BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of FLORIDA POWER & LIGHT COMPANY (Turkey Point Nuclear Generating Units 3 and 4)	Docket Nos. 50-250 (SP) 50-251 (SP) (Proposed Amendments to Facility Operating License to Permit Steam Generator Repairs)

AFFIDAVIT OF WALTON A. RODGER ON CONTENTIONS 3 and 6

My name is Walton A. Rodger. My address is 7815 English Way, Bethesda, Maryland 20034. A statement of my qualifications is attached hereto and made a part hereof.

My testimony is directed to two contentions:

Contention 3

"During the course of the repairs proposed by the Licensee, (a) the handling, processing, storing or discharging of primary coolant or (b) the discharging of laundry waste water is likely to result in the release of radioactive material to unrestricted areas in quantities which will not be as low as is reasonably achievable within the meaning of 10 CFR Parts 20 and 50."

Contention 6

"The cumulative offsite radiation releases as a result of all activity at Turkey Point, during the proposed repairs, do not comply with 10 CFR Parts 20 and 50."

I have examined and am familiar with those parts of the Steam Generator Repair Report (SGRR), the Safety Evaluation Report concerning Appendix I and the Final Environmental Statement which relates to these contentions.

Concerning Contention 3

Section 5.2.2.4 of the SGRR contains an analysis of the liquid releases which may be expected to result from the operations associated with the steam generator repair. I have reviewed these calculations of releases and the assumptions upon which they are based. I agree with the assumptions and find the data presented in Tables 5.2-4 and 5.2-5 to be representative of concentrations which can be expected in reactor coolant and laundry waste water, respectively. Table 5.2-6 of the SGRR gives the estimated releases with the discharged liquid waste. I have independently reviewed the values in Table 5.2-6 and find them reasonable.

In the event that processed primary reactor coolant and laundry waste water are to be discharged, the discharge will be into the canal system. Fishing is not permitted in the canals. However, in order to conservatively estimate the maximum individual dose, I assumed a poacher might eat both fish and shellfish taken from the canal system near the discharge point. I also assumed that the concentration of all isotopes in the canal system had reached their equilibrium values. These calculations were done using the methods outlined in NRC Regulatory Guide 1.109. The results are shown in Table 1 which, together with Tables 2-5, is attached to and made a part of this testimony.

Table 1 shows that the dose from these releases meets the requirements of Section II, paragraph A of Appendix I to Part 50. Section II, paragraph D of Appendix I requires that the applicant either (a) perform a cost-benefit analysis to show that population dose cannot be further reduced at a cost less than $1000 per man-rem or (b) show that the total annual release is less than 5 curies. */ Table 5.2-6 of the SGRR shows that the release will amount to less than 5 curies. Therefore a cost-benefit analysis is not needed.

The liquid releases from the steam generator repair are as low as reasonably achievable within the meaning of 10 CFR Parts 20 and 50.

Concerning Contention 6

To address this contention I have, for both liquid and gaseous releases, calculated the maximum individual doses for the operation of one unit and also the doses associated with the steam generator repair.

In estimating the doses associated with a single operating unit I used actual releases for the period July 1979 through June 1980. This period fairly represents releases which may be expected from the operating unit during repair of the other. These releases, both gaseous and liquid, are shown in Table 2. To estimate the doses due to all liquid discharges the liquid releases shown on Table 5.2-6 of SGRR

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*/ Other than tritium and dissolved noble gases.

and Table 2 of this testimony were added together and are shown in Table 3. Then doses to the hypothetical poacher were calculated in the same manner as used in producing Table 1. The doses to the poacher from the combined liquid releases are shown in Table 4.

Table 4 shows that both the operating unit and the steam generator repair activity meet the requirements of Section II, paragraph A of Appendix I to Part 50. Further the operating unit will discharge less than 5 curies/year, as will the repair operation, so Section II, paragraph D of Appendix I to Part 50 is also met for liquid discharge.

Similarly for gaseous discharges I have calculated the doses to maximum individuals for actual releases from the 1979-80 period and for the estimated steam generator releases. The gaseous releases from the repair operation were taken from Table 5.2-2 of the SGRR. The combined releases are also shown in Table 3.

The resulting calculated gaseous doses are shown in Table 5. It can be seen that all doses meet Section II, paragraphs B and C of Appendix I and that the contributions from the steam generator repair activities are truly trivial.

The requirement of Section II, paragraph D is met by the fact that releases of I-131 per unit are less than 1 curie/year.

Thus the cumulative releases at Turkey Point will indeed comply with 10 CFR Parts 20 and 50. It should

be noted that the requirements of Section II, paragraphs A, B, and C of Appendix I apply to individual units. The only place cumulative doses come into play at all is in establishing the right to forego a cost-benefit analysis under Section II, paragraph D. Even so the cumulative effects of releases from one operating unit plus those associated with the steam generator repair will meet the Section II, paragraph A, B, and C limits for a single unit.

Consequently I conclude that "the cumulative offsite radiation releases as a result of all activity at Turkey Point, during the proposed repairs, do comply with 10 CFR Parts 20 and 50."

Walton A. Rodger

Subscribed and sworn to before me
this 6th day of April, 1981.

Marilyn D. Newton
Notary Public

My Commission expires: 8/31/85

Table 1

Maximum Dose to Individual from Steam Generator Repair Releases

Age Group	Max Organ	Organ Dose mrem/year	Total Body Dose mrem/year
Adult	GI-LLI	1.3E-01	4.4E-02
Teen	GI-LLI	8.2E-02	3.0E-02
Child	Thyroid	6.6E-02	2.2E-02

Table 2

Turkey Point Units 3 and 4
Releases of Radioisotopes for the Period July 1, 1979-June 30, 1980

Isotope	(Releases) 7/79-12/79 curies	1/80-6/80 curies	12-months Total curies
Liquid Releases			
Ag-110m	4.5E-03	1.4E-03	5.4E-03
Ba-140	neg	neg	neg
Co-58	8.8E-02	3.4E-02	1.2E-01
Co-60	1.7E-01	4.7E-02	2.2E-01
Cr-51	9.4E-03	1.4E-03	1.1E-02
Cs-134	1.8E-02	1.3E-02	3.1E-02
Cs-136	4.9E-04	neg	4.9E-04
Cs-137	3.4E-02	2.2E-02	5.6E-02
Cs-138	neg	neg	neg
F-18	neg	neg	neg
Fe-59	6.0E-04	1.7E-04	7.7E-04
I-131	4.0E-02	2.0E-03	4.2E-02
I-132	7.9E-03	5.8E-04	8.5E-03
I-133	2.3E-02	2.1E-03	2.5E-02
I-134	neg	neg	neg
I-135	neg	neg	neg
La-140	8.5E-04	2.2E-04	1.1E-03
Mn-54	2.2E-03	5.1E-04	2.7E-03
Mo-99/Tc-99m	9.3E-04	1.2E-04	1.1E-03
Na-24	1.5E-03	neg	1.5E-03
Nb-95	9.9E-04	neg	9.9E-04
Ru-103	3.1E-04	neg	3.1E-04
Sb-124	5.1E-03	1.2E-02	1.7E-02
Sb-125	2.4E-03	1.2E-02	1.4E-02
Sr-89	1.5E-03	5.7E-03	7.2E-03
Sr-90	7.3E-06	4.8E-05	5.5E-05
Te-132	neg	8.0E-04	8.0E-04
Total Liquids	4.1E-01	1.6E-01	5.7E-01

Table 2

Turkey Point Units 3 and 4
Releases of Radioisotopes for the Period July 1, 1979-June 30, 1980

Isotope	(Releases) 7/79-12/79 curies	1/80-6/80 curies	12-months Total curies
Gaseous Releases			
Gases			
Ar-41	7.6E+01	3.4E+01	1.1E+02
Kr-85	1.0E-01	4.5E-01	5.5E-01
Kr-85m	1.5E 00	1.1E 00	2.6E 00
Kr-87	6.2E-01	1.8E-01	8.0E-01
Kr-88	1.1E 00	7.6E-01	1.9E 00
Xe-131m	3.6E 00	2.0E-01	3.8E 00
Xe-133	1.3E+04	9.1E+03	2.2E+04
Xe-133m	1.0E+01	4.2E 00	1.4E+01
Xe-135	3.1E+01	2.2E+01	5.3E+01
Xe-135m	9.8E-02	neg	9.8E-02
Xe-138	neg	neg	neg
Total Gases	1.3E+04	9.2E+03	2.2E+04
Halogens			
I-131	3.7E-02	1.7E-02	5.4E-02
I-133	3.1E-02	7.0E-03	3.8E-02
I-135	1.6E-02	neg	1.6E-02
Br-82	1.1E-03	3.7E-04	1.5E-03
Total Halogens	8.6E-02	2.5E-02	1.1E-01

Table 2

Turkey Point Units 3 and 4
Releases of Radioisotopes for the Period July 1, 1979-June 30, 1980

Isotope	(Releases) 7/79-12/79 curies	1/80-6/80 curies	12-months Total curies
Particulates			
Ag-110m	4.8E-05	-	4.8E-05
Ba-140	2.8E-05	3.6E-05	6.4E-05
Ce-141	2.6E-05	1.1E-04	1.4E-04
Co-57	5.3E-05	5.5E-05	1.1E-04
Co-58	2.0E-02	2.1E-02	4.1E-02
Co-60	3.1E-03	1.0E-02	1.3E-02
Cr-51	2.1E-03	3.2E-03	5.3E-03
Cs-134	1.4E-04	2.0E-04	3.4E-04
Cs-136	6.9E-06	neg	6.9E-06
Cs-137	2.2E-04	3.2E-04	5.4E-04
Fe-59	1.8E-04	1.7E-04	3.5E-04
I-131	5.2E-05	4.1E-05	9.3E-05
La-140	2.0E-05	5.0E-05	7.0E-05
Mn-54	5.5E-04	5.7E-04	1.1E-03
Nb-95	3.9E-04	3.3E-04	7.2E-04
Ru-103	8.3E-05	3.9E-04	4.7E-04
Sb-124	2.3E-04	1.6E-04	3.9E-04
Sr-89	1.9E-05	5.5E-05	7.4E-05
Sr-90	1.2E-06	1.1E-05	1.2E-05
Zr-95	1.7E-04	1.1E-04	2.8E-04
Ce-144		7.3E-05	7.3E-05
Sb-125		1.5E-05	1.5E-05
Zn-65		1.5E-04	1.5E-04
Total Particulates	2.8E-02	3.7E-02	6.5E-02

Table 3

Releases from One Operating Unit and Steam Generator Repair of the Other

Isotope	Releases from: (curies) One Operating Unit[a]	SG Repair	Total
Liquid Releases			
Ag-110m	3.0E-03	-	3.0E-03
Co-58	6.0E-02	1.7E-01	2.3E-01
Co-60	1.1E-01	1.3E-01	2.4E-01
Cr-51	5.5E-03	3.7E-04	5.9E-03
Cs-134	1.6E-02	3.0E-02	4.6E-02
Cs-136	2.5E-04	-	2.5E-04
Cs-137	2.8E-02	1.4E-01	1.7E-01
Fe-59	3.9E-04	1.7E-05	4.1E-04
I-131	2.1E-02	7.6E-02	9.7E-02
I-132	4.3E-03	-	4.3E-03
I-133	1.3E-02	-	1.3E-02
La-140	5.5E-04	-	5.5E-04
Mn-54	1.4E-03	1.8E-02	1.9E-02
Mo-99/Tc-99m	5.5E-04	-	5.5E-04
Na-24	7.5E-04	-	7.5E-04
Nb-95	5.0E-04	-	5.0E-04
Ru-103	1.6E-04	-	1.6E-04
Sb-124	8.5E-03	-	8.5E-03
Sb-125	7.0E-03	-	7.0E-03
Sr-89	3.6E-03	4.8E-05	3.6E-03
Sr-90	2.8E-05	-	2.8E-05
Te-132	4.0E-04	-	4.0E-04
Total Liquids	2.9E-01	5.5E-01	8.4E-01

a One-half the annual releases from Units 3 and 4 as shown on Table 2.

Table 3

Releases from One Operating Unit
and Steam Generator Repair of the Other

Isotope	Releases from: (curies) One Operating Unit[a]	SG Repair	Total
Gaseous Releases			
A-41	5.5E+01	-	5.5E+01
Kr-85	2.8E-01	-	2.8E-01
Kr-85m	1.3E 00	-	1.3E 00
Kr-87	4.0E-01	-	4.0E-01
Kr-88	1.0E 00	-	1.0E 00
Xe-131m	1.9E 00	-	1.9E 00
Xe-133	1.1E+04	-	1.1E+04
Xe-133m	7.0E 00	-	7.0E 00
Xe-135	2.7E+01	-	2.7E+01
Xe-135m	4.9E-02	-	4.9E-02
I-131	2.7E-02	9.1E-03	3.6E-02
I-132	-	1.4E-03	1.4E-03
I-133	1.9E-02	-	1.9E-02
I-135	8.0E-03	-	8.0E-03
Br-82	7.5E-04	-	7.5E-04
Ag-110m	2.4E-05	-	2.4E-05
Ba-140	3.2E-05	-	3.2E-05
Ce-141	7.0E-05	4.0E-04	4.7E-04
Co-57	5.5E-05	-	5.5E-05
Co-58	2.1E-02	1.7E-02	3.8E-02
Co-60	6.5E-03	1.3E-02	1.9E-02
Cr-51	2.7E-03	6.8E-04	3.4E-03
Cs-134	1.7E-04	-	1.7E-04
Cs-136	3.5E-06	-	3.5E-06
Cs-137	2.7E-04	-	2.7E-04
Fe-59	1.8E-04	2.7E-04	4.5E-04
La-140	3.5E-05	1.7E-04	2.1E-04
Mn-54	5.5E-04	1.5E-03	2.1E-03
Nb-95	3.6E-04	2.5E-03	2.8E-03
Ru-103	2.4E-04	8.5E-04	1.1E-03
Sb-124	2.0E-04	-	2.0E-04
Sr-89	3.7E-05	-	3.7E-05
Sr-90	6.0E-06	-	6.0E-06
Zr-95	1.4E-04	1.4E-03	1.5E-03
Ce-144/Pr-144	3.7E-05	2.7E-03	2.7E-03
Sb-125	7.5E-06	-	7.5E-06
Zn-65	7.5E-05	-	7.5E-05

a One-half the annual releases from Units 3 and 4 as shown on Table 2

Table 4

Doses to Maximum Individual
from Combined Liquid Releases

Type of Dose	Maximum Individual Dose, mrem/year from: Operation of One Unit	SG Repair	Total
Adult--GI-LLI	1.4E-01	1.3E-01	2.7E-01
--Total Body	1.9E-02	4.4E-02	6.1E-02
Teen--GI-LLI	9.0E-02	8.2E-02	1.7E-01
--Total Body	1.5E-02	3.0E-02	4.5E-02
Child--GI-LLI	3.6E-02	3.1E-02	6.7E-02
--Total Body	1.3E-02	2.2E-02	3.5E-02

Table 5

Doses to Maximum Individual
from Combined Gaseous Releases

Type of Dose		Maximum Individual Dose, mrem/year, from: Operation One Unit	SG Repair	Total
Air Dose--Site Boundary	Beta	2.2E-01	-	2.2E-01
	Gamma	8.0E-02	-	8.0E-02
Nearest Garden and Residence, 3.6 m WNW				
Adult	Total Body	7.0E-03	5.7E-04	7.6E-03
	Thyroid	1.3E-02	2.4E-03	1.5E-02
Teen	Total Body	7.0E-03	6.0E-04	7.6E-03
	Thyroid	1.2E-02	2.0E-03	1.4E-02
Child	Total Body	7.0E-03	7.1E-04	7.7E-03
	Thyroid	1.4E-02	2.8E-03	1.7E-02
Infant	Total Body	7.0E-03	4.9E-04	7.5E-03
	Thyroid	8.0E-03	8.9E-04	8.9E-03
Staff Cow at 4.5 mi W				
Adult	Total Body	1.3E-04	6.0E-05	1.9E-04
	Thyroid	2.9E-02	9.5E-03	3.9E-02
Teen	Total Body	1.6E-04	7.0E-05	2.3E-04
	Thyroid	4.2E-02	1.4E-02	5.6E-02
Child	Total Body	2.8E-04	1.3E-04	4.1E-04
	Thyroid	8.5E-02	2.8E-02	1.1E-01
Infant	Total Body	4.2E-04	1.6E-04	5.8E-04
	Thyroid	2.0E-01	6.6E-02	2.7E-01

PROFESSIONAL QUALIFICATIONS AND EXPERIENCE
OF DR. WALTON A. RODGER

My name is Walton A. Rodger. I am President of the nuclear consulting firm Nuclear Safety Associates, Inc. of Bethesda, Maryland and have been associated with the firm for the past thirteen years. The four years prior to that I was Vice President of Nuclear Fuel Services, Inc., serving as its Technical Director and later as General Manager of its West Valley plant. In the latter position I was responsible for the construction, startup, and licensing of the world's first privately owned nuclear fuel reprocessing plant.

From 1960 to 1962, I was a Partner in the nuclear consulting firm of McLain Rodger Associates. Before entering the consulting field, I spent 13 years at Argonne National Laboratory, four at Oak Ridge National Laboratory, and one at the Metallurgical Laboratory of the University of Chicago. At all three I was active in the development of all of the various processes which have been considered for use in reprocessing of nuclear fuel. I also did a great deal of work in the field of radioactive waste management. At Argonne I was Associate Director of the Chemical Engineering Division. My total experience in the nuclear field has covered 39 years.

I was graduated in both Chemical and Metallurgical Engineering from the University of Michigan in 1939. I obtained

my Master's Degree in Chemical Engineering from the same institution in 1940. My Doctorate in Chemical Engineering was awarded by the Illinois Institute of Technology in 1956.

I am the author of sections of several nuclear handbooks and have published more than two dozen papers in the nuclear field, largely on reprocessing and waste disposal. I am a Fellow of AIChE, and in 1960 was Chairman of the Nuclear Engineering Division of the Institute. I am also a member of ANS and AIF. I am past chairman of the ANSI Committee N-48 which is developing standards for the disposal of solid nuclear waste. In 1959, I served as Technical Consultant to the Joint Committee on Atomic Energy of the 86th Congress at the Hearings on Industrial Radioactive Waste Disposal. I served as a principal witness for the Consolidated Utility Group in the As Low As Practicable Rule Making Hearing (RM-50-2). In this capacity I have done extensive cost-benefit studies on LWR radwaste systems.