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PERIOD ENDING DEC 31, 1977.

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OCONEE - UNIT 2
OCONEE - UNIT 3

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DUKE POWER COMPANY

POWER BUILDING

422 SOUTH CHURCH STREET, CHARLOTTE, N. C. 28242

WILLIAM O. PARKER, JR.
VICE PRESIDENT
STEAM PRODUCTION

May 11, 1978

TELEPHONE: AREA 704
373-4083

Director
Office of Inspection and Enforcement
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

RE: Oconee Nuclear Station
Docket Nos. 50-269, -270, -287

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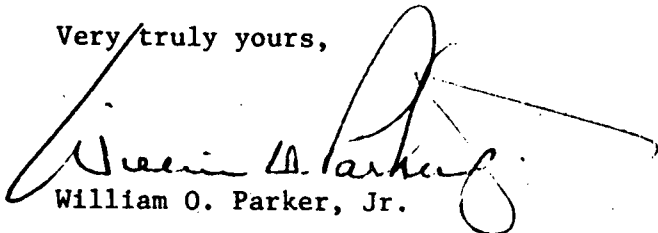
1978 MAY 24 AM 10 48

DISTRIBUTION
SERVICES UNIT

Dear Sir:

Please find enclosed forty (40) copies of the Oconee Nuclear Station Radio-logical Environmental Monitoring Report for the period ending December 31, 1977. This report is submitted pursuant to Oconee Nuclear Station Technical Specification 6.6.1.5 as a supplement to the 1977 Annual Operating Report, which was submitted on March 31, 1978.

Very truly yours,



William O. Parker, Jr.

LJB:scs

Enclosures

cc: Mr. J. P. O'Reilly, Director
Office of Inspection and Enforcement, Region II

REGULATORY DOCKET FILE COPY

781440062

1007
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ENVIRONMENTAL MONITORING

Table 2.13-1 summarizes the environmental monitoring program for 1977. Table 2.13-2 provides the locations of milch animals determined by survey within a five-mile radius of the station site.

Unavoidable deviations from the routine sampling schedule during the year included nine weekly air particulate samples at the 006 (control) location between September and the end of the year due to numerous sampler malfunctions and power failures at the location. Two weekly air particulate samples at the 009 location were not collected, one in August and the other in November, due to sampler malfunction. The second semiannual aquatic vegetation sample at location 000.4 was not available due to environmental conditions. The January rain and settled dust samples at locations 002, 006, and 010 were lost when freezing conditions damaged the samplers. The 000.2 location rain and settled dust sample for September was lost due to vandalism.

During the year several sample types, primarily in the aquatic pathway and for locations near the waste discharge area, were statistically higher than the control samples. Aquatic vegetation samples just below the discharge point (Location 000.4) showed Mn-54, Co-58, Co-60, Cs-134, and Cs-137 at levels well above background as would be expected. In one case a small quantity of I-131 was also seen. Further downstream at location 005.2 detectable but lower levels of Co-58/60 and Cs-134/137 were seen. Bottom sediment samples at locations 000.4 and 000.7, also in or near the discharge area, showed the expected Mn-54, Co-58/60, and Cs-134/137. Fish samples at the 013 location also showed detectable levels of Cs-134/137. Surface water at location 000.7 showed levels higher than background for gross beta, tritium, Cs-137, and I-131. Drinking water at the 006.1 location had tritium activity above background and, during one period early in the year, low levels of I-131 were seen. Lastly, the 000.18 TLD location on the Restricted Area fence near a borated water storage tank was, of course, higher than at other locations.

Wherever any of the above observed activities appropriately exceeded control values, reports were written (see last column of table 2.13-1) as required by Technical Specifications explaining the occurrence with an evaluation of the dose significance. None of these observed activities resulted in a significant environmental dose potential. Finally, trend analyses for the year showed no significant long-term positive trends in environmental media except perhaps in aquatic vegetation and sediment at the waste discharge point.

The effects of two Chinese nuclear tests, one in late 1976 and one in September 1977, were easily seen in air particulate samples. Gross beta in air ran as high as 50 times normal and samples showed normally undetectable quantities of Ce-141/144 Mo-99, Ru-103, Ba/La-140, Te/I-132, and Np-239.

Table 2.13-2

SEMI-ANNUAL CENSUS
OF MILCH ANIMALS

NAME	DISTANCE/DIRECTION FROM STATION	JANUARY-JUNE 1977		JULY-DECEMBER 1977	
		COWS	GOATS	COWS	GOATS
FEW	4 MI ENE	1	0	1	0
MERCK	3 MI E	1*	0	1*	0
HALE	4½ MI E	0	1*	0	1*
RAMPLEY	4½ MI ESE	1	0	1*	0
HOLDER	3 MI SE	2	0	1	0
DYAR	1½ MI SSW	1*	0	1*	0
POWELL	4½ MI W	65	0	65	0
MERRIL	4 MI NNW	1	0	0	0
HENDRIX	1½ MI E	1	0	1*	0
LUSK	3 MI E	1*	0	1*	0

* Unavailable for sampling

TABLE 2.13-1

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ENVIRONMENTAL RADIOLOGICAL MONITORING PROGRAM ANNUAL SUMMARY

OCONEE NUCLEAR STATION
OCONEE COUNTY, SOUTH CAROLINADOCKET NOS. 50-269, -270, -287
JANUARY 1, 1977-DECEMBER 31, 1977

Medium or Pathway Sampled (Unit of Measurement)	Type and Total Number of Analyses Performed	Lower Limit of Detection (LLD)	All Indicator Locations Mean (f) ^a Range	Location with Highest Annual Mean		Control Locations Mean (f) ^a Range	Number of Nonroutine Reported Measurements
				Name Distance/Direction	Mean (f) ^a Range		
Air Particulates (pCi/m ³) 4 Locations	Gross α 197	0.001	0.019(153/154) (0.0009-0.20)	006 8 miles SSE	0.027(43/43) (0.0013-0.27)	0.027(43/43) (0.0013-0.27)	0
	Gross β 197	0.01	0.17(153/154) (0.0034-1.4)	014 1.8 miles ESE	0.21(52/52) (0.0034-1.4)	0.20(43/43) (0.027-1.5)	0
	⁸⁹ Sr 48	0.005	0.0084(35/36) (0.0007-0.035)	006	0.019(11/12) (0.0011-0.13)	0.019(11/12) (0.0011-0.13)	0
	⁹⁰ Sr 48	0.001	0.0015(36/36) (0.0001-0.0036)	006	0.0019(12/12) (0.0001-0.0052)	0.0019(12/12) (0.0001-0.0052)	0
	γ- Spec 197						
	⁵⁴ Mn	0.01	0.018(15/54) (0.0035-0.077)	000 0.1 miles N	0.021(4/52) (0.0060-0.049)	0.019(9/43) (0.0039-0.066)	0
	⁶⁰ Co	0.01	0.0083(21/154) (0.0033-0.015)	014	0.0096(10/52) (0.0046-0.015)	0.0080(9/43) (0.0035-0.014)	0
	⁹⁵ Zr/Nb	0.01	0.037(112/154) (0.0033-0.12)	006	0.045(33/43) (0.0010-0.13)	0.045(33/43) (0.0010-0.13)	0
	¹³⁴ Cs	0.01	0.0018(1/154)	000	0.0018(1/52)	<LLD	0
	¹³⁷ Cs	0.01	0.0077(40/154) (0.0016-0.018)	014	0.0091(16/52) (0.0050-0.018)	0.0084(12/43) (0.0027-0.021)	0
	¹³¹ I	0.07	0.026(42/154) 0.0041-0.16	006	0.036(10/43) (0.0044-0.15)	0.036(10/43) (0.0044-0.15)	0

^aMean and range based upon detectable measurements only. Fraction of detectable measurements at specified locations is indicated in parentheses, (f).

TABLE 2.13-1 (Cont.)

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ENVIRONMENTAL RADIOLOGICAL MONITORING PROGRAM ANNUAL SUMMARYOCONEE NUCLEAR STATION
OCONEE COUNTY, SOUTH CAROLINADOCKET NOS. 50-269, -270, -287
JANUARY 1, 1977-DECEMBER 31, 1977

Medium or Pathway Sampled (Unit of Measurement)	Type and Total Number of Analyses Performed	Lower Limit of Detection (LLD)	All Indicator Locations Mean (f) ^a Range	Location with Highest Annual Mean		Control Locations Mean (f) ^a Range	Number of Nonroutine Reported Measurements
				Name Distance/Direction	Mean (f) ^a Range		
Aquatic Vegetation (pCi/Kg, wet) 3 Locations	⁸⁹ Sr 5	40	<LLD		<LLD	<LLD	0
	⁹⁰ Sr 5	8	75(2/3) (70-81)	005.5 4.5 miles S	75(2/2) (70-81)	43(2/2) (36-50)	
	γ- Spec 5						
	⁵⁴ Mn	100	450(3/3) (246-766)	000.4 0.25 miles E	766(1/1)	<LLD	1
	⁵⁸ Co	100	2120(3/3) (675-2900)	000.4	2900(1/1)	<LLD	3
	⁶⁰ Co	100	865(3/3) (230-1700)	000.4	1700(1/1)	<LLD	1
	¹³⁴ Cs	100	2850(3/3) (1260-3990)	000.4	3300(1/1)	<LLD	3
	¹³⁷ Cs	100	3180(3/3) (130-7030)	000.4	7030(1/1)	<LLD	3
¹³¹ I	80	234(2/3) (165-304)	000.4	304(1/1)	<LLD	0	

^a Mean and range based upon detectable measurements only. Fraction of detectable measurements at specified locations is indicated in parentheses, (f).

TABLE 2.13-1 (Cont.)

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ENVIRONMENTAL RADIOLOGICAL MONITORING PROGRAM ANNUAL SUMMARYOCONEE NUCLEAR STATION
OCONEE COUNTY, SOUTH CAROLINADOCKET NOS. 50-269, -270, -287
JANUARY 1, 1977-DECEMBER 31, 1977

Medium or Pathway Sampled (Unit of Measurement)	Type and Total Number of Analyses Performed	Lower Limit of Detection (LLD)	All Indicator Locations Mean (f) ^a Range	Location with Highest Annual Mean		Control Locations Mean (f) ^a Range	Number of Nonroutine Reported Measurements
				Name Distance/Direction	Mean (f) ^a Range		
Bottom Sediment (pCi/Kg, dry) 6 Locations	⁸⁹ Sr 23	600	<LLD		<LLD	<LLD	0
	⁹⁰ Sr 23	150	111(10/20) (86-160)	000.5 0.3 miles N	127(3/3) (120-140)	127(3/3) (120-140)	0
	γ- Spec 18						
	⁵⁴ Mn	150	581(3/15) (236-939)	000.4 0.25 miles E	581(3/3) (236-939)	<LLD	0
	⁵⁸ Co	150	5670(5/15) (832-12200)	000.7 1 mile SSE	7550(1/3)	<LLD	2
	⁶⁰ Co	150	1340(7/15) (283-4990)	000.4	2380(3/3) (979-4990)	<LLD	1
	¹³⁴ Cs	150	3370(12/15) (204-22,000)	000.4	10,200(3/3) (4280-22,000)	<LLD	3
	¹³⁷ Cs	150	5390(12/15) (110-39,100)	000.4	15,800(3/3) (110-39,100)	703(1/3)	3
	Fish (pCi/kg, wet) 2 Locations	⁸⁹ Sr 11	40	<LLD			<LLD
⁹⁰ Sr 11		8	430(6/6) (89-950)	013 5.8 miles S	430(6/6) (89-950)	570(5/5) (89-980)	0
⁵⁴ Mn		130	<LLD		<LLD	<LLD	0

^aMean and range based upon detectable measurements only. Fraction of detectable measurements at specified locations is indicated in parentheses, (f).

TABLE 2.13-1 (Cont.)

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ENVIRONMENTAL RADIOLOGICAL MONITORING PROGRAM ANNUAL SUMMARYOCONEE NUCLEAR STATION
OCONEE COUNTY, SOUTH CAROLINADOCKET NOS. 50-269, -270, -287
JANUARY 1, 1977-DECEMBER 31, 1977

Medium or Pathway Sampled (Unit of Measurement)	Type and Total Number of Analyses Performed	Lower Limit of Detection (LLD)	All Indicator Locations Mean (f) ^a Range	Location with Highest Annual Mean		Control Locations Mean (f) ^a Range	Number of Nonroutine Reported Measurements	
				Name Distance/Direction	Mean (f) ^a Range			
Fish (Cont'd)	⁵⁹ Fe	260	<LLD		<LLD	<LLD	0	
	⁶⁰ Co	130	<LLD		<LLD	<LLD	0	
	⁶⁵ Zn	260	<LLD		<LLD	<LLD	0	
	¹³⁴ Cs	130	180(6/8) (62-530)	013	180(6/8) (62-530)	<LLD	0	
	¹³⁷ Cs	130	360(8/9) (100-1200)	013	360(8/9) (100-1200)	89(3/5) (62-136)	1	
Milk (pCi/liter) 3 Locations	¹³¹ I	76	0.98(14/69) (0.15-6.0)	002.1 5 miles NW	0.98(14/64) (0.15-6.0)	<LLD	1	
	³ H	19	244(16/16) (100-390)	006.3 8 miles SSE	567(3/3) (410-820)	567(3/3) (410-820)	0	
	⁸⁹ Sr	22	10	2.7(1/16)	002.1	2.7(1/12)	<LLD	0
	⁹⁰ Sr	22	2	4.3(16/16) (1-12)	015 1.5 miles E	12(1/1)	3.5(6/6) (1.3-5.4)	0
	γ- Spec	22						
	¹³⁴ Cs	15	<LLD			<LLD	<LLD	0
	¹³⁷ Cs	15	<LLD			<LLD	<LLD	0

^aMean and range based upon detectable measurements only. Fraction of detectable measurements at specified locations is indicated in parentheses, (f).

TABLE 2.13-1 (Cont.)

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ENVIRONMENTAL RADIOLOGICAL MONITORING PROGRAM ANNUAL SUMMARYOCONEE NUCLEAR STATION
OCONEE COUNTY, SOUTH CAROLINADOCKET NOS. 50-269, -270, -287
JANUARY 1, 1977-DECEMBER 31, 1977

Medium or Pathway Sampled (Unit of Measurement)	Type and Total Number of Analyses Performed	Lower Limit of Detection (LLD)	All Indicator Locations Mean (f) ^a Range	Location with Highest Annual Mean		Control Locations Mean (f) ^a Range	Number of Nonroutine Reported Measurements
				Name Distance/Direction	Mean (f) ^a Range		
Milk (Cont'd)	¹⁴⁰ Ba/La	15	<LLD		<LLD	<LLD	0
	⁴⁰ K	200	1200(16/16) (578-1750)	015 Hendrix 1.5 miles E	1300(1/1)	1200(7/7) (950-1400)	0
Radiation Dose (mR/hr) 25 Locations	TLD 98	0.005	0.035(94/94) (0.005-0.74)	000.18 0.1 miles W	0.46(4/4) (0.13-0.74)	0.011(4/4) (0.01-0.013)	6
Rain & Settled Dust (pCi/m ²) 6 Locations	Gross α 67	10	770(54/56) (76-2000)	000 0.1 mile N	860(11/12) (78-2000)	800(10/11) (120-2200)	0
	Gross β 67	10	6300(56/56) (140-17,000)	002 5 miles W	7000(11/11) (2300-16,000)	6100(11/11) (1800-15,000)	0
	γ- Spec 67						
	⁵⁴ Mn	1000	2900(24/56) (350-16,000)	000	3600(6/12) (420-16,000)	2300(6/11) (250-7600)	0
	⁶⁰ Co	1000	1600(21/56) (110-5800)	002 5 miles W	2200(5/11) (550-5800)	1400(5/11) (330-3900)	0
	⁶⁵ Zn	1000	2100(10/56) (1100-4700)	002	4700(1/11)	2000(5/9) (720-3500)	0
	¹³⁷ Cs	1000	2800(29/56) (720-12,000)	002	3300(5/11) (1900-8500)	2800(7/11) (490-11,000)	0
	¹³¹ I	1000	2800(27/56) (510-8300)	006 8 miles SSE	3100(7/11) (790-8900)	3100(7/11) (790-8900)	0

^aMean and range based upon detectable measurements only. Fraction of detectable measurements at specified locations is indicated in parentheses, (f).

TABLE 2.13-1 (Cont.)

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ENVIRONMENTAL RADIOLOGICAL MONITORING PROGRAM ANNUAL SUMMARY

OCONEE NUCLEAR STATION
OCONEE COUNTY, SOUTH CAROLINADOCKET NOS. 50-269, -270, -287
JANUARY 1, 1977-DECEMBER 31, 1977

Medium or Pathway Sampled (Unit of Measurement)	Type and Total Number of Analyses Performed	Lower Limit of Detection (LLD)	All Indicator Locations Mean (f) ^a Range	Location with Highest Annual Mean		Control Locations Mean (f) ^a Range	Number of Nonroutine Reported Measurements
				Name Distance/Direction	Mean (f) ^a Range		
Soil (pCi/Kg, dry) 3 Locations	⁸⁹ Sr 3	600	<LLD		<LLD	<LLD	0
	⁹⁰ Sr 3	150	150(1/2)	006 8 miles SSE	210(1/1)	210(1/1)	0
	γ- Spec 3						
	¹³⁴ Cs	150	<LLD		<LLD	<LLD	0
	¹³⁷ Cs	150	<LLD		<LLD	<LLD	0
Surface Water (pCi/liter) 3 Locations	Gross α 73 Dissolved	0.5	1.4(25/61) (0.21-5.9)	000.7 0.25 miles SSE	2.0(10/13) (0.21-5.9)	0.78(2/12) (0.30-1.3)	0
	Suspended		1.5(14/61) (0.27-5.9)	000.7	3.4(2/13) (0.82-5.9)	0.35(2/12) (0.25-0.45)	0
	Gross β 73 Dissolved	1.0	8.6(58/61) (0.20-52)	000.7	26(13/13) (1.8-52)	2.5(11/12) (1.6-4.1)	4
	Suspended		2.9(16/61) (0.81-18)	000.7	4.8(5/13) (0.83-18)	1.5(2/12) (1.4-1.6)	
	³ H 52	330	2100(48/48) (110-9400)	000.7	2900(19/19) (190-9400)	165(4/4) (110-270)	9
	⁸⁹ Sr 38	10	<LLD		<LLD	<LLD	0

^aMean and range based upon detectable measurements only. Fraction of detectable measurements at specified locations is indicated in parentheses, (f).

TABLE 2.13-1 (Cont.)

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ENVIRONMENTAL RADIOLOGICAL MONITORING PROGRAM ANNUAL SUMMARY

OCONEE NUCLEAR STATION
OCONEE COUNTY, SOUTH CAROLINADOCKET NOS. 50-269, -270, -287
JANUARY 1, 1977-DECEMBER 31, 1977

Medium or Pathway Sampled (Unit of Measurement)	Type and Total Number of Analyses Performed	Lower Limit of Detection (LLD)	All Indicator Locations Mean (f) ^a Range	Location with Highest Annual Mean		Control Locations Mean (f) ^a Range	Number of Nonroutine Reported Measurements
				Name Distance/Direction	Mean (f) ^a Range		
Surface Water (Cont'd)	⁹⁰ Sr 38	2	1.2(1/34)	005.2 4.5 miles S	1.2(1/9)	<LLD	0
	γ- Spec 105						
	⁵⁴ Mn	15	16(11/93) (6.6-44)	000.7	19(9/28) (7.5-44)	<LLD	0
	⁵⁸ Co	15	26(2/93) (23-30)	000.7	26(2/28) (23-30)	<LLD	0
	⁶⁰ Co	15	13(6/93) (5.6-24)	000.7	18(2/28) (16-20)	<LLD	0
	¹³⁴ Cs	15	28(9/93) (13-74)	000.7	36(5/28)	<LLD	0
	¹³⁷ Cs	15	24(30/93) (6.2-130)	000.7	31(15/28) (10-130)	7.5(2/12) (6.9-8.1)	0
	¹³¹ I	15	30(26/93) (0.9-77)	000.7	32(13/27) (8.5-77)	<LLD	1
Terrestrial Vegetation (pCi/Kg, wet) 4 Locations	γ- Spec 18 ⁹⁵ Zr/Nb	100	3000(11/14) (1400-8000)	015 4.5 miles W	3600(4/4) (1600-8000)	2600(4/4) (1400-5200)	0

^aMean and range based upon detectable measurements only. Fraction of detectable measurements at specified locations is indicated in parentheses, (f).

TABLE 2.13-1 (Cont.)

ENVIRONMENTAL RADIOLOGICAL MONITORING PROGRAM ANNUAL SUMMARY

OCONEE NUCLEAR STATION
OCONEE COUNTY, SOUTH CAROLINA

DOCKET NOS. 50-269, -270, -287
JANUARY 1, 1977-DECEMBER 31, 1977

Medium or Pathway Sampled (Unit of Measurement)	Type and Total Number of Analyses Performed	Lower Limit of Detection (LLD)	All Indicator Locations Mean (f) ^a Range	Location with Highest Annual Mean		Control Locations Mean (f) ^a Range	Number of Nonroutine Reported Measurements	
				Name Distance/Direction	Mean (f) ^a Range			
Terrestrial Veg. (Cont'd)	¹³⁴ Cs	100	<LLD		<LLD	<LLD	0	
	¹³⁷ Cs	100	<LLD		<LLD	790(1/4)	0	
	¹⁴⁰ Ba/La	100	5500(3/14) (5000-6200)	002.1 5 miles W	6200(1/1)	5700(1/1)	0	
	¹³¹ I	80	3500(3/14) (2700-4100)	002.1	4100(1/4)	2100(1/4)	0	
Drinking Water (pCi/liter) 3 Locations	Gross α 38 Dissolved	0.5	0.95(8/25) (0.39-1.8)	012 15 miles SSE	1.4(2/12) (1.1-1.8)	0.79(1/13)	0	
	Suspended		1.4(6/25) (0.77-3.1)	006.1 8 miles SSE	1.6(5/13) (0.77-3.1)	<LLD		
	Gross β 38 Dissolved	1.0	3.2(25/25) (1.9-5.5)	006.1	2.7(13/13) (2.5-5.5)	2.3(13/13) (1.4-3.8)	0	
	Suspended		1.6(5/25) (1.1-2.2)	006.1	1.7(4/13) (1.3-2.2)	1.3(2/13) (1.2-1.4)		
	³ H	28	330	890(23/23) (530-2900)	006.1	1200(11/11) (530-2900)	290(4/5) (160-590)	2
	⁸⁹ Sr	27	10	<LLD		<LLD	<LLD	0

^a Mean and range based upon detectable measurements only. Fraction of detectable measurements at specified locations is indicated in parentheses, (f).