Designer
54	Madison King	5151 Redwood Ln	Wheaton	Illinois	Systems Administrator
55	Wyatt King	5252 Cedar Ave	Wheaton	Illinois	Business Development
56	Skylar King	5353 Birch Dr	Wheaton	Illinois	Marketing Coordinator
57	John King	5454 Elm St	Wheaton	Illinois	Product Designer
58	Chloe King	5555 Maple Ln	Wheaton	Illinois	Systems Administrator
59	Matthew King	5656 Pine Ct	Wheaton	Illinois	Business Development
60	Grace King	5757 Oak Rd	Wheaton	Illinois	Marketing Coordinator
61	David King	5858 Spruce Ave	Wheaton	Illinois	Product Tester
62	Lily King	5959 Walnut St	Wheaton	Illinois	Customer Support
63	Lucas King	6060 Ash Dr	Wheaton	Illinois	Quality Control
64	Olivia King	6161 Hickory Ln	Wheaton	Illinois	Project Coordinator
65	Benjamin King	6262 Cypress Ct	Wheaton	Illinois	Business Analyst
66	Sophia King	6363 Dogwood Ave	Wheaton	Illinois	Marketing Assistant
67	Ethan King	6464 Magnolia Dr	Wheaton	Illinois	Operations Assistant
68	Mia King	6565 Sycamore Rd	Wheaton	Illinois	Product Support
69	Lucas King	6666 Redwood Ln	Wheaton	Illinois	Business Development
70	Isabella King	6767 Fir St	Wheaton	Illinois	Marketing Specialist
71	Sebastian King	6868 Juniper Ct	Wheaton	Illinois	Product Designer
72	Madison King	6969 Redwood Ln	Wheaton	Illinois	Systems Administrator
73	Wyatt King	7070 Cedar Ave	Wheaton	Illinois	Business Development
74	Skylar King	7171 Birch Dr	Wheaton	Illinois	Marketing Coordinator
75	John King	7272 Elm St	Wheaton	Illinois	Product Designer
76	Chloe King	7373 Maple Ln	Wheaton	Illinois	Systems Administrator
77	Matthew King	7474 Pine Ct	Wheaton	Illinois	Business Development
78	Grace King	7575 Oak Rd	Wheaton	Illinois	Marketing Coordinator
79	David King	7676 Spruce Ave	Wheaton	Illinois	Product Tester
80	Lily King	7777 Walnut St	Wheaton	Illinois	Customer Support
81	Lucas King	7878 Ash Dr	Wheaton	Illinois	Quality Control
82	Olivia King	7979 Hickory Ln	Wheaton	Illinois	Project Coordinator
83	Benjamin King	8080 Cypress Ct	Wheaton	Illinois	Business Analyst
84	Sophia King	8181 Dogwood Ave	Wheaton	Illinois	Marketing Assistant
85	Ethan King	8282 Magnolia Dr	Wheaton	Illinois	Operations Assistant
86	Mia King	8383 Sycamore Rd	Wheaton	Illinois	Product Support
87	Lucas King	8484 Redwood Ln	Wheaton	Illinois	Business Development
88	Isabella King	8585 Fir St	Wheaton	Illinois	Marketing Specialist
89	Sebastian King	8686 Juniper Ct	Wheaton	Illinois	Product Designer
90	Madison King	8787 Redwood Ln	Wheaton	Illinois	Systems Administrator
91	Wyatt King	8888 Cedar Ave	Wheaton	Illinois	Business Development
92	Skylar King	8989 Birch Dr	Wheaton	Illinois	Marketing Coordinator
93	John King	9090 Elm St	Wheaton	Illinois	Product Designer
94	Chloe King	9191 Maple Ln	Wheaton	Illinois	Systems Administrator
95	Matthew King	9292 Pine Ct	Wheaton	Illinois	Business Development
96	Grace King	9393 Oak Rd	Wheaton	Illinois	Marketing Coordinator
97	David King	9494 Spruce Ave	Wheaton	Illinois	Product Tester
98	Lily King	9595 Walnut St	Wheaton	Illinois	Customer Support
99	Lucas King	9696 Ash Dr	Wheaton	Illinois	Quality Control
100	Olivia King	9797 Hickory Ln	Wheaton	Illinois	Project Coordinator



March 26, 1982
L-82-118

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
Post-TMI Requirements
NUREG-0737 Item II.K.3.2

Attached is our response to your request for additional information concerning NUREG-0737 Item II.K.3.2 which is contained in your letter of February 11, 1982. We trust that this additional information will allow you to complete your evaluation of this item with respect to Turkey Point Units 3 and 4.

Very truly yours,

Robert E. Uhrig
Vice President
Advanced Systems & Technology

REU/PKG/ras

Attachment

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

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ATTACHMENT

Re: Turkey Point Units 3 & 4
Docket Nos. 50-250 and 50-251
Post-TMI Requirements
NUREG-0737 ITEM II.K.3.2

1. A calculation of safety valve failure rates based on past histories of the operating plants designed by the NSSS vendors.

As discussed in WCAP-9804, Appendix II, no attempt was made to identify a safety valve failure probability based on actual demand. The lack of sufficient data precludes a statistical approach. This was recognized in both the WASH-1400 and EPRI NP-801 studies which used an "engineering estimate" for the safety valve failure rate. These studies also used the PORV failure probability value for that of the safety valve. Indeed, when one considers the ASME code requirements, the strict adherence to quality assurance specifications (i.e., Appendix B to 10 CFR 50), the design and manufacture of the safety valve, it may be surmised that the PORV failure rate is overly conservative when applied to the safety valve.

2. An analysis of the probability of a small-break LOCA caused by a stuck-open safety valve using the safety valve failure rate calculated in Question 1. Since operating data indicate that some plants operate with the block valve shut and others block all PORV's some of the time, the analysis provided should account for the additional challenges to the safety valves when PORV(s) are blocked intentionally.

The sensitivity analyses as presented in Tables 3.9 and 3.10 do account for the additional challenges to the safety valves when the PORV's are intentionally blocked. The values of 10, 55 (baseline), and 90 percent for PORV isolation were used to gain insight into the range of safety valve failure frequency obtainable. The frequency of a safety valve failing open did increase (from a total of $.31E-05$ to $.15E-04$ total) over the range from 10 to 90 percent.

3. Further clarification of the sources and the method used to determine the initiator event frequencies. Specifically, describe why only 16 transient initiators are considered in the Westinghouse generic report. Describe the method used to group the transient initiators and to arrive at the resultant frequencies.

As discussed in Section 3.1, the transients chosen as initiating events are only those transients which have the potential for opening the PORV; i.e., while the EPRI NP-801 study uses 41 transient initiators, not all would lead to PORV lifting. Additionally, the system response to certain transients is similar and permits enveloping analyses. For example, the loss of main feedwater event (transient number T1) envelopes 10 of the EPRI stated events.



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The source used to determine the event frequencies was EPRI report NP-801 where applicable. Those events not covered by EPRI were determined through conservative engineering judgment and used as a basis WASH-1400 or other ongoing studies (i.e., Indian Point/Zion).

The following table gives the source for each event frequency considered (EPRI events are listed by number):

EVENT TREE INITIATING EVENTS CONSIDERED

<u>Transient Number</u>	<u>Transient Name</u>	<u>Source of Event Frequency</u>
T1	Loss of main feedwater, offsite power available	*Conservative Engineering Judgment
T2	Loss of main feedwater due to and coincident with loss of offsite A/C Power	EPRI-35
T3	Loss of main feedwater coincident with loss of all A/C power	Conservative Engineering Judgment
T4	Turbine trip	EPRI-33
T5	Large load rejection without turbine trip	Conservative Engineering Judgment
T6	MSIV closure - all loops	EPRI-18
T7A	Inadvertent safety injection - high head plants**	EPRI-9
T7B	Inadvertent safety injection - low head plants**	
T8	Main feedline rupture	Conservative Engineering Judgment
T9A	Main steamline rupture - high head plants**	
T9B	Main steamline rupture - low head plants**	
T10	CVCS malfunction resulting in power increase	EPRI-11

*Combination of EPRI 15, 16, 21, 22, 23, 24, 26, 27, 28, 29 transients

** High head plants are those with SI pumps capable of challenging the PORV's. Low head plants are the others.

EVENT TREE INITIATING EVENTS CONSIDERED
(cont'd)

<u>Transient Name</u>	<u>Transient Name</u>	<u>Source of Event Frequency</u>
T11	Partial loss of reactor coolant flow (1 loop)	EPRI-1
T12	Complete loss of reactor coolant flow	EPRI-14
T13	Locked (or sheared) reactor coolant pump rotor	Conservative Engineering Judgment
T14	Uncontrolled bank withdrawal resulting in power increase	EPRI-2
T15	Inadvertent PORV opening	EPRI-8
T16	Excessive steam generator tube leakage or tube rupture	EPRI-26

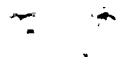
4. A justified estimate of how many multiple PORV openings per transient could be expanded with each initiator event.

The available data is insufficient to warrant calculation of the number of multiple openings for each initiator event. As discussed, the survey data is considered to be essentially complete only for those transients occurring after the issuance of Reference 7. An approximation of multiple PORV openings based on all transient initiators is discussed in the report.

5. An explanation of the analysis yielding the PORV failure rate of 1×10^{-3} per demand.

As stated in WCAP-9804, WASH-1400 (Reference 4 rather than Reference 3) estimates the probability of a PORV failing to reclose on demand to be approximately 10^{-2} , with lower and upper bounds of 10^{-3} and 10^{-1} , respectively. WASH-1400 treats these estimates as the median 5th and 95th percentiles of a lognormal distribution. Given the domestic Westinghouse data presented in Appendix 1 of WCAP-9804, the WASH-1400 distribution can be updated by applying Bayesian techniques. Statistical analysis yields a median estimate of approximately 10^{-3} per demand, which is the value used in the Westinghouse analysis.

6. Show that the assumptions made and credits taken for plant reconfigurations and non-design improvements in the Westinghouse generic report are appropriate for TP-3 and TP-4.



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The information provided to Westinghouse by the utility pertaining to plant reconfigurations and non-design improvements is reflected in Table 1.3. The effects on the study due to these changes is discussed in Sections 3.4.2 and 3.4.3 with the conclusions given in Section 4.0.



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