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THADANI, A. C. PWR Project Directorate 8

SUBJECT: Forwards response to NRC 860930 request for addl info re util 860228 application for amend to License DPR-67, extending license expiration date to 160301.

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FLORIDA POWER & LIGHT COMPANY

NOVEMBER 14 1986

L-86-458

Office of Nuclear Reactor Regulation
Attention: Mr. Ashok C. Thadani, Director
PWR Project Directorate #8
Division of PWR Licensing - B
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Mr. Thadani:

Re: St. Lucie Unit 1
Docket No. 50-335
Operating License Expiration Date

By letter L-86-66, dated February 28, 1986, Florida Power & Light Company (FPL) proposed to extend the date of expiration of the St. Lucie Unit 1 operating license so that the forty year term of the license begins with the issuance of the operating license rather than the date of issuance of the construction permit. The expiration date of the operating license of St. Lucie Unit 1 would be extended from July 1, 2010 to March 1, 2016.

By letter dated September 30, 1986 (E. G. Tourigny to C. O. Woody), the NRC identified additional information required to continue its review of the proposed license amendment. The attached responds to the staff's request for additional information.

Please contact us if you have any questions about this submittal.

Very truly yours,

C. O. Woody
Group Vice President
Nuclear Energy

COW/EJW/gp

Attachment

cc: Dr. J. Nelson Grace, USNRC, Region II
Harold F. Reis, Esquire, Newman & Holtzinger

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PEOPLE . . . SERVING PEOPLE

REQUEST FOR ADDITIONAL INFORMATION
LICENSE EXTENSION FOR ST. LUCIE UNIT 1

REQUEST 1. ALARA MEASURES

Discuss specific ALARA measures which will be utilized during the seven additional years of service.

RESPONSE 1.
FPL COMMITMENT TO ALARA

Florida Power and Light Company is committed to ensure that radiation exposure to personnel is kept as low as reasonably achievable (ALARA). ALARA means that anytime personnel exposure can be effectively reduced without excessive cost, it should be done. This includes total person-rem exposure for the facility as well as individual exposure. This requires a general awareness by all personnel that they should make every reasonable effort to avoid any exposure that is not necessary to accomplish their work assignment. Examples of ALARA techniques that are evaluated include adequate training of personnel working in the radiation controlled area (RCA), preplanning of job activities, installation of shielding, and design review of new facilities or plant modifications. The present emphasis on ALARA is the result of changes in regulations and issuance of regulatory guides that are intended to promote a more formal (documented)approach to the ALARA concept.

Radiation protection is the responsibility of all personnel working in a nuclear plant; therefore, each individual is responsible to ensure that his exposure, as well as all other personnel's exposure, is maintained ALARA.

ALARA EXECUTIVE ORGANIZATION

The Group Vice President of Nuclear Energy has the overall responsibilty for administering the Company ALARA program.

The Vice President of Nuclear Operations has the responsibility to ensure implementation of the Company ALARA program and to evaluate periodically the effectiveness of the program.

The Plant Manager has the responsibility to implement the overall plant ALARA program ensuring the effectiveness of this program and that sufficient resources are available within the plant for support of program implementation.

The Corporate Health Physicist provides basic guidelines for the implementation of ALARA concepts, implementation of the corporate policy and keeping management abreast of the effectiveness of the ALARA program, goals and objectives.

The Plant Health Physics Supervisor has the responsibility to develop, maintain, and supervise the health physics ALARA program at the plant. He is also responsible for periodically evaluating the effectiveness of the program and keeping the Plant Manager abreast of its effectiveness, goals and objectives.

The Health Physics ALARA Coordinator has, as his primary responsibility, the coordination, implementation and monitoring of the health physics program in accordance with established health physics procedures.

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The Health Physics Training Supervisor is responsible for ensuring that an effective training program is maintained stressing the importance of ALARA in personnel's daily activities.

Each department supervisor and contract project leader has the overall responsibility to ensure that every individual under his supervision adheres to the established ALARA program. He verifies the effectiveness of the implementation of this program in his department by routine review of person-rem accumulated, saved and trending and the preplanning of job activities. He is also responsible to incorporate ALARA concepts in design modifications and new facilities.

OPERATIONAL GUIDELINES

The following guidelines should be followed when assessing the need for preplanning job/task activities to maintain exposure as low as reasonably achievable:

1. For any task where the collective dose is estimated to be less than 1 person-rem, no special formal ALARA documentation other than a Radiation Work Permit (RWP) (See Radiation Work Permits below for conditions requiring an RWP) is required.

2. For any task where the collective dose is estimated to exceed 1 person-rem, additional ALARA review should be performed, documented and, if necessary, implemented prior to issuance of an RWP.

3. For any task where the collective dose is estimated to exceed 50 person-rem, in addition to an ALARA review as stated in item 2 above, an historical review of similar tasks performed and the effectiveness of the ALARA techniques used is performed prior to issuance of an RWP.

4. For any task where the collective dose is estimated to exceed 50 person-rem, in addition to item 3 above, a formal, documented, post-operational review of the task documenting the degree of success (or failure) of ALARA techniques used is performed.

Documentation of ALARA reviews is maintained for the specific tasks stated above, as appropriate.

A plant ALARA Review Board periodically evaluates the effectiveness of the plant's ALARA program. The appropriate board personnel normally meet on a quarterly basis and/or after each major outage.

RADIATION WORK PERMITS

The primary purpose of a Radiation Work Permit (RWP) is to provide Health Physics with a vehicle whereby it can evaluate and plan jobs in order to maintain radiation exposure ALARA. The Florida Power & Light Company RWP philosophy is based on the fact that control of radiation and contamination is accomplished primarily by training, Health Physics job surveillance, pre-job planning, post-job evaluation, and special instructions. An RWP normally describes the radiological conditions of a job, the protective clothing, monitoring to be performed, and any other special instructions.

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RWP REQUIREMENTS

An RWP shall be required for the following conditions.

1. Entry into high radiation areas, airborne radioactivity areas, areas contaminated to levels in excess of 10,000 dpm/100 cm^2, or into any area posted as "RWP REQUIRED FOR ENTRY".

2. Entry into the reactor containment at any time during and subsequent to initial reactor startup.

3. Maintenance or inspection of equipment contaminated in excess of 10,000 dpm/100 cm^2.

4. Work assignments involving changes (withdrawing, uncovering, opening, valving, disassembling, moving) that have the following potential as the work progresses:

   a. Exposure of a major portion of the body to a radiation dose in excess of 100 milli-rem in any one hour.

   b. Increasing surface contamination levels to exceed 10,000 dpm/ 100 cm^2.

   c. Increasing airborne radioactivity concentration exceeding 25% of those listed or referred to in 10CFR20 Appendix B, Table I, Column I.

MAINTAINING ALARA IN THE FUTURE

FPL will remain committed to ALARA in the future. Potential enhancements currently under review and/or implementation are ALARA awareness, Robotics and Data Base Management.

ALARA Awareness

Methods and data sheets are being developed to allow every department, through the ALARA Coordinator, to establish an awareness of exposure control goals, track the progress towards those goals and select tasks on which the data indicates the need for special emphasis on radiation exposure reduction.

Robotics

Robotics, as they are developed and approved for use, have the potential for large scale exposure reduction. Robotics have been used for steam generator work and will continue to be evaluated and applied, as appropriate.

Data Base Management

Future efforts in Data Base Management may result in exposure reduction by identifying which jobs in a major evolution result in the most exposure. This serves to target additional exposure control efforts. Subsequent exposure is then tracked to determine the effectiveness of any changes made.

REQUEST 2. DOSE ASSESSMENT

a) Provide a table showing St. Lucie, Unit 1 personnel exposure experiences for the years 1978 thru 1985 indicating the man-rem exposures by plant system, regardless of how these exposures were obtained (e.g., during normal operations, maintenance, repair or refueling activities) and by whom (e.g., by plant operations personnel, plant maintenance personnel, contractor/vendor personnel, etc.)

RESPONSE 2.

a) The yearly exposure data and outage reports for the years 1977 to 1985 were reviewed to determine the man-rem exposures attributable to routine operations and refueling outages. The normal operations exposure is determined as the difference between the site annual total and outage totals.

Each outage is divided into 15 general categories such as pressurizer work, steam generator primary side, etc. The categories are further sub-divided into the applicable RWP numbers and the total man-hours and man-rem data are listed. Table 1 provides the Refueling Outage Summary, and Table 2 provides the Outage Exposure Summary, Category & Year.

REQUEST 2.

b) Provide a similar table for the years 2010 to 2016. Include doses from expected decontamination, decommissioning, additional maintenance and related doses. Provide discussion which confirms that your ALARA program will maintain the state-of-the-art for reducing personnel exposures to a minimum.

RESPONSE 2.

b) An estimate of dose from decommissioning and extensive decontamination was not attempted. Utilizing the data from Tables 1 and 3, predictions of dose for the additional years can be made. The predicted value is 160 man-rem for a non-outage year and 760 man-rem for a refueling outage year. The net Man-Rem is based on typical refueling outage conditions. The exposures attributable to special projects, e.g. thermal shield removal, coolant pump modifications, etc., are not included in the data base for the projections.

This prediction is being treated as an upper value. Dose allowance for crud build-up will be offset by dose savings from a continually improving ALARA program. It is expected that state-of-the-art technologies will be in use including robotics, enhanced chemistry control and modern decontamination processes.

Noting the projected refueling outage schedule for Unit 1 (Table 4) and assuming eighteen month fuel cycles, for the years 2011 to 2016, there will be four additional refueling cycle years and two non-refueling cycle years. For these additional years, the predicted total dose is 3360 man-rem.

TABLE I

REFUELING OUTAGE SUMMARY

Note: This Table does not include refueling dose associatied with 1983 - 1984 outage, which was compounded with Thermal Shield Removal and Core Support Barrel repair

Year	Gross Man-Rem	Adjustments Man-rem	Description	Net Man-Rem
1978	144.25	(6.7)	Neutron Shielding	131.85
		(5.7)	Flammastic Application	
		(12.4)		
1979	263.024	(14.2)	S/G Rim Cut	248.82
1980	446.880	(12.2)	RX Head Stud Modifications	400.56
		(16.4)	Complete Containment Painting	
		(15.12)	TMI Modifications	
		(2.60)	PAR Inc. Equip Modifications	
		(46.32)		
1981	719.829	(159.31)	RCP Modifications	504.42
		(32.34)	Containment Modifications	
		(6.82)	ICI Flange Modification	
		(9.54)	TMI Modifications	
		(4.80)	UGS Modifications	
		(2.60)	Hot Tool Room Construction	
		(215.41)		
1985	1025.835	(254.93)	S/G Mods for Nozzle Dams	651.8
		(44.80)	S/G Tube Pull	
		(42.50)	S/G Tube Sheet Work	
		(21.56)	S/G Secondary Special Work	
		(10.26)	Plant Modifications	
		(374.05)		

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TABLE 2

OUTAGE EXPOSURE SUMMARY, CATEGORY & YEAR

Activity Category	Man Year	Man Hours(MH)	Man REM(MR)
Decon & Clean Up	1978	1,282.4	11.375
	1979	972.4	7.530
	1980	215.9	2.825
	1981	5,351.5	28.290
	1982	116.8	1.205
	'83-'84	35,423.3	172.880
	1985	8,719.0	85.610
		(TOT) 52,081.3	(TOT) 309.715
Reactor Head Work	1978	3,318.7	60.070
	1979	3,617.6	80.822
	1980	5,528.1	161.925
	1981	4,269.1	106.815
	1982	Steam Generator Inspection Outage	
	'83-'84	5,344.0	117.880
	1985	4,356.5	82.340
		(TOT) 26,434.0	(TOT) 609.852
Pressurizer Work	1978	170.5	1.520
	1979	506.6	8.470
	1980	1,094.3	16.718
	1981	800.1	10.960
	1982	296.4	10.355
	'83-'84	301.9	6.465
	1985	356.7	9.050
		(TOT) 3,526.5	(TOT) 63.538
Keyway	1978 304.2	0.945	.003
	1979	349.2	1.950
	1980	5,686.7	16.400
	1981	134.0	1.195
	1982	18.0	0.340
	'83-'84	9,209.2	59.83
	1985	79.9	3.63
		(TOT) 15,981.2	(TOT) 84.29

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TABLE 2 (cont'd)
OUTAGE EXPOSURE SUMMARY, CATEGORY & YEAR (cont'd)

Activity Category	Year	Man Hours (MH)	Man Rem (MR)
Steam Generator Primary Job	1978	381.8	6.175
	1979	1,156.0	16.755
	1980	1,165.0	13.505
	1981	2,874.9	130.160
	1982	1,048.0	24.360
	'83-'84	6,988.1	396.185
	1985	7,113.2	458.305
		(TOT) 20,727.0	(TOT) 1,045.895
Steam Generator Secondary Side	1978	55.5	4.320
	1979	306.3	5.940
	1980	81.9	3.420
	1981	13.7	4.200
	1982	48.4	0.775
	'83-'84	231.5	7.860
	1985	975.5	25.300
		(TOT) 1,712.8	(TOT) 51.915
Reactor Coolant Pumps	1978	802.2	10.470
	1979	2,145.3	23.009
	1980	3,332.3	35.857
	1981	5,719.0	64.052
	1982	386.2	9.255
	'83-'84	1,788.7	40.170
	1985	2,708.9	47.105
		(TOT) 16,882.6	(TOT) 229.918
Refueling Work	1978	477.3	3.130
	1979	1,384.4	8.200
	1980	862.5	7.255
	1981	1,920.2	15.760
	1982	Steam Generator	Inspection Outage
	'83-'84	5,212.7	36.740
	1985	1,654.2	14.865
		(TOT) 11,511.3	(TOT) 85.95

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TABLE 2 (Cont'd)
OUTAGE EXPOSURE SUMMARY, CATEGORY & YEAR (cont'd)

Activity Category	Man Year	Man Hours (MH)	Man Rem (MR)
Routine Maintenance	1978	1,773.9	23.460
	1979	2,062.6	33.210
	1980	4,038.1	56.635
	1981	5,575.6	60.236
	1982	227.5	2.915
	'83-'84	3,288.7	23.915
	1985	1,346.2	9.845
		(TOT) 18,312.6	(TOT) 210.216
Special Maintenance	1978	719.6	10.385
	1979	587.9	4.555
	1980	213.9	2.870
	1981	1,098.8	16.360
	1982	195.0	3.395
	'83-'84	16,090.3	148.340
	1985	12,593.4	109.175
		(TOT) 31,498.9	(TOT) 295.080
Plant Modifications	1978	2,144.9	6.010
	1979	424.4	14.710
	1980	5,098.3	29.790
	1981	18,424.1	182.175
	1982	No Plant Mods during S/G Outage	
	'83-'84	28,764.8	191.40
	1985	3,230.1	10.565
		(TOT) 58,086.6	(TOT) 434.39
Calibration	1978	Cal Data Not Segregated before 1980	
	1979		
	1980	4.0	0.135
	1981	679.0	7.165
	1982	101.1	2.245
	'83-'84	899.6	11.765
	1985	913.9	8.745
		(TOT) 2,597.6	(TOT) 30.055

TABLE 2 (Cont'd)
OUTAGE EXPOSURE SUMMARY, CATEGORY & YEAR (cont'd)

Activity Category	Man Year	Man Hours (MH)	Man Rem (MR)
Ventilation, Filters, Coolers, etc.	1978	Data not segregated/Work not done	
	1979	37.6	0.435
	1980	46.5	1.975
	1981	33.1	0.350
	1982	10.7	0.140
	'83-'84	964.8	3.215
	1985	412.4	2.160
		(TOT) 1,505.1	(TOT) 8.275
General Entries & Inspections	1978	551.0	4.995
	1979	7,715.8	48.198
	1980	10,523.4	95.885
	1981	8557.1	73.871
	1982	1,379.0	18.710
	'83-'84	38,052.1	244.505
	1985	21,240.9	147.850
		(TOT) 88,019.3	(TOT) 634.014
Miscellaneous	1978	110.4	1.490
	1979	1,413.6	9.240
	1980	166.7	1.670
	1981	1,942.2	17.790
	1982	51.8	1.035
	'83-'84	Misc Dose Data included in TSR/CSBR (below)	
	1985	2,889.4	11.190
		(TOT) 6,574.1	(TOT) 42.415
Thermal Shield Removal/Core Support Barrel Repair (TSR/CSBR)	'83-'84	59,105.8	504.920

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TABLE 3

DERIVATION OF "NORMAL OPERATIONS" EXPOSURE

Year	Total Man-Rem	Outage Man-Rem		Net Oprng Man-Rem
1977	142.2	No outages		142.2
1978	317.54	144.25		173.29
1979	420.25	263.02		157.23
1980	522.44	446.88		75.56
1981	889.34	719.83		169.51
1982	254.25	74.73		179.52
1983	*1,141.33	659.94	*481.41 / 2	240.7
1984	*1,196.89	917.68	279.21 / 2	139.6
1985	*1,274.07	1,025.835	*248.24 / 2	124.1
			Total	1,401.71
			Average	156

* The total Man-Rem now includes two fully operating reactors.
The net operating dose is divided equally between the units.

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TABLE 4
ST. LUCIE UNIT I

REMAINING AND PROJECTED REFUELING OUTAGES

Year	Month	Cycle	
1985	October	7	
1986	-None-		
1987	April	8	
1988	October	9	
1989	-None-		
1990	April	10	
1991	October	11	
1992	-None-		
1993	April	12	
1994	October	13	
1995	-None-		
1996	April	14	
1997	October	15	
1998	-None-		
1999	April	16	
2000	October	17	
2001	-None-		
2002	April	18	
2003	October	19	
2004	-None-		
2005	April	20	
2006	October	21	
2007	-None-		
2008	April	22	
2009	October	23	
2010	-None-	___	End of Current License

Year	Month	Cycle	Man-Rem
2011	April	24	760
2012	October	25	760
2013	-None-		160
2014	April	25	760
2015	October	27	760
2016	-None-	___	160
	End of License		3360

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