

April 14, 1997

FOR: The Commissioners  
 FROM: L. Joseph Callan /s/  
 Executive Director for Operations  
 SUBJECT: PERFORMANCE ISSUES RELATED TO OWNERSHIP STRUCTURE

## PURPOSE:

To forward to the Commission the results of the staff's evaluation of the performance of licensees with an ownership structure similar to Maine Yankee. No Commission action is requested or required.

## BACKGROUND:

The Independent Safety Assessment (ISA) of Maine Yankee Atomic Power Company issued in October 1996 examined a number of financial and economic issues relating to plant performance. The ISA report noted as deficiencies "weak identification and resolution of problems; weak scope, rigor, and evaluation of testing; and declining material condition." The report also named two closely related root causes: "(1) economic pressure to be a low-cost energy producer has limited available resources to address corrective actions and some plant improvement upgrades and (2) there is a lack of a questioning culture which has resulted in the failure to identify or promptly correct significant problems in areas perceived by management to be of low safety significance."

The Maine Yankee Atomic Power Company (MYAPCo), the licensee for the Maine Yankee plant is both the owner and operator. MYAPCo in turn is owned by 10 utilities in the New England region. The owners have exclusive rights to the power generated by Maine Yankee, and they are also required to provide for the operating costs, capital expenses, and decommissioning funds for the plant. Unlike most other utilities, MYAPCo does not retain earnings and does not set aside reserve funds for unplanned requirements, except for those required by law. The owner utilities are required to finance from their own operating budgets unexpected emergent expenses that exceed the amount left in a \$5 million fund established for emergent work.

In a staff requirements memorandum dated November 15, 1996, the Commission asked the staff to identify other licensees who have an ownership structure similar to Maine Yankee and to discuss the performance of those licensees, particularly how performance may be impacted by the financial arrangements that result from such ownership structures.

## DISCUSSION:

In order to examine whether there was a correlation between ownership structure and performance, the staff grouped operating reactor units into five groups according to differing ownership and operating arrangements. Various performance indicators were examined for possible correlations between categories of ownership and performance to determine whether any conclusions could be drawn. A list of the groups follows:

**Group 1:** Plants with multiple owners of an operating company that owns and operates a single plant. The owners own all the stock of the operating company and the Federal Energy Regulatory Commission (FERC) regulates the plant and determines wholesale power rates.

Haddam Neck (no longer operating)  
 Maine Yankee  
 Vermont Yankee

**Group 2:** Plants operated by operating companies that do not own the plants.

Arkansas Nuclear 1, 2	Seabrook
Grand Gulf	TMI 1
Farley 1, 2	Waterford
Hatch 1, 2	Wolf Creek
Oyster Creek	Vogtle
River Bend	

**Group 3:** Plants owned by more than one utility company and operated by one of the investor-owned utility owners.

Beaver Valley 1, 2	North Anna 1, 2
Brunswick 1, 2	Palo Verde 1, 2, 3
Catawba 1, 2 <sup>(1)</sup>	Peach Bottom 2, 3
Clinton	Perry 1
Crystal River 3	Quad Cities 1, 2
Davis-Besse	Salem 1, 2
Duane Arnold	San Onofre 2, 3
Harris 1	South Texas 1, 2
Hope Creek	St. Lucie 2
Kewaunee	Summer 1

Millstone 1, 2, 3

Susquehanna 1, 2

Nine Mile Point 2

**Group 4:** Plants owned and operated by a single investor-owned utility company.

Big Rock Point

Monticello

Braidwood 1, 2

Nine Mile Point 1

Byron 1, 2

Oconee 1, 2, 3

Callaway 1

Palisades

Calvert Cliffs 1, 2

Pilgrim 1

Comanche Peak 1, 2

Point Beach 1, 2

Cook 1, 2

Prairie Island 1, 2

Diablo Canyon 1, 2

Robinson 2

Dresden 2, 3

St. Lucie 1

Fermi 2

Surry 1, 2

Ginna

Turkey Point 3, 4

Indian Point 2

Zion 1, 2

LaSalle 1, 2

Limerick 1, 2

McGuire 1, 2

**Group 5:** Plants owned and operated by governmental authorities.

Browns Ferry 2, 3

Indian Point 3

Cooper

Sequoyah 1, 2

FitzPatrick

WNP 2

Fort Calhoun 1

The measures selected for examination were intended to provide a general, macroscopic overview across these ownership groups that may be indicative of a correlation between ownership structure and performance. Therefore, a variety of indicators was selected for this preliminary look. The first measures selected for evaluation were (1) long-term (five to seven cycles per unit) SALP averages in the Operations and Maintenance categories, (2) the number of times a unit appeared in Categories 2 and 3 on the "Watch List,"<sup>(2)</sup> and (3) the number of times a unit appeared on the "superior performer" list. The staff also examined long-term (540 days for operations or 180 days shutdown experience) trend deviations of the individual units from their nuclear steam supply system (NSSS) peer group taken from the Performance Indicator Report prepared by the Office for Analysis and Evaluation of Operational Data. The trend data consisted of scrams, safety system failures (SSFs), design construction installation fabrication problems (DCIFs), forced outage rate (FOR), and equipment forced outage rate per 1000 critical commercial hours (EQFOR/K). The above performance data are arranged by power plant unit and ownership group and are tabulated in [Attachment 4](#).

In order to detect a correlation between the performance data and the ownership group, the staff developed three charts to visually display the data.

[Attachment 1](#), "SALP - Operations and Maintenance" displays the groups' average SALP rating in these areas. [Attachment 2](#), "Watch and Superior Performer Lists," displays the groups' average number of times on the lists, on a unit basis, for each of the five ownership groups. Overall, some correlations by ownership group are indicated. In general, the plants in Groups 1, 2, and 3 indicate the best overall average performance when considering these measures. Group 4 units (single utility owned and operated) are placed on the superior performer list more often than the plants in Group 1 through 3.<sup>(3)</sup> However, Group 4 plants have appeared on the average more often on the Watch List than the plants in Groups 1 through 3. Group 5 units (government/municipal owned and operated), indicated worse average group performance in all measures compared with the other groups.

To compare the performance by ownership group of performance indicator longterm trend deviation data, the staff averaged the individual unit's trends. These deviations are centered around zero; negative deviations reflect worse performance (e.g. -0.2 for scrams represents a higher average frequency). [Attachment 3](#) is a bar chart by ownership group with the different trends illustrated in an attempt to detect performance correlation by group. Average performance for a group would be represented by the bar chart centered around zero. For a better performing group, the bars would be centered around a more positive number. Although the differences are not dramatic, the best performing group would appear to be Group 2, followed in order by Groups 3, 4, 5, and 1. Overall, there was a wide variability in these data, especially when examining Group 1 plants (three units). This is expected for Group 1, considering that the individual parameter deviation data should tend toward a smaller magnitude average deviation as the number of units in the sample increases. Group 1 plants are shown as experiencing more safety system failures during operation and more design/construction/installation/fabrication (DCIF) problems during operation than plants in other groups. The number of DCIF problems may be a misleading indicator since a plant going through a design basis reconstitution might show a peak in this area which would not necessarily indicate poor performance and could be indicative of a proactive corrective action program. The Group 1 plants do better than other groups in the frequency of scrams during operation and in the equipment forced outage rate per thousand commercial critical hours (EQFOR/K).

Overall, the staff's examination of various performance measures, binned into various ownership categories, did not indicate that there was a readily apparent tie between an ownership structure such as that of MYAPCo (a Group 1 plant), with its attendant financial arrangements, and performance, as measured by the existing NRC methods.

The Office for Analysis and Evaluation of Operational Data is also working to develop a variety of potential financial performance indicators. We will keep the Commission informed of the results of this effort and our plans to utilize financial performance indicators in future reactor oversight activities.

COORDINATION:

This paper has been coordinated with the Office for Analysis and Evaluation of Operational Data.

L. Joseph Callan  
Executive Director for Operations

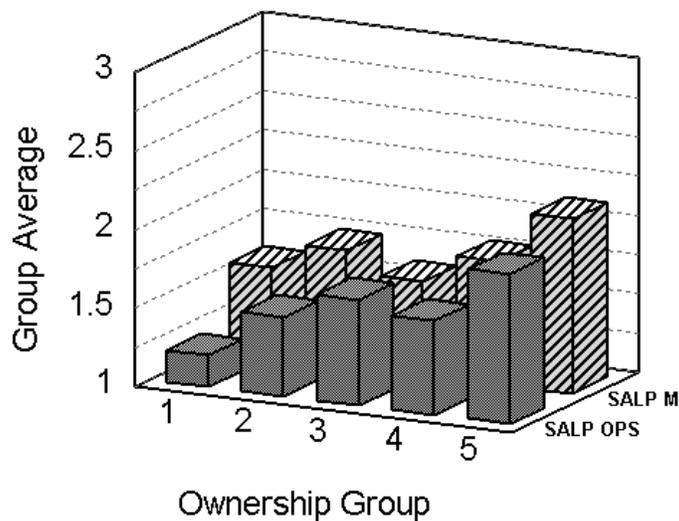
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415-1289

- Attachments:
1. [Chart, SALP - Operations and Maintenance Averages by Group](#)
  2. [Chart, Watch List and Superior Performance Lists](#)
  3. [Chart, Performance Indicator Group Average Peer Group Deviations](#)
  4. [Table of Performance Data for All Units by Ownership Group](#)

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ATTACHMENT 1

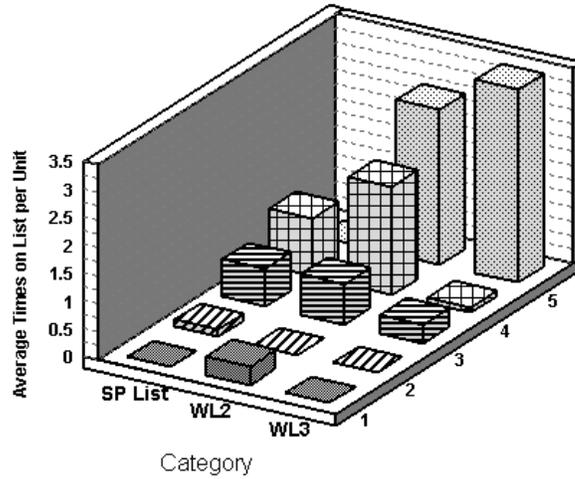
### SALP-Operations and Maintenance Lower is Better



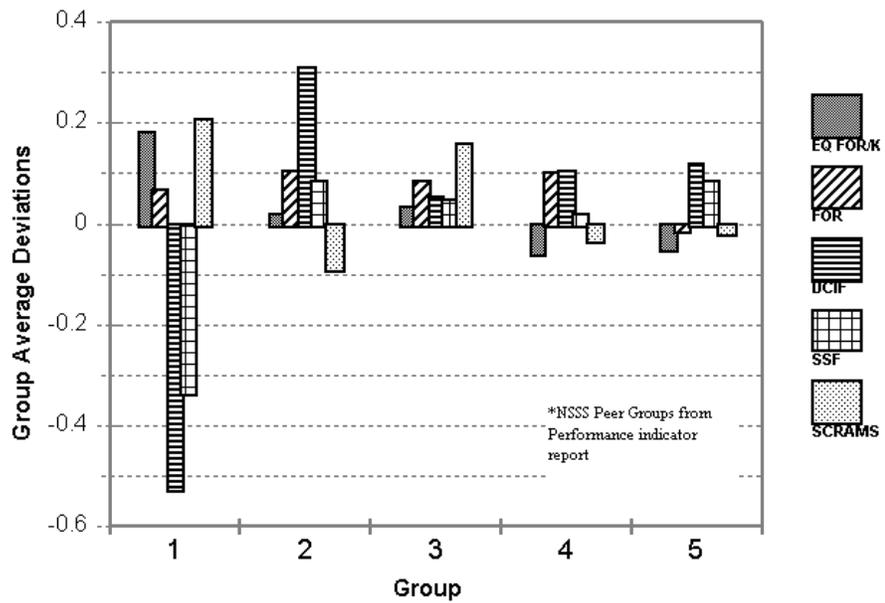
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ATTACHMENT 2

### Watch and Superior Performer Lists By Ownership Group



### Performance Indicator Group Average Peer\* Group Deviations by Category



ATTACHMENT 3

Attachment 3

ATTACHMENT 4

### Performance Data for All Units by Group

Group	DOCKET NO.	Power Plant	Watch List Cat.		Superior	SALP Averages		Number of SALPs	Long Term Trend Deviations, Performance Indicator Report					
			WL2	WL3	Performer	Operations	Maintenance		Scrams	SSF	DCIF	FOR	EQ FOR/K	
Group 1: Plants operated by a holding company that owns the plant														

1	50-213	Haddam Neck				1.20	1.80	5	0.45	-0.79	-0.33	-0.1	-0.18
1	50-309	Maine Yankee	1			1.00	1.50	6	-0.28	0	-0.69	-0.28	0.21
1	50-271	Vermont Yankee				1.40	1.40	5	0.45	-0.22	-0.56	0.58	0.51
Group 1 Total Times on List			1	0	0								
3		Group 1 Average				1.20	1.57		0.21	-0.34	-0.53	0.07	0.18
Group 2: Plants operated by operating companies that do not own the plant													
2	50-313	Arkansas 1				1.29	2.00	7	-0.85	0.26	0.26	0.02	-0.72
2	50-368	Arkansas 2				1.29	2.00	7	0	0	0.77	-0.03	-0.36
2	50-348	Farley 1				1.20	1.60	5	0	-0.22	0	-0.01	0.26
2	50-364	Farley 2				1.20	1.60	5	-0.28	0	0	-0.02	-0.18
2	50-416	Grand Gulf 1			3	1.00	1.20	5	-0.99	-0.9	0.26	0	-0.81
2	50-321	Hatch 1				1.40	1.60	5	-0.28	0.26	0.9	0.4	0
2	50-366	Hatch 2				1.40	1.60	5	0.45	0.78	0.9	-0.01	0
2	50-219	Oyster Creek				2.00	2.00	6	-0.28	0.52	0.64	0	0.26
2	50-458	River Bend 1				1.67	2.17	6	0.68	0.45	0	0.16	0.64
2	50-443	Seabrook 1				1.80	2.00	5	0	0.13	0	-0.01	-0.09
2	50-289	Three Mile Is 1			1	1.33	1.33	6	0.45	0.52	0.77	0.52	0.51
2	50-424	Vogtle 1				1.86	1.57	7	0	-0.17	-0.13	-0.01	0.39
2	50-425	Vogtle 2				1.80	1.60	5	0	0.13	0.26	0.53	0.64
2	50-382	Waterford				1.50	1.50	6	0	-0.23	0	-0.13	-0.18
2	50-482	Wolf Creek				1.83	2.00	6	-0.28	-0.28	0	0.16	-0.09
Group 2 Total Times on List			0	0	4								
15		Group 2 Average				1.50	1.72		-0.09	0.08	0.31	0.10	0.02
Group 3: Plants owned by multiple utilities and operated by one													
3	50-334	Beaver Valley 1				1.33	1.67	6	0	0.26	-0.07	-0.1	0
3	50-428	Beaver Valley 2				1.33	1.67	6	0	0.39	0.26	0.51	0.39
3	50-325	Brunswick 1	4			1.71	2.14	7	0	0	-0.03	0.15	-0.18
3	50-324	Brunswick 2	4			1.71	2.14	7	0.9	0.52	0.39	0.37	-0.18
3	50-413	Catawba 1				2.00	2.00	6	0.45	-0.06	0.26	0.3	-0.09

3	50-414	Catawba 2				2.00	2.00	6	-0.57	-0.72	0.26	-0.1	-2.25
3	50-461	Clinton				1.67	1.67	6	0.22	0	0.51	-0.05	-0.45
3	50-302	Crystal River 3	1			1.83	2.00	6	0	-0.9	-0.92	-0.14	0
3	50-346	Davis-Besse			1	1.80	1.40	5	0.45	0.26	0.26	0.52	0.51
3	50-331	Duane Arnold				1.50	2.00	6	0.45	0.52	1.16	0.57	0.51
3	50-400	Harris 1			2	1.00	1.60	5	-0.57	0.13	-0.07	-0.05	-0.45
3	50-354	Hope Creek				1.20	1.80	5	0.68	-0.67	-0.13	0.01	0.64
3	50-305	Kewaunee			3	1.00	1.40	5	-0.85	0	1.03	0.07	0
3	50-245	Millstone 1	1	2		1.60	1.60	5	0.9	-0.45	-0.49	-0.03	0.26
3	50-336	Millstone 2	1	2		1.80	2.20	5	0.45	-0.56	-0.83	-0.11	0.04
3	50-423	Millstone 3	1	2		2.00	1.60	5	0.45	-0.62	0	-0.27	0.39
3	50-410	Nine Mile Pt 2	5			2.00	2.29	7	0.68	0.52	-0.2	0.39	0.64
3	50-338	North Anna 1			1	1.00	1.60	5	0	0	0.26	0.24	0.26
3	50-339	North Anna 2			1	1.00	1.60	5	0	0.26	0	0.26	0.26
3	50-528	Palo Verde 1				2.00	2.00	7	-0.57	0.26	-0.07	-0.03	-0.18
3	50-529	Palo Verde 2				2.00	2.00	7	0	-0.23	-0.26	0.11	0
3	50-530	Palo Verde 3				2.00	2.00	7	0.45	-0.11	-0.2	0.12	0
3	50-277	Peach Bottom 2	2	3		1.71	1.86	7	0.9	0.78	-0.03	0.69	0.77
3	50-278	Peach Bottom 3	2	3		1.71	1.86	7	0	0.52	-0.03	0.08	-0.18
3	50-440	Perry 1				2.00	2.00	5	-0.71	0.78	-0.13	-0.04	-0.81
3	50-254	Quad Cities 1				2.33	2.33	6	0.45	-0.45	-0.03	-0.4	0
3	50-265	Quad Cities 2				2.33	2.33	6	0	-0.56	-0.16	-0.59	-0.9
3	50-272	Salem 1				2.40	2.20	5	-0.67	-0.56	-0.85	0.93	-0.7
3	50-311	Salem 2				2.40	2.20	5	0.24	-0.05	-0.59	1.39	-0.34
3	50-361	San Onofre 2				1.50	1.83	6	0.9	0.26	0.26	0.06	0.26
3	50-362	San Onofre 3				1.50	1.83	6	0.9	0.26	0.51	0	0.26
3	50-498	South Texas 1	3			1.83	1.67	6	-0.28	0.39	0.51	0.41	0.64
3	50-499	South Texas 2	3			1.83	1.67	6	-0.28	0.39	0.51	0.3	0.13
3	50-389	St. Lucie 2			5	1.20	1.40	5	0	0.26	0.39	0.77	-0.21
3	50-395	Summer 1			6	1.20	1.00	5	0.45	0.39	0	0.6	0.64
3	50-387	Susquehanna			3	1.20	1.00	5	0.22	0.26	0.26	0.76	0.9

		1											
3	50-388	Susquehanna 2			3	1.20	1.00	5	0.22	0.26	0.26	0.03	0.64
	Group 3 Total Times on List		27	12	25								
37		Group 3 Average				1.67	1.80		0.16	0.05	0.05	0.08	0.03
	Group 4: Plants owned and operated by a single utility												
4	50-155	Big Rock Point				1.67	2.00	6	0	0.78	0.64	-0.03	-0.18
4	50-456	Braidwood 1				1.83	1.33	6	0	-0.17	0.26	-0.04	0.13
4	50-457	Braidwood 2				1.83	1.33	6	0.45	-0.28	0	0.33	0.39
4	50-454	Byron 1			3	1.20	1.00	5	0	0.39	-0.07	0.09	0.39
4	50-455	Byron 2			3	1.20	1.00	5	0.45	-0.17	0.51	0	0.39
4	50-483	Callaway 1			9	1.20	1.00	5	-0.28	0.39	0.77	0.16	-0.45
4	50-317	Calvert Cliffs 1	9			1.67	2.17	6	0.45	0	0.13	-0.04	-0.39
4	50-318	Calvert Cliffs 2	9			1.67	2.17	6	0	0.26	0.39	1.06	0.99
4	50-445	Comanche Pk 1				1.80	1.80	5	-0.85	-0.17	-0.07	-0.05	-0.63
4	50-446	Comanche Pk 2				1.67	1.67	3	-0.57	0.13	0.26	-0.05	-0.27
4	50-315	Cook 1				1.50	1.83	6	0	0.9	0.64	-0.02	0.9
4	50-316	Cook 2				1.50	1.83	6	-0.57	1.16	0.64	0.88	0.9
4	50-275	Diablo Canyon 1			7	1.33	1.67	6	-0.28	-0.51	-0.07	0.03	-0.09
4	50-323	Diablo Canyon 2				1.33	1.67	6	0	-0.39	-0.07	0.01	0.13
4	50-237	Dresden 2	14			2.17	2.00	6	0.9	-1.05	-0.98	-0.82	-0.01
4	50-249	Dresden 3	14			2.17	2.00	6	-0.85	-1.01	-0.82	0.88	-0.36
4	50-341	Fermi 2	5			2.33	2.33	6	-0.14	0	-0.07	-0.1	0.64
4	50-244	Ginna				1.80	1.60	5	0	0.52	0	-0.06	-0.54
4	50-247	Indian Point 2				1.33	1.67	6	-0.85	0.12	0.13	0.9	-0.27
4	50-373	LaSalle 1	1			1.40	2.17	5	-0.43	0	0	-0.1	-0.81
4	50-374	LaSalle 2	1			1.40	2.17	5	0.68	-0.22	-0.2	-0.04	-0.09
4	50-352	Limerick 1				1.00	1.33	6	-0.43	-0.22	0.26	-0.01	-0.45
4	50--353	Limerick 2				1.00	1.33	6	-0.43	-0.11	0.51	0.57	-0.27

4	50-369	McGuire 1				2.00	2.17	6	0	0.13	0.26	0.1	-0.63
4	50-370	McGuire 2				2.00	2.17	6	0	-0.06	-0.07	-0.14	-0.45
4	50-263	Monticello			2	1.17	1.17	6	0	0	0.39	0.37	0
4	50-220	Nine Mile Pt 1	5			2.00	2.33	7	0	1.04	-0.03	0.06	-0.72
4	50-269	Oconee 1				1.50	2.00	6	0	-0.11	-0.07	0	0
4	50-270	Oconee 2				1.50	2.00	6	0	0	0	-0.07	-0.72
4	50-287	Oconee 3				1.50	2.00	6	-0.28	-0.11	-0.07	-0.02	-0.54
4	50-255	Palisades	1	1		1.80	1.60	5	0.45	-0.23	-0.3	0.51	-0.03
4	50-293	Pilgrim 1		3		1.67	2.00	6	0.45	-0.11	0.39	-0.02	0.26
4	50-266	Point Beach 1				1.67	1.67	6	0	0	0	0	0.26
4	50-301	Point Beach 2				1.67	1.67	6	-0.28	0	0.26	0.1	0.26
4	50-282	Prairie Is 1			4	1.00	1.00	5	0	-0.11	-0.2	0.06	0.51
4	50-306	Prairie Is 2			4	1.00	1.00	5	-0.57	-0.11	-0.26	0	0
4	50-261	Robinson 2				1.83	2.17	6	0	0.26	0.51	0.12	0
4	50-335	St. Lucie 1			5	1.20	1.40	5	-0.28	-0.11	-0.03	-0.17	-1.29
4	50-280	Surry 1	3			1.67	2.33	6	0.45	0.26	0.26	0.24	0.26
4	50-281	Surry 2	3			1.67	2.33	6	-0.57	0	0	-0.07	-0.54
4	50-250	Turkey Point 3	5		1	1.40	1.80	5	0	-0.22	-0.07	-0.02	-0.54
4	50-251	Turkey Point 4	5		1	1.40	1.80	5	0.45	0	0.51	0.07	0
4	50-295	Zion 1	5			2.33	2.33	6	0	0.12	0.39	0.17	0.39
4	50-304	Zion 2	5			2.33	2.33	6	1.35	-0.17	-0.03	1.41	0.9
	Group 4 Total Times on List		85	4	46								
44		Group 4 Average				1.60	1.78		-0.04	0.02	0.11	0.10	-0.06
	Group 5: Plants owned and operated by governmental authorities												
5	50-260	Browns Ferry 2	2	7		1.25	2.25	4	-0.28	0	0.64	0.38	0.51
5	50-296	Browns Ferry 3	7	17				0	-0.9	-0.13	0.71	0.05	-0.7
5	50-298	Cooper				1.60	2.20	5	0.9	-0.22	-0.23	-0.08	0.77
5	50-333	FitzPatrick	4			2.00	2.17	6	0	-0.11	0.13	-0.07	0.51
5	50-285	Fort Calhoun 1	2			2.00	2.00	6	0	0.26	0.13	0.39	0.21

5	50-286	Indian Point 3	8			2.20	2.00	5	1.35	-0.08	-0.1	-0.9	-0.47
5	50-327	Sequoyah 1	1	4		2.14	2.14	7	-0.57	0.39	-0.07	-0.04	-0.81
5	50-328	Sequoyah 2	1	3		2.14	2.14	7	-0.28	0.39	-0.07	-0.04	-0.63
5	50-397	WNP 2				2.29	2.00	7	-0.43	0.26	-0.07	0.2	0.13
	Group 5 Total Times on List		25	31	0								
9		Group 5 Average				1.95	2.11		-0.02	0.08	0.12	-0.01	-0.05

1. Catawba 2, although owned by two publicly owned utilities, is operated by Duke.

2. Watch List Category 2 are those plants authorized to operate that the NRC will monitor closely. Although these plants are being operated in a manner that adequately protects public health and safety, they are having or have had weaknesses that warrant increased NRC attention from both headquarters and the associated regional office. A plant will remain in this category until the licensee either demonstrates a period of improved performance or until a further deterioration of performance results in the plant being placed in Category 3.

Watch List Category 3 are shut down plants requiring NRC authorization to start up and that the NRC will monitor closely. These plants are having or have had significant weaknesses that warrant maintaining the plant in a shutdown condition until the licensee can demonstrate to the NRC that adequate programs have both been established and implemented to ensure substantial improvement. The Commission must approve restart of a plant in a Category 3 status.

3. The criteria for consideration as a superior performance changed following the June 1994 Senior Management Meeting. Starting with the January 1995 SMM, only plants with SALP reports issued during the prior 6 months were eligible for superior performer consideration. Under the previous criteria plants were considered at each SMM based on their last SALP scores.