ATTACHMENT II

Wolf Creek Nuclear Operating Corporation Administrative Procedure AP 07B-004, Revision 0, "Offsite Dose Calculation Manual (Radiological Environmental Monitoring Program)"

CC
12-08-1999

WOLF CREEK
NUCLEAR OPERATING CORPORATION

AP 07B-004

OFFSITE DOSE CALCULATION MANUAL (RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM)

Responsible Manager

Manager Resource Protection

Revision Number	0
Use Category	Reference
Administrative Controls Procedure	Yes
Infrequently Performed Procedure	No
Program Number	07B

DC4 03/02/1999

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1.0 PURPOSE

1.1 This procedure contains the Offsite Dose Calculation Manual (ODCM) Radiological Environmental Monitoring Program (REMP) requirements.

2.0 SCOPE

2.1 Technical Specifications 6.8.4-f (ITS N/A), 6.9.1.6 (ITS 5.6.2) and 6.14 (ITS 5.5.1) shall be fully implemented by this procedure.

2.2 Procedure AP 07B-003, OFFSITE DOSE CALCULATION MANUAL has been split into two procedures. Requirements for the REMP are now contained in this procedure.

3.0 REFERENCES AND COMMITMENTS

3.1 References

3.1.1 AP 07B-003, OFFSITE DOSE CALCULATION MANUAL

3.1.2 Radiological Assessment Branch Technical Position on Environmental Monitoring, Revision 1, November 1979

3.1.3 PIR 98-0112, Revising the ODCM with an OTSC

3.1.4 Technical Specification 6.14 (ITS 5.5.1)

3.1.5 Technical Specification 6.8.4-f (ITS N/A)

3.1.6 Technical Specification 6.9.1.6 (ITS 5.6.2)

3.2 Commitments

3.2.1 None

4.0 DEFINITIONS

4.1 None

5.0 RESPONSIBILITIES

5.1 Environmental Management

5.1.1 Ensures the REMP is established, implemented and maintained.

6.0 PROCEDURE

6.1 Revisions to This Procedure

NOTE

To comply with Technical Specification 6.14 (ITS 5.5.1), revisions to this procedure are not permitted via APF 15C-004-04, ON THE SPOT CHANGE form (Reference Step 3.1.3).

6.1.1 Revisions to this procedure are to be submitted through the Manager Resource Protection via APF 15C-004-01, DOCUMENT REVISION REQUEST (DRR).

6.1.2 Changes to ATTACHMENT A shall include:

1. Each change shall be identified by markings in the margin of the affected pages, clearly indicating the area of the page that was changed, and shall indicate the date (e.g., month/year) the change was implemented. (Reference Step 3.1.4)

2. Sufficient information to support the change together with the appropriate analyses or evaluations justifying the change(s) and (Reference Step 3.1.4)

NOTE

Changes to the REMP will have no impact upon the level of radioactive effluent control nor will impact the accuracy or reliability of effluent dose or setpoint calculations.

3. A determination that the change will maintain the level of radioactive effluent control required by 10 CFR 20.106 (ITS replaces 20.106 with 20.1302), 40 CFR Part 190, 10 CFR 50.36A, and Appendix I to 10 CFR Part 50 and not adversely impact the accuracy or reliability of effluent dose, or setpoint calculations. (Reference Step 3.1.4)

6.1.3 The changes shall become effective after review and acceptance by the PSRC and (ITS deletes "review and acceptance by the PSRC and") the approval of the Plant Manager. (Reference Step 3.1.4)

6.2 ODCM Submittal To NRC

NOTE

To comply with Technical Specification 6.14 (ITS 5.5.1), a copy of this procedure must be submitted to the NRC with the Annual (ITS deletes "Annual") Radioactive Effluent Release Report.

6.2.1 Changes to the ODCM shall be submitted to the Commission (ITS replaces Commission with NRC) in the form of a complete, legible copy of the entire ODCM as a part of or concurrent with the Annual Radioactive Effluent Release Report for the period of the report in which any change to the ODCM was made. (Reference Step 3.1.4)

7.0 RECORDS

7.1 The following is a lifetime QA Record:

7.1.1 AP 07B-004, OFFSITE DOSE CALCULATION MANUAL (RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM)

8.0 FORMS

8.1 None

- END -

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Wolf Creek Generating Station

Offsite Dose Calculation Manual
Radiological Environmental Monitoring Program

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1.0 Introduction

This attachment contains the ODCM for the Radiological Environmental Monitoring Program which was previously contained in AP 07B-003. This program is provided to monitor the radiation and radionuclides in the environs of the plant. The program provides (1) representative measurements of radioactivity in the highest potential exposure pathways, and (2) verification of the accuracy of the effluent monitoring program and modeling of environmental exposure pathways. This program conforms to the guidance of Appendix I to 10 CFR part 50 and includes the following: (Reference Step 3.1.5)

1. Monitoring, sampling, analysis and reporting of radiation and radionuclides in the environment. (Reference Step 3.1.5)

2. A Land Use Census to ensure that changes in the use of areas at and beyond the site boundary are identified and the modifications to the monitoring program are made if required by the results of this census, and (Reference Step 3.1.5)

3. Participation in an Interlaboratory Comparison Program to ensure that independent checks on the precision and accuracy of the measurements of radioactive materials in environmental sample matrices are performed as part of the quality assurance program for environmental monitoring. (Reference Step 3.1.5)

This attachment also provides a description of the information that should be included in the Annual Radiological Environmental Operating Report. ***11/98***

2.0 Liquid Effluents (Contained in AP 07B-003)

3.0 Gaseous Effluents (Contained in AP 07B-003)

4.0 Total Dose (Contained in AP 07B-003)

5.0 Radiological Environmental Monitoring Program

This section describes the Radiological Environmental Monitoring Program specified in Section 6.8.4.f (ITS N/A) of the Wolf Creek Technical Specifications. ***12/99***

5.1 Monitoring Program

Table 5-1 provides a schedule which describes the pathways, specific locations, sample collection frequencies, and analyses to be performed to implement the Radiological Environmental Monitoring Program.

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Figures 5.1 through 5.5 contain maps depicting sampling locations in relation to the WCGS site. Table 5-2 lists distances and directions to these locations from the WCGS site.

Table 5-3 lists required detection capabilities for the analyses performed.

5.2 Land Use Census

A Land Use Census shall be conducted annually during the growing season to identify the nearest (1) milk animal, (2) residence, and (3) garden of greater than 500 square feet producing broadleaf vegetation in each of the 16 meteorological sections within five miles of the WCGS site. (Broadleaf vegetation sampling of available vegetation may be performed at the site boundary in each of two different direction sectors with the highest predicted D/Qs in lieu of the garden census. Specifications for broadleaf vegetation sampling in Table 5-1, Part 4.c. shall be followed, including analysis of control samples.) Methods shall be used in conducting the census that provide the best results, such as door-to-door surveys, telephone surveys, consulting the U.S.D.A. office in Burlington, inspection of aerial photographs of the area, or reviewing leasing records for area farms and residences. *5/96*

If a location(s) is identified which yields a calculated dose or dose commitment (via the same exposure pathway) 20% greater than at a location from which samples are currently being obtained, and the cooperator agrees, the new location(s) shall be added to the Radiological Environmental Monitoring Program. The indicator sampling location(s) having the lowest calculated dose or dose commitment may then be deleted from the monitoring program. *11/98*

The results of the Land Use Census shall be included in the Annual Radiological Environmental Operating Report described in Section 7.1.

5.3 Interlaboratory Comparison Program

The analysis laboratory contracted to analyze samples from the Radiological Environmental Monitoring Program participates in the EPA Laboratory Intercomparison Program or similar program.

A summary of intercomparison results shall be included in the Annual Radiological Environmental Operating Report described in Section 7.1.

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5.4 Reporting Requirements

5.4.1 Annual Radiological Environmental Operating Report

To meet the requirements of Wolf Creek Technical Specification 6.9.1.6 (ITS 5.6.2), the Annual Radiological Environmental Operating Report covering the operation of the unit during the previous calendar year shall be submitted to the NRC before May 1 of each year. The content of this report is described in Section 7.1.

5.4.2 Special Reports

A special report shall be prepared and submitted to the NRC within 30 days if levels of radioactivity as a result of plant effluents detected in an environmental medium at a specified location exceed the reporting levels of Table 5-4 when averaged over any calendar quarter. The special report shall identify the cause(s) for exceeding the limit(s) and define the corrective actions to be taken to reduce radioactive effluents so that the potential annual dose* to a member of the public is less than the calendar year limits of Wolf Creek Technical Specification 6.8.4.e (ITS 5.5.4). When one or more of the radionuclides in Table 5-4 is detected in the sampling medium, this report shall be submitted if:

$$\frac{\text{Concentration (1)}}{\text{Reporting Level (1)}} + \frac{\text{Concentration (2)}}{\text{Reporting Level (2)}} + \ldots \geq 1.0$$

When radionuclides other than those in Table 5-4 are detected and are the result of plant effluents, this report shall be submitted if the potential annual dose* to a member of the public from all radionuclides is equal to or greater than the calendar year limits of Technical Specification 6.8.4.e (ITS 5.5.4). (*The methodology and parameters used to estimate the potential annual dose to a member of the public shall be indicated in this report.)

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TABLE 5-1
RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM

Exposure Pathway/ Sample Type	Number of Samples and Sample Locations (1)	Sample Collection Frequency	Type and Frequency of Analysis
1. AIRBORNE	FIGURES 5.1 & 5.5		
Radioiodine and Particulates	Samples from five locations	Continuous sampler operation with sample collection weekly, or more frequently if required, by dust loading	Analyze radioiodine canister weekly for I-131
	Samples from locations near the site boundary in three sectors having the highest calculated annual average D/Q (Locations 2, 3 & 37 on Figure 5.1);		
	Sample from the vicinity of a community having the highest calculated annual average D/Q (Location 32 on Figure 5.1, New Strawn);		Analyze particulate filter weekly for gross beta activity (2); perform quarterly gamma isotopic analysis (3)composite (by location).
	Sample from a control location 10-20 miles distant in a low D/Q sector (Location 40 on Figure 5.5). (11)		
2. DIRECT RADIATION (4)	FIGURES 5.2 AND 5.5		
	40 routine monitoring stations with two or more dosimeters measuring dose continuously, placed as follows:	Quarterly	Gamma dose quarterly
	An inner ring of stations; one in each meteorological sector 0-3 mile range from the site (Locations 1, 7-9, 11-13, 18, 26, 27, 29-31, 37, 38 & 47 on Figure 5.2).		

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TABLE 5-1 (Continued)
RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM

Exposure Pathway/ Sample Type	Number of Samples and Sample Locations (1)	Sample Collection Frequency	Type and Frequency of Analysis
DIRECT RADIATION (4) (CONTINUED)	An outer ring of stations, one in each meteorological sector in the 3 to 5 mile range from the site (Locations 4-6, 15-17, 19-25, and 33-36 on Figure 5.2). Five sectors [A, B, D, G & L] contain an additional station (Locations 2, 3, 10, 14 and 28) The balance of the stations to be placed in special interest areas such as population centers (Locations 23 and 32), nearby residences (many locations are near a residence), schools (Location 23), and in one or two areas to serve as control stations 10-20 miles distant from the site (Locations 39 and 40 on Figure 5.5)(11)		*6/97*
3. WATERBORNE	FIGURE 5.3		
Surface	One sample upstream (5) (Location MUSH on Figure 5.3) and one sample down-stream (Location DC on Figure 5.3)	Monthly grab sample	Monthly gamma isotopic analysis (3) and composite for tritium analysis quarterly.
Ground	Samples from one or two sources only if likely to be affected Indicator samples at locations hydrologically down-gradient of the site (Locations C-10, C-49 and D-65 on Figure 5.3); control sample at a location hydrologically upgradient of the site (Location B-12 on Figure 5.3)(6)	Quarterly grab sample	Quarterly gamma isotopic analysis (3) and tritium analysis. *6/97*

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TABLE 5-1 (Continued)
RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM

Exposure Pathway/ Sample Type	Number of Samples and Sample Locations (1)	Sample Collection Frequency	Type and Frequency of Analysis
3. WATERBORNE (CONT.) Drinking	Sample of municipal water supply at an indicator location downstream of the site (Location LW-40 on Figure 5.5); control sample from location upstream of the site (Location BW-15 on Figure 5.3)	Monthly composite (7)	Monthly gamma isotopic analysis (3) and gross beta analysis of composite sample. Quarterly tritium analysis of composites (8).
Shoreline Sediment	One sample from the vicinity of Wolf Creek Cooling Lake discharge cove (Location DC on Figure 5.3); control sample from John Redmond Reservoir.	Semiannually	Semiannual gamma isotopic analysis (3)
4. INGESTION	FIGURES 5.4 AND 5.5		
Milk	Samples from milking animals at three indicator locations within 5 miles of the site having the highest dose potential (currently there are no locations producing milk for human consumption within 5 miles of the site); one sample from a control location greater than 10 miles from the site if indicator locations are sampled. (11)	Semimonthly April to November; monthly December-March (9)	Gamma isotopic analysis (3) and I-131 analysis of each sample. *7/97* *6/97*
Fish	Indicator samples of 1 to 3 recreationally important species from Wolf Creek Cooling Lake (several sampling areas indicated in Figure 5.4); control samples of similar species from John Redmond Reservoir Spillway (indicated on Figure 5.4).	Semiannually	Gamma isotopic analysis (3) on edible portions

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TABLE 5-1 (Continued)
RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM

Exposure Pathway/ Sample Type	Number of Samples and Sample Locations (1)	Sample Collection Frequency	Type and Frequency of Analysis
4. INGESTION (CONT.) Food Products	Samples of available broadleaf vegetation from two indicator locations with highest calculated annual average D/Q (Locations G-1 and F-1 and alternate Location E-1 on Figure 5.4); sample of similar broadleaf vegetation from a control location greater than 10 miles from the site in a low D/Q section (Location S-4 on Figure 5.5).(11)	Monthly when available (9)	Gamma isotopic analysis (3) on edible portions. *1/98*
Food Products	Sample of crops irrigated with water from the Neosho River downstream of the Neosho River-Wolf Creek confluence (locations will vary from year to year, e.g., Location NR-D1 & NR-D2 on Figure 5.5).	At time of harvest (10)	Gamma isotopic analysis (3) on edible portions

TABLE 5-1 (Continued)
TABLE NOTATIONS

(1) Deviations are permitted from the required sampling schedule if specimens are unobtainable due to hazardous conditions, seasonal unavailability, malfunction of automatic sampling equipment, and other legitimate reasons. If specimens are unobtainable due to sampling equipment malfunction, every effort shall be made to complete corrective action prior to the end of the next sampling period. All deviations from the sampling schedule shall be documented in the Annual Radiological Environmental Operating Report described in Section 7.1. *5/96*

It is recognized that, at times, it may not be possible or practicable to continue to obtain samples of the media of choice at the most desired location or time. In these instances, suitable specific alternative media and locations may be chosen for the particular pathway in question and appropriate substitutions made. *11/98*

(2) Airborne particulate sample filters shall be analyzed for gross beta radioactivity 24 hours or more after sampling to allow for Rn-220 and Rn-222 daughter decay. If gross beta activity in air particulate samples is greater than 10 times the yearly mean of control samples, gamma isotopic analysis shall be performed on the individual samples.

(3) Gamma isotopic analysis means the identification and quantification of gamma-emitting radionuclides that may be attributable to the effluents from the facility.

(4) One or more instruments, such as a pressurized ion chamber, for measuring and recording dose rate continuously may be used in place of, or in addition to, integrating dosimeters. For the purposes of this table, a thermoluminescent dosimeter (TLD) is considered to be one phosphor; two or more phosphors in a packet are considered as two or more dosimeters. Film badges shall not be used as dosimeters for measuring direct radiation. The 40 stations are not an absolute number. The number of direct radiation monitoring stations may be reduced according to geographical limitations, e.g., some sectors are over water so that the number of dosimeters may be reduced accordingly. The frequency or analysis or readout for the TLD system depends upon the characteristics of the specific system used and is selected to obtain optimum dose information with minimal fading. *5/96*

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TABLE 5-1 (Continued)
TABLE NOTATIONS

(5) The "upstream" sample is taken at a distance beyond significant influence of the discharge.

(6) Ground water samples shall be taken when this source is tapped for drinking or irrigation purposes in areas where the hydraulic gradient or recharge properties are suitable for contamination.

(7) A composite sample is one in which the quantity (aliquot) of liquid sampled is consistent over the sampling period and in which the method of sampling employed results in a specimen that is representative of the liquid concentrate. In this program, composite sample aliquots shall be collected at time intervals that are very short (e.g., every two hours) relative to the compositing period (e.g., monthly) in order to assure obtaining a representative sample. *5/96*

(8) If the dose calculated for consumption of water (using ODCM methodology and parameters) exceeds one millirem per year, composite sampling at the indicator location shall be performed every two weeks and I-131 analysis shall be performed on the composite samples.

(9) Milk and broadleaf vegetation samples are often temporarily, but not permanently, unavailable at the scheduled sample collection times. Alternate sampling locations may therefore be listed in the Table and used at these times to provide continued monitoring of these pathways. If samples are considered permanently unavailable at a location, another location will be selected (if available) as described in Note (1).

(10) If harvest occurs more than once a year, sampling shall be performed during each discrete harvest. If harvest occurs continuously, sampling shall be monthly. Attention shall be paid to including samples of tuberous and root food products.

(11) The purpose of this sample is to obtain background information. If it is not practical to establish control locations in accordance with the distance and wind direction criteria, other sites that provide valid background data may be substituted.

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TABLE 5-2

SAMPLING LOCATION NUMBERS, DISTANCES (miles) AND DIRECTIONS

Air Particulate

Location Number	Distance/ Direction
2	2.7/N
3	3.0/NNE
32	3.2/WNW
37	2.1/NNW
40	>15.0/WNW

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TLD

Location Number	Distance/ Direction	Location Number	Distance/ Direction	Location Number	Distance/ Direction	Location Number	Distance/ Direction
1	1.4/N	11	1.6/E	21	3.8/S	31	3.0/WNW
2	2.7/N	12	1.8/ESE	22	4.1/SSW	32	3.2/WNW
3	3.0/NNE	13	1.5/SE	23	4.5/SW	33	3.7/WNW
4	4.0/NNE	14	2.6/SE	24	4.1/WSW	34	4.0/NW
5	4.0/NE	15	4.5/ESE	25	3.6/W	35	4.6/NNW
6	4.4/ENE	16	4.2/E	26	2.6/WSW	36	4.2/N
7	1.9/NE	17	3.6/SE	27	2.1/SW	37	2.1/NNW
8	1.6/NNE	18	3.0/SSE	28	2.8/SW	38	1.2/NW
							6/97
9	2.0/ENE	19	4.0/SSE	29	2.6/SSW	39	13.0/N
10	2.4/ENE	20	3.3/S	30	2.2/W	40	>15.0/WNW
						47	.16/S
							7/97

Groundwater		Drinking Water		Surface Water	
B-12	2.2/NNE	BW-15	3.9/SW	MUSH	3.6/W
C-10	2.8/W	LW-40	>10/SSE	DC	0.6/WNW
C-49	2.9/SW				
D-65	3.9/S				

Milk & Food Products

F-1	1.8/ESE			
G-1	1.6/SE	S-4	>15.0/WNW	*6/97*
E-1	1.8/E			*1/98*

Fish		Shoreline Sediments		Irrigated Crops	
WCCL		DC	0.6/WNW	NR-D1	9.2/S
JRR	4/W	JRR	4/W	NR-D2	>10/S

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TABLE 5-3

DETECTION CAPABILITIES FOR ENVIRONMENTAL SAMPLE ANALYSIS [1][2]

Lower Limit of Detection (LLD) [3]

ANALYSIS	WATER (pCi/l)	AIRBORNE PARTICULATE OR GASES (pCi/m^3)	FISH (pCi/kg, wet)	MILK (pCi/l)	FOOD PRODUCTS (pCi/kg, wet)	SEDIMENT (pCi/kg, dry)
Gross Beta	4	0.01				
H-3	2,000*					
Mn-54	15		130			
Co-58	15		130			
Fe-59	30		260			
Co-60	15		130			
Zn-65	30		260			
Zr-Nb-95	15					
I-131	1**	0.07		1	60	
Cs-134	15	0.05	130	15	60	150
Cs-137	18	0.06	150	18	80	180
Ba-La-140	15			15		

* LLD for drinking water samples. If no drinking water pathway exists, a value of 3,000 pCi/l may be used.

** LLD for drinking water samples. If no drinking water pathway exists, the LLD of gamma isotopic analysis may be used.

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TABLE 5-3 (Continued)
TABLE NOTATIONS

(1) This list does not mean that only these nuclides are to be considered. Other peaks that are identifiable, together with those of the above nuclides, shall also be analyzed and reported in the Annual Radiological Environmental Operating Report described in Section 7.1.

(2) Required detection capabilities for thermoluminescent dosimeters used for environmental measurements shall be in accordance with the recommendations of Regulatory Guide 4.13, Revision 1, 1977.

(3) The LLD is defined, as the smallest concentration of radioactive material in a sample that will yield a net count, above system background, that will be detected with 95% probability with only 5% probability of falsely concluding that a blank observation represents a "real" signal.

For a particular measurement system, which may include radiochemical separation:

$$LLD = \frac{4.66\, s_b}{E \bullet V \bullet 2.22 \bullet Y \bullet \exp(-\lambda \Delta t)}$$

Where:

LLD = the "a priori" lower limit of detection (picoCuries per unit mass or volume),

S_b = the standard deviation of the background counting rate or of the counting rate of a blank sample as appropriate (counts per minute),

E = the counting efficiency (counts per disintegration),

V = the sample size (units of mass or volume),

2.22 = the number of disintegrations per minute per picoCurie,

Y = the fractional radiochemical yield, when applicable,

λ = the radioactive decay constant for the particular radionuclide (sec^{-1}), and

Δt = the elapsed time between sample collection, or end of the sample collection period, and time of counting(sec).

Typical values of E, V, Y, and Δt should be used in the calculation.

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TABLE 5-3 (Continued)
TABLE NOTATIONS

It should be recognized that the LLD is defined as an a priori (before the fact) limit representing the capability of a measurement system and not as an a posteriori (after the fact) limit for a particular measurement. Analyses shall be performed in such a manner that the stated LLDs will be achieved under routine conditions. Occasionally background fluctuations, unavoidable small sample sizes, the presence of interfering nuclides, or other uncontrollable circumstances may render these LLDs unachievable. In such cases, the contributing factors shall be identified and described in the Annual Radiological Environmental Operating Report described in Section 7.1.

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TABLE 5-4
REPORTING LEVELS FOR RADIOACTIVITY CONCENTRATIONS IN ENVIRONMENTAL SAMPLES

ANALYSIS	WATER (pCi/l)	AIRBORNE PARTICULATE OR GASES (pCi/m^3)	FISH (pCi/kg, wet)	MILK (pCi/l)	FOOD PRODUCTS (pCi/kg, wet)
H-3	20,000*				
Mn-54	1,000		30,000		
Co-58	1,000		30,000		
Fe-59	400		10,000		
Co-60	300		10,000		
Zn-65	300		20,000		
Zr-Nb-95	400				
I-131	2**	0.9		3	100
Cs-134	30	10	1,000	60	1,000
Cs-137	50	20	2,000	70	2,000
Ba-La-140	200			300	

* For drinking water samples. This is 40 CFR Part 141 value. If no drinking water pathway exists, a value of 30,000 pCi/l may be used.
** If no drinking water pathway exists, a value of 20 pCi/l may be used.

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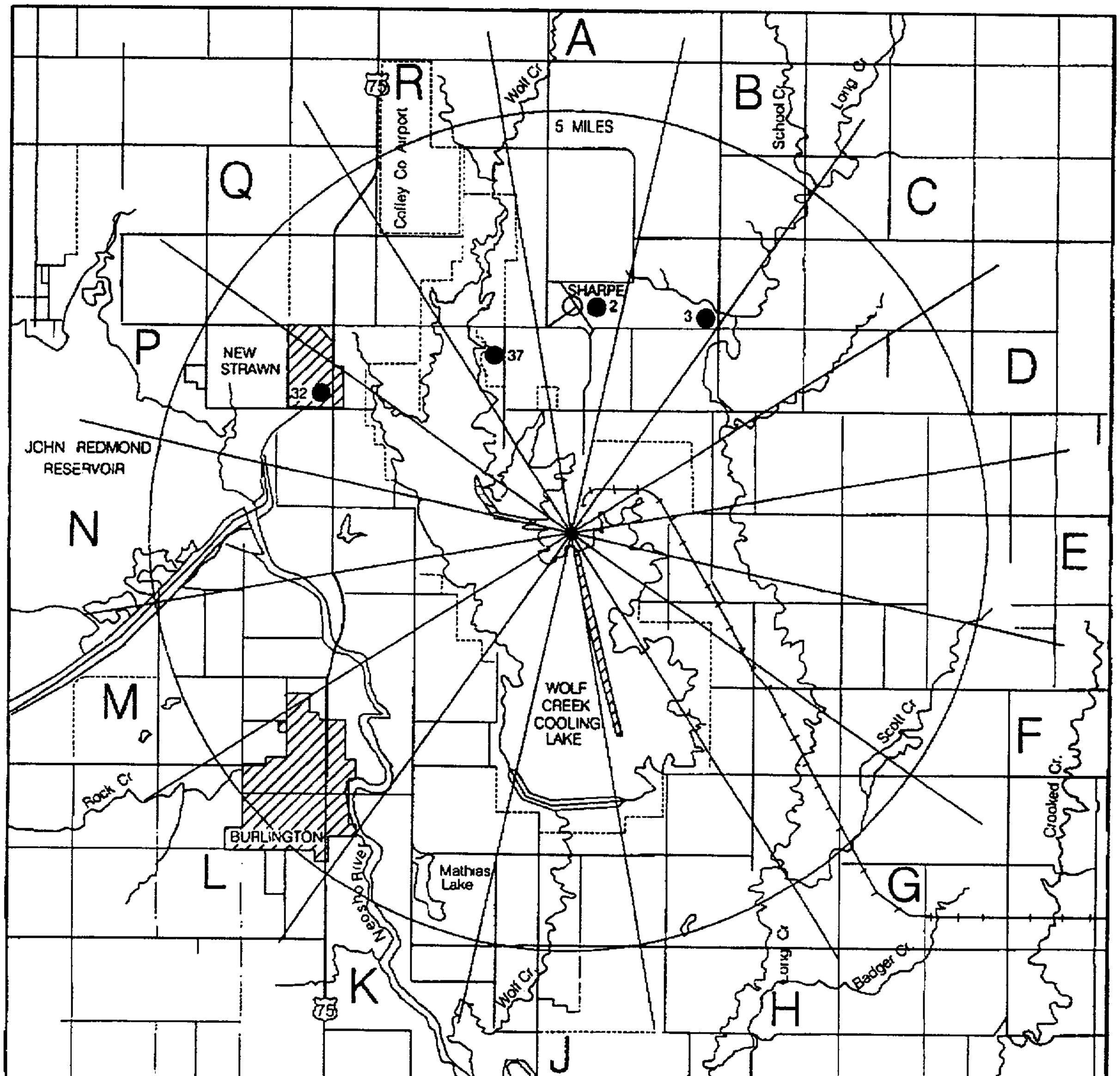
FIGURE 5.1



AIRBORNE PATHWAY SAMPLING LOCATIONS

● = AIRBORNE PARTICULATE AND RADIOIODINE

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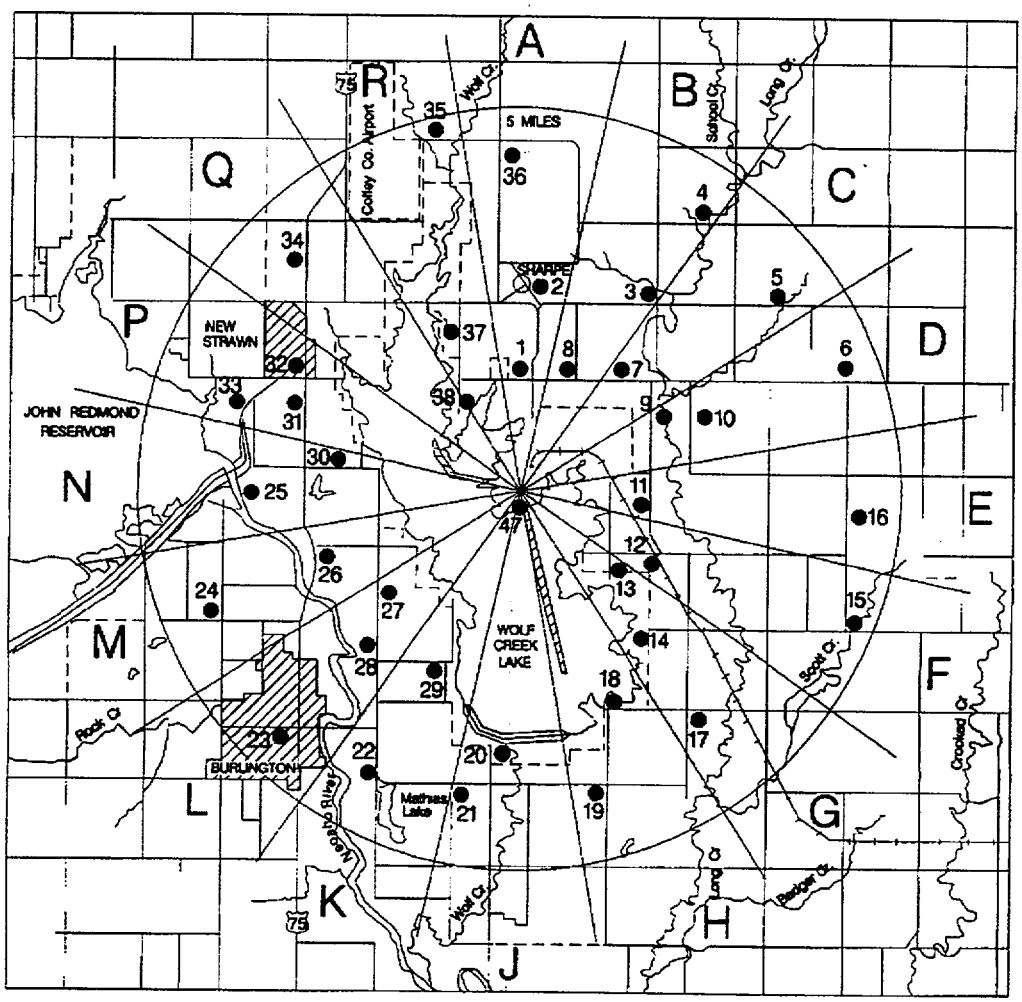
FIGURE 5.2



DIRECT RADIATION PATHWAY SAMPLING LOCATIONS

● = TLD LOCATIONS

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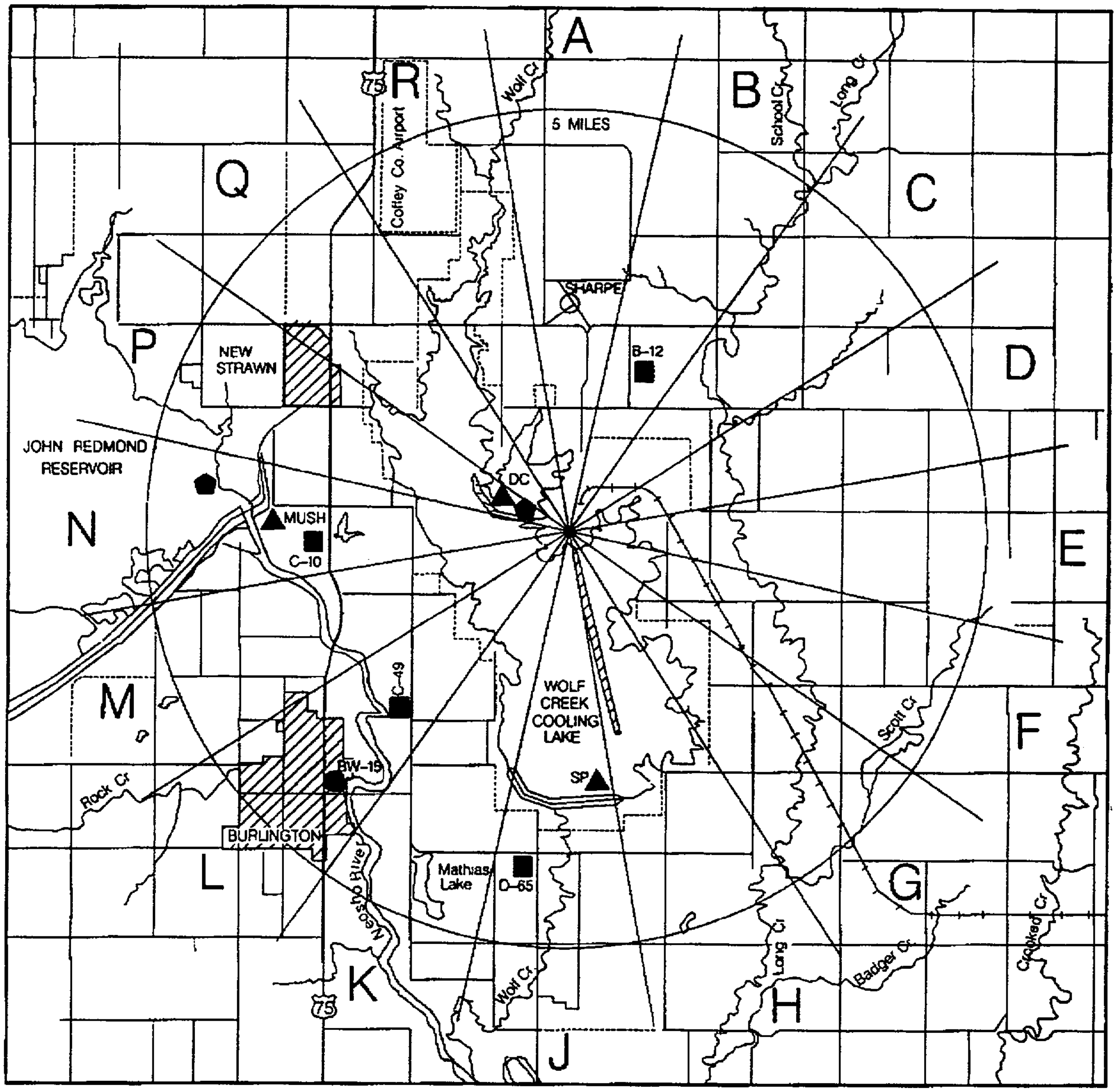
FIGURE 5.3



WATERBORNE PATHWAY SAMPLING LOCATIONS

● = DRINKING WATER ▲ = SURFACE WATER

■ = GROUND WATER ⬟ = SHORELINE SEDIMENT

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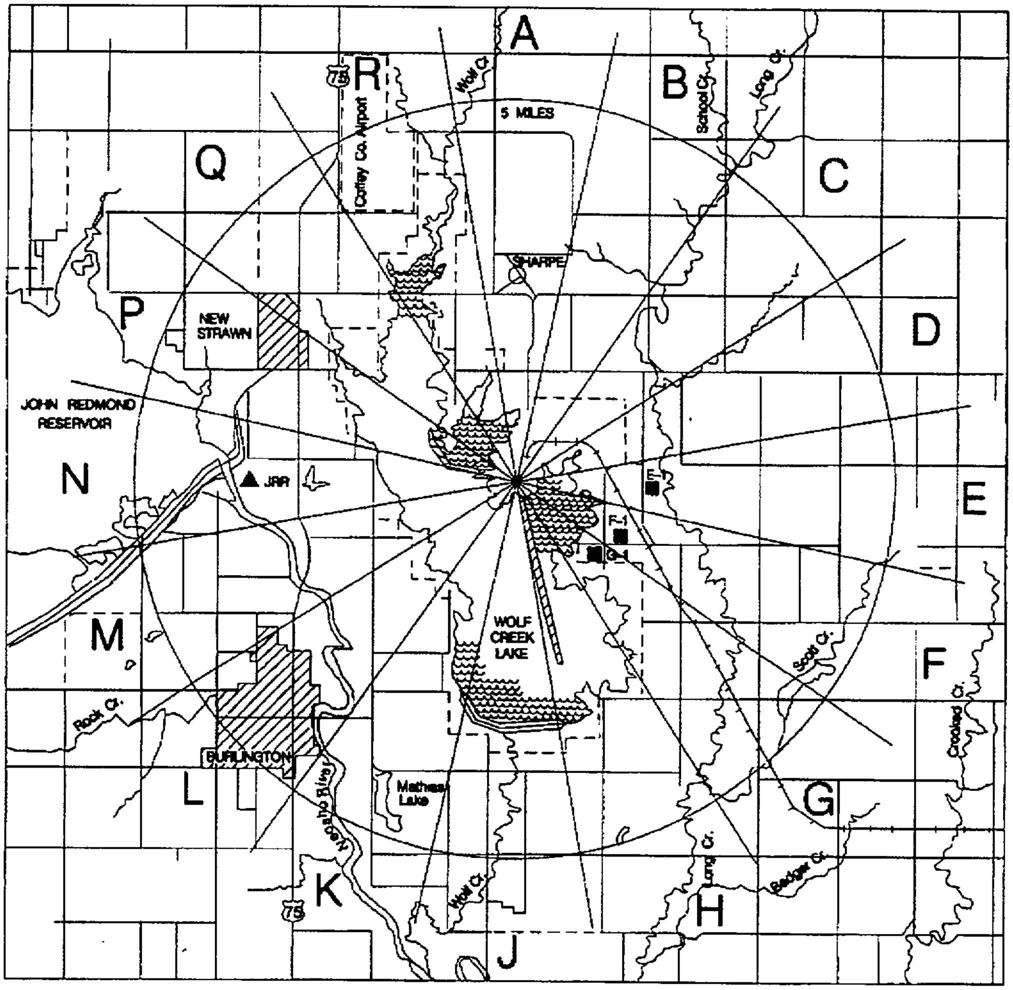
FIGURE 5.4



INGESTION PATHWAY SAMPLING LOCATIONS

▲ = FISH (JRR) ■ = BROADLEAF VEGETATION / IRRIGATED CROPS
(wave symbol) = FISH (WCL)

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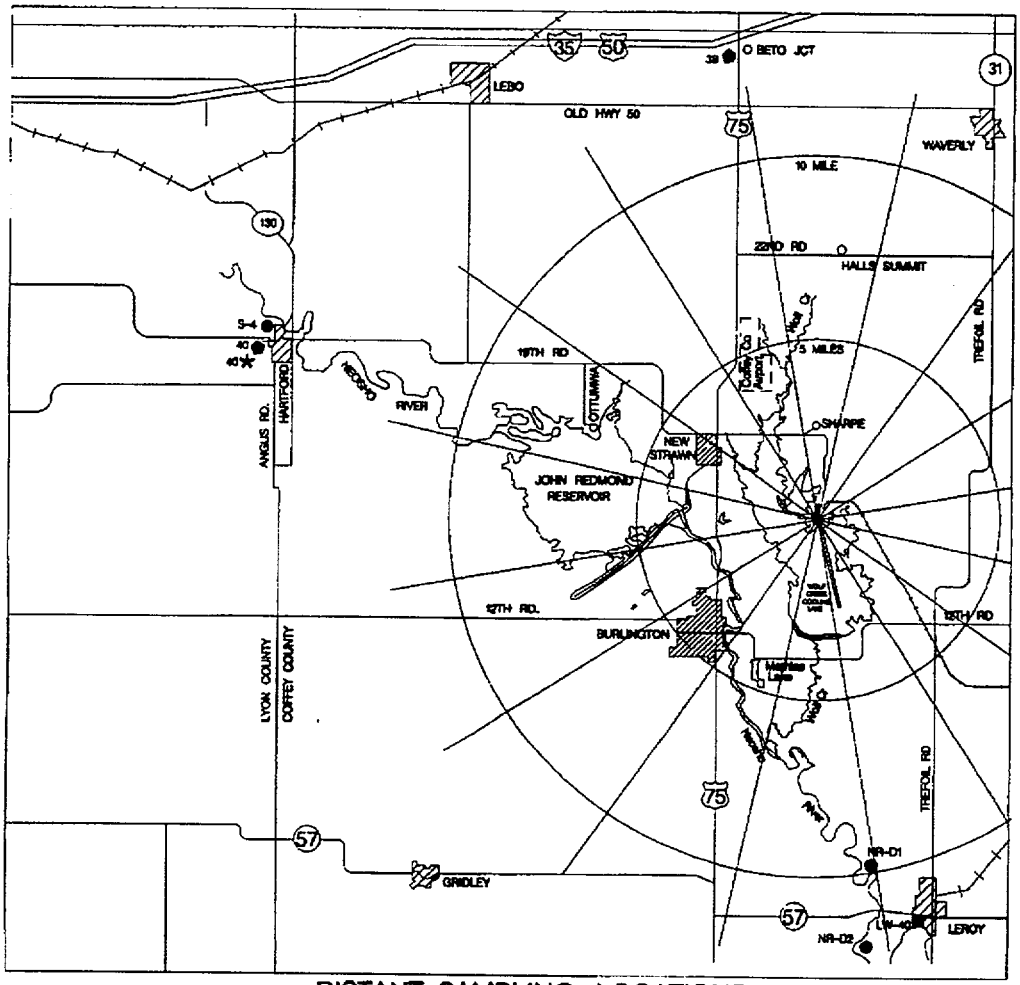
FIGURE 5.5



DISTANT SAMPLING LOCATIONS

● = TLD
■ = DRINKING WATER
★ = AIRBORNE PARTICULATE & RADIOIODINE
● = BROADLEAF VEGETATION/ IRRIGATED CROPS

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6.0 Bases

The bases contained on the succeeding pages summarize the general requirements of Section 5.0 of the ODCM (REMP).

Section 2.0 Liquid Effluents (Contained in AP 07B-003)

Section 3.0 Gaseous Effluents (Contained in AP 07B-003)

Section 4.0 Total Dose (Contained in AP 07B-003)

Section 5.0 Radiological Environmental Monitoring Program

Section 5.1 Monitoring Program

The Radiological Environmental Monitoring Program provides representative measurements of radiation and of radioactive materials in those exposure pathways and for those radionuclides that lead to the highest potential radiation exposures of MEMBERS OF THE PUBLIC resulting from the station operation. This monitoring program implements Section IV.B.2 of Appendix I to 10 CFR Part 50 and thereby supplements the Radiological Effluent Monitoring Program by verifying that the measurable concentrations of radioactive materials and levels of radiation are not higher than expected on the basis of the effluent measurements and the modeling of the environmental exposure pathways. Guidance for this monitoring program is provided by the Radiological Assessment Branch Technical Position on Environmental Monitoring, Revision 1, November 1979.

The required detection capabilities for environmental sample analyses are tabulated in terms of the lower limits of detection (LLDs). The LLDs are considered optimum for routine environmental measurements in industrial laboratories. It should be recognized that the LLD is defined as an a priori (before the fact) limit representing the capability of a measurement system and not as an a posteriori (after the fact) limit for a particular measurement.

Detailed discussion of the LLD, and other detection limits, can be found in HASL Procedures Manual, HASL-300 (revised annually), Currie, L.A., "Limits for Qualitative Detection and Quantitative Determination-Application to Radiochemistry," Anal. Chem. 40, 586-93 (1968), and Hartwell, J.K., "Detection Limits for Radioanalytical Counting Techniques," Atlantic Richfield Hanford Company Report ARH-SA-215 (June 1975).

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Section 5.2 Land Use Census

This section is provided to ensure that changes in the use of areas at and beyond the SITE BOUNDARY are identified and that modifications to the Radiological Environmental Monitoring Program given in the ODCM are made if required by the results of this census. Information that will provide the best results, such as door-to-door survey, aerial survey, or consulting with local agricultural authorities, shall be used. This census satisfies the requirements of Section IV.B.3 of Appendix I to 10 CFR Part 50. Restricting the census to gardens of greater than 50 m^2 provides assurance that significant exposure pathways via leafy vegetables will be identified and monitored since a garden of this size is the minimum required to produce the quantity (26 kg/year) of leafy vegetables assume in Regulatory Guide 1.109 for consumption by a child.

To determine this minimum garden size, the following assumptions were made: (1) 20% of the garden was used for growing broadleaf vegetation (i.e., similar to lettuce and cabbage), and (2) a vegetation yield of 2 kg/m^2.

Section 5.3 Interlaboratory Comparison Program

The requirement for participation in an approved Interlaboratory Comparison Program is provided to ensure that independent checks on the precision and accuracy of the measurements of radioactive material in environmental sample matrices are performed as part of the quality assurance program for environmental monitoring in order to demonstrate that the results are valid for the purposes of Section IV.B.2 of Appendix I to 10 CFR Part 50.

7.0 Reports

7.1 Annual Radiological Environmental Operating Report

The Annual Radiological Environmental Operating Report shall include summaries, interpretations, and analysis of trends of the results of the Radiological Environmental Monitoring Program for the reporting period. The material provided shall be consistent with the objectives outlined in (1) the ODCM and (2) Sections IV.B.2, IV.B.3 and IV.C of Appendix I to 10 CFR Part 50 (Reference Step 3.1.6), including a comparison with preoperational studies, with operational controls and with previous environmental surveillance reports, and an assessment of the observed impacts of the plant operation on the environment. The report shall also include the results of the Land Use Census described in Section 5.2. ***11/98***

The Annual Radiological Environmental Operating Report shall include the results of analysis of all radiological environmental samples and of all environmental radiation measurements taken during the period pursuant to the locations specified in Table 5-1 as well as summarized and tabulated results of these analyses and measurements in the format of the table in the Radiological Assessment Branch Technical Position, Revision 1, November 1979. In the event that some individual results are not available for inclusion with the report, the report shall be submitted noting and explaining the reasons for the missing results. The missing data shall be submitted as soon as possible in a supplementary report.

The report shall also include the following: a summary description of the Radiological Environmental Monitoring Program; legible maps covering all sampling locations keyed to a table giving distances and directions from the centerline of the reactor; the results of licensee participation in the Interlaboratory Comparison Program and the corrective actions being taken if the specified program is not being performed as required by Section 5.3; reasons for not conducting the Radiological Environmental Program as required by Section 5.1 with plans for preventing a recurrence and discussion of all deviations from the sampling schedule of Table 5-1; discussion of environmental sample measurements that exceed the reporting levels of Table 5-4 but are not the result of plant effluents, and discussions of all analyses in which the LLD required by Table 5-3 was not achieved. *5/96*

7.2 **Annual Radioactive Effluent Release Report (Contained in AP 07B-003)**

APPENDIX A **Dose Conversion Factor Tables (Contained in AP 07B-003)**

APPENDIX B **Meteorological Model (Contained in AP 07B-003)**

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