December 29, 1988

Subject: Offsite Dose Calculation Manual
Revision 24

The General Office Radwaste Engineering Staff is transmitting to you this date, Revision 24 of the Offsite Dose Calculation Manual. As this revision only affects Catawba Nuclear Station, the approval of other station managers is not required. Please update your copy No. 1, and discard the affected pages.

REMOVE THESE PAGES		ADD/REPLACE WITH PAGE	
C-7	Rev. 19	C-7	Rev. 24
C-12	Rev. 19	C-12	Rev. 24
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C-14	Rev. 19	C-14	Rev. 24
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C-23	Rev. 19	C-23	Rev. 24
Table C5.0-1	Rev. 6	Table C5.0-1	Rev. 24
Table C5.0-2	Rev. 19	Table C5.0-2	Rev. 24

NOTE: As this letter, with it's attachments, contains "LOEP" information, please insert this in front of the December 28, 1988 letter.

Approval Date: 12/29/88

Effective Date: 1/1/89

Mary L. Birch

Mary L. Birch
Radiation Protection Manager

Approval Date: 12/29/88

Effective Date: 1/1/89

Tony B Owen

T.B. Owen, Manager
Catawba Nuclear Station

If you have any questions concerning Revision 24, please call Jim Stewart at (704) 373-5444.

James M. Stewart Jr

James M. Stewart, Jr.
Scientist
Radiation Protection

JUSTIFICATIONS FOR REVISION 24

Pages C-4 thru C-23	Updated sections using 1988 Effluent Release Data (first nine months) and the 1988 Land Use Census Data.
Table C5.0-1	Changed per attached November 15, 1988 letter from W P Deal
Table C5.0-2	Changed per attached November 15, 1988 letter from W P Deal

Duke Power Company
Catawba Nuclear Station
P.O. Box 256
Clover, S.C. 29710

(803) 831-3000

DUKE POWER

November 15, 1988

INTERSTATION LETTER
CATAWBA NUCLEAR STATION

TO: M. L. Birch

SUBJECT: Catawba Nuclear Station
Revision to Offsite Dose Calculation Manual
File No.: CN-778.02

Please correct the distance and direction for Tega Cay sampling location number 212 from 2.7m ESE to 3.3m E, on both Table C5.0-1 and Table C5.0-2 (as shown on Attachments 1 and 2). The physical sampling location has not actually changed; this error was discovered during our recent Radiological Environmental Monitoring Program Review. The results of this review have been included as Attachment 3.

If you have any questions about this correction, please contact Brian Chundrlik at 831-5580. Thank-you for your assistance in this matter.

W. P. Deal

W. P. Deal
Station Health Physicist

BMC/bjp

cc: G. L. Courtney (Without Attachment 3)
R. E. Sorber (Without Attachment 3)
[redacted]ithout Attachment 3)

Attachments

$(\overline{X/Q})$ = 3.10E-05 sec/m^3. The highest calculated annual average relative concentration (dispersion parameter) for any area at or beyond the unrestricted area boundary. The location is the NNE sector @ 0.5 miles.

W = The highest calculated annual average dispersion parameter for estimating the dose to an individual at a location in the unrestricted area where the total inhalation, food and ground plane pathway dose is determined to be a maximum based on operational source term data, land use surveys, and NUREG-0133 guidance.

W = 2.5E-05 sec/m^3, for the inhalation pathway. The location is the S sector @ 0.5 miles.

W = 7.2E-08 $meter^{-2}$, for the food and ground plane pathways. The location is the S sector @ 0.5 miles.

$$\tilde{Q}_i = k_1 C_i f \div k_2 = 4.72E{+}2 C_i f$$

where:

C_i = the concentration of radionuclide, i, in undiluted gaseous effluent, in μCi/ml.

f = the undiluted effluent flow, in cfm

k_1 = conversion factor, 2.83E4 ml/ft^3

k_2 = conversion factor, 6E1 sec/min

C4.0 DOSE CALCULATIONS

C4.1 FREQUENCY OF CALCULATIONS

Dose contributions to the maximum individual shall be calculated at least every 31 days, quarterly, semiannually, and annually (or as required by Technical Specifications) using the methodology in the generic information sections. This methodology shall also be used for any special reports. Dose calculations that are required for individual pre-release calculations, and/or abnormal releases shall not be calculated by using the simplified dose calculations. Station dose projections for these types and others that are known to vary from the station historical averages shall be calculated by using the methodology in the generic information section. STATION Dose projections may be performed using simplified dose estimates.

Fuel cycle dose calcuations shall be performed annually or as required by special reports. Dose contributions shall be calculated using the methodology in the appropriate generic information sections.

C4.2 DOSE MODELS FOR MAXIMUM EXPOSED INDIVIDUAL

C4.2.1 Liquid Effluents

For dose contributions from liquid radioactive releases, dose calculations based on operational source term data and NUREG-0133 guidance indicate that the maximum exposed individual would be an adult who consumed fish caught in the discharge canal and who drank water from the nearest "downstream" potable water intake. The dose from Cs-134 and Cs-137 has been calculated to be 93% of that individual's total body dose.

C4.2.2 Gaseous Effluents

C4.2.2.1 Noble Gases

For dose contributions from exposure to beta and gamma radiation from noble gases, it is assumed that the maximum exposed individual is an adult at a controlling location in the unrestricted area where the total noble gas dose is determined to be a maximum.

C4.2.2.2 Radioiodines, Particulates, and Other Radionuclides $T\ 1/2 > 8$ days

For dose contributions from radioiodines, particulates and other radionuclides; it is assumed that the maximum exposed individual is a child or infant at a controlling location in the unrestricted area where the total inhalation, food and ground plane pathway dose is determined to be a maximum based on operational source term data, land use surveys, and NUREG-0133 guidance.

C4.3 SIMPLIFIED DOSE ESTIMATE

C4.3.1 Liquid Effluents

For dose estimates, a simplified calculation based on the assumptions presented in Section C4.2.1 and operational source term data is presented below. Updated operational source term data shall be used to revise these calculations as necessary.

$$D_{WB} = 6.26E{+}05 \sum_{\ell=1}^{m} (F_\ell)(T_\ell)\ (C_{Cs-134} + 0.59\ C_{Cs-137})$$

where:

$6.26E{+}05 = 1.14E{+}05\ (U_{aw}/D_w + U_{af}\ BF_i)\ DF_{ai\tau}\ (1.08)$

where:

$1.14E{+}05 = 10^6 pCi/\mu Ci \times 10^3 ml/kg \div 8760\ hr/yr$

U_{aw} = 730 ℓ/yr, adult water consumption

D_w = 37.7, dilution factor from the near field area to the nearest potable water intake.

U_{af} = 21 kg/yr, adult fish consumption

BF_i = 2.00E+03, bioaccumulation factor for Cesium (Table 3.1-1)

$DF_{ai\tau}$ = 1.21E-04, adult, total body, ingestion dose factor for Cs-134 (Table 3.1-2)

1.08 = factor derived from the assumption that 93% of dose is from Cs-134 and Cs-137 or 100% ÷ 93% = 1.08

And where:

$$F_\ell = \frac{f\sigma}{F + f}$$

where:

f = liquid radwaste flow, in gpm

σ = recirculation factor at equilibrium, 1.027 (see Section C2.1.1)

F = dilution flow, in gpm

And where:

T_{ℓ} = The length of time, in hours, over which C_{Cs-134}, C_{Cs-137}, and F_{ℓ} are averaged.

C_{Cs-134} = the average concentration of Cs-134 in undiluted effluent, in μCi/ml, during the time period considered.

C_{Cs-137} = the average concentration of Cs-137 in undiluted effluent, in μCi/ml, during the time period considered.

0.59 = The ratio of the adult total body ingestion dose factors for Cs-134 and Cs-137 or 7.14E-05 ÷ 1.21E-04 = 0.59

C4.3.2 Gaseous Effluents

Meteorological data is provided in Tables C4.0-1 and C4.0-2.

C4.3.2.1 Noble Gases

For dose estimates, simplified dose calculations based on the assumptions in C4.2.2.1 and operational source term data are presented below. Updated operational source term data shall be used to revise these calculations as necessary. These calculations further assume that the annual average dispersion parameter is used and that Xenon-133 contributes 83% of the gamma air dose and 93% of the beta air dose.

$$D_\gamma = 3.47E\text{-}10\ [\tilde{Q}]_{Xe\text{-}133}\ (1.21)$$

$$D_\beta = 1.03E\text{-}09\ [\tilde{Q}]_{Xe\text{-}133}\ (1.08)$$

where:

3.47E-10 = (3.17E-8)(353) ($\overline{X/Q}$), derived from equation presented in Section 3.1.2.1.

1.03E-09 = (3.17E-08) (1050) ($\overline{X/Q}$), derived from equation presented in Section 3.1.2.1.

$\overline{X/Q}$ = 3.1E-05 sec/m^3, as defined in Section C2.2.2

$[\tilde{Q}]_{Xe\text{-}133}$ = the total Xenon-133 activity released in μCi

1.21 = factor derived from the assumption that 83% of the gamma air dose is contributed by Xe-133.

1.08 = factor derived from the assumption that 93% of the beta air dose is contributed by Xe-133.

C4.3.2.2 Radioiodines, Particulates, and Other Radionuclides with T 1/2 > 8 days

For dose estimates, simplified dose calculations based on the assumptions in C4.2.2.2 and operational source term data are presented below. Updated operational source term data shall be used to revise these calculations as necessary. These calculations further assume that the annual average dispersion/deposition parameters are used and that 68% of the dose results from H-3 ingested by the maximally exposed individual via the vegetable garden pathway at the controlling location. The simplified dose estimate for exposure to the thyroid of a child is:

$$D = 1.28E\text{-}04\ w\ (\tilde{Q})_{H\text{-}3}\ (1.89)$$

where:

w = 2.50E-05 = $\overline{X/Q}$ for vegetable garden pathway, in sec/m^3 from Table C4.0-1 for the controlling location (S sector at 0.5 miles).

$(\tilde{Q})_{H-3}$ = the total Tritium activity released in μCi.

1.28E-04 = $(3.17E-08)(R_i^V\ [\overline{X/Q}])$ with the appropriate substitutions for child vegetable pathway factor, $R_i^V\ [\overline{X/Q}]$ for H-3. See Section 3.1.2.2.

1.89 = factor derived from the assumption that 53% of the total inhalation, food and ground plane pathway dose to the maximally exposed individual is contributed by H-3 via the vegetable garden pathway.

C4.4 FUEL CYCLE CALCULATIONS

As discussed in Section 3.3.5, more than one nuclear power station site may contribute to the doses to be considered in accordance with 40CFR190. The fuel cycle dose assessments for Catawba Nuclear Station must include gaseous dose contributions from McGuire Nuclear Station, which is located approximately thirty miles NNE of Catawba. For this dose assessment, the total body and maximum organ dose contributions to the maximum exposed individual from the combined Catawba and McGuire liquid and gaseous releases are estimated using the following calculations:

$$D_{WB}(T) = D_{WB}(l_m) + D_{WB}(l_c) + D_{WB}(g_m) + D_{WB}(g_c)$$

$$D_{MO}(T) = D_{MO}(l_m) + D_{MO}(l_c) + D_{MO}(g_m) + D_{MO}(g_c)$$

where:

$D_{WB}(T)$ = Total estimated fuel cycle whole body dose commitment resulting from the combined liquid and gaseous effluents of Catawba and McGuire during the calender year of interest, in mrem.

$D_{MO}(T)$ = Total estimated fuel cycle maximum organ dose commitment resulting from the combined liquid and gaseous effluents of Catawba and McGuire during the calender year of interest, in mrem.

C4.4.1 Liquid Effluents

Liquid pathway dose estimates are based on values and assumptions presented in Sections B4.3.1. and C4.3.1. Operational source terms shall be used to update these simplified calculations as necessary.

C4.4.1.1 McGuire's Liquid Contributions

Based on operational history, the Catawba fuel cycle maximum exposed individual whole body dose resulting from McGuire liquid effluent releases ($D_{WB}(l_m)$) is estimated using the simplified dose calculation given below:

$$D_{WB}(l_m) = (1.03E+06)\ (F_\ell)\ (T_\ell)\ (C_{Cs-134} + 0.59\ C_{Cs-137})$$

where:

$$1.03E+06 = 1.14E+05 (U_{aw} + U_{af} \times BF_i) (DF_{ait}) (1.75)$$

where:

$$1.14E+05 = (1.0E+06 \text{ pCi/uCi} \times 1.0E+03 \text{ ml/kg}) / (8760 \text{ hr/yr})$$

U_{aw} = 730 ℓ/yr, Adult water consumption

U_{af} = 21 kg/yr, Adult fish consumption

BF_i = 2.00E+03, Bioaccumulation factor for Cesium (Table 3.1-1)

DF_{ait} = 1.21E-04, Adult total body ingestion dose factor for Cs-134 (Table 3.1-2)

1.75 = Factor derived from the assumption that 57% of the dose is derived from Cs-134 and Cs-137 or 100% / 57% = 1.75

where:

$$F_\ell = f / F$$

where:

f = McGuire's liquid radwaste flow, in gpm

F = 1.97E+06 gpm, the average flow past Lake Wylie Dam

where:

T_ℓ = 8760 hours, the time period of time over which C_{Cs-134} , C_{Cs-137} and F_ℓ are averaged.

C_{Cs-134} = The average concentration of Cs-134 in McGuire's undiluted effluent, in uCi/ml, during the calender year of interest.

C_{Cs-137} = The average concentration of Cs-137 in McGuire's undiluted effluent, in uCi/ml, during the calender year of interest.

0.59 = The ratio of the adult total body ingestion dose factors for Cs-134 and Cs-137 or 7.14E-05 / 1.21E-04 = 0.59

Based on operational history, the Catawba fuel cycle maximum exposed individual maximum organ dose (Adult-GI-LLI) resulting from McGuire's liquid effluent releases ($D_{MO}(1_m)$) is estimated using the simplified dose calculation given below:

$$D_{MO}(1_m) = (1.51E+06) (F_\ell) (T_\ell) (C_{Nb-95})$$

where:

$$1.51E+06 = (1.14E+05 (U_{aw} + U_{af} \times BF_i) (DF_{ait}) (1.21)$$

where:

$1.14E+05 = (1.0E+06 \text{ pCi/uCi} \times 1.0E+03 \text{ ml/kg}) / (8760 \text{ hr/yr})$

U_{aw} = 730 ℓ/yr, adult water consumption

U_{af} = 21 kg/yr, Adult fish comsumption

BF_i = 3.00E+04, Bioaccumulation factor for Niobium (Table 3.1-1)

DF_{ait} = 2.10E-05, adult GI-tract ingestion dose factor for Nb-95 (Table 3.1-2)

1.21 = Factor derived from the assumption that 83% of the adult GI-tract dose is from Nb-95 or 100% / 83% = 1.21

where:

$F_\ell = f / F$

where:

f = McGuire's liquid radwaste flow, in gpm

F = 1.97E+06 gpm, the average flow past Lake Wylie Dam

where:

T_ℓ = 8760 hours, the time period of time over which C_{Nb-95} and F_ℓ are averaged.

C_{Nb-95} = The average concentration of Nb-95 in McGuire undiluted effluent, in uCi/ml, during the calender year of interest.

C4.4.1.2 Catawba's Liquid Contribution

Based on operational history, the Catawba fuel cycle maximum exposed individual whole body dose resulting from Catawba's liquid effluent releases ($D_{WB}(1_c)$) is estimated using the simplified dose calcuation given below:

$$D_{WB}(1_c) = (6.26E+05)(F_\ell)(T_\ell)(C_{Cs-134} + 0.59\, C_{Cs-137})$$

where:

$$6.26E+05 = 1.14E+05\,(U_{aw} / D_w + U_{af} \times BF_i)(DF_{ait})(1.08)$$

where:

$1.14E+05 = (1.0E+06$ pCi/uCi x $1.0E+03$ ml/kg) / (8760 hr/yr)

U_{aw} = 730 ℓ/yr, Adult water consumption

D_w = 37.7, dilution factor from the near field area to the nearest potable water intake (Rock Hill Water Intake)

U_{af} = 21 kg/yr, Adult fish consumption

BF_i = 2.00E+03, Bioaccumulation factor for Cesium (Table 3.1-1)

DF_{ait} = 1.21E-04, Adult total body ingestion dose factor for Cs-134 (Table 3.1-2)

1.08 = Factor derived from the assumption that 93% of the dose is derived from Cs-134 and Cs-137 or 100% / 93% = 1.08

and where:

$$F_\ell = (f) (\sigma) / (F + f)$$

where:

f = Catawba's liquid radwaste flow, in gpm

σ = Recirculation factor at equilibrium, 1.027 (See section C2.2.1)

F = Catawba's dilution flow, in gpm

and where:

T_ℓ = 8760 hours, the time period of time over which C_{Cs-134}, C_{Cs-137} and F_ℓ are averaged.

C_{Cs-134} = The average concentration of Cs-134 in Catawba's undiluted effluent, in uCi/ml, during the calender year of interest.

C_{Cs-137} = The average concentration of Cs-137 in Catawba's undiluted effluent, in uCi/ml, during the calender year of interest.

0.59 = The ratio of the adult total body ingestion dose factors for Cs-134 and Cs-137 or 7.14E-05 / 1.21E-04 = 0.59

Based on operational history, the Catawba fuel cycle maximum exposed individual maximum organ dose (Adult, GI-LLI) resulting from Catawba's liquid effluent releases ($D_{MO}(1_c)$) is estimated using the simplified dose calculation given below:

$$D_{MO}(1_c) = (1.58E+06) (F_\ell) (T_\ell) (C_{Nb-95})$$

where:

$$1.58E+06 = (1.14+05) (U_{aw} / D_w + U_{af} \times BF_i) (DF_{ait}) (1.05)$$

where:

1.14E+05 = (1.0E+06 pCi/uCi x 1.0E+03 ml/kg) / 8760 hr/yr

U_{aw} = 730 ℓ/yr, Adult water consumption

D_w = 37.7, Dilution factor from the near field area to potable water intake.

U_{af} = 21 kg/yr, Adult fish consumption

BF_i = 3.00E+04, Bioaccumulation factor for Niobium (Table 3.1-1)

DF_{ait} = 2.10E-05, Adult GI-LLI ingestion dose factor for Nb-95 (Table 3.1-2)

1.05 = Factor derived from the assumption that 96% of adult GI-LLI dose is from Nb-95 or 100% / 96% = 1.05

where:

$$F_\ell = (f) (\sigma) / (F + f)$$

where:

f = Catawba's liquid radwaste flow, in gpm

σ = Recirculation factor at equilibrium, 1.027

F = Catawba's dilution flow, in gpm

where:

T_ℓ = 8760 hours, the time period of time over which C_{Nb-95} and F_ℓ are averaged.

C_{Nb-95} = The average concentration of Nb-95 in Catawba's undiluted effluent, in uCi/ml, during the calender year of interest.

C4.4.2 Gaseous Effluents

Airborne effluent pathway dose estimates are based on the values and assumptions presented in Sections B4.3.2. and C4.3.2. Operational source term data shall be used to update these calculations as necessary.

C4.4.2.1 McGuire's Gaseous Contribution

Based on operational history, the Catawba fuel cycle maximum exposed individual whole body dose resulting from McGuire's gaseous effluent releases ($D_{WB}(g_m)$) is estimated using the simplified dose calculation given below:

$$D_{WB}(g_m) = (9.32E-06) (w) (\tilde{Q}_{Xe-133}) (S_F) (1.41)$$

where:

w = 1.50E-07 = ($\overline{X/Q}$) for the plume immersion factor pathway factor, in sec/m^3 which corresponds to a location 5 miles SSW of the McGuire site (See table B4.0-1)

$\tilde{Q}_{Xe-133}$ = The total Xe-133 activity released from McGuire during the calender year of interest, in uCi.

9.32E-06 = (3.17E-08) ($K_i[\overline{X/Q}]$), with appropriate substitutions for whole body exposure in a semi-infinite cloud of Xe-133. See Section 1.2.1.

S_F = 0.7 = External radiation shielding factor for individuals.

1.41 = The factor derived from the conservative assumption (based on historical data) that 71% of the whole body dose to the maximally exposed individual is contributed by Xe-133.

Based on operational history, the Catawba fuel cycle maximum exposed individual maximum organ dose (Adult-GI-LLI) resulting from McGuire's gaseous effluent releases ($D_{MO}(g_m)$) is estimated using the simplified dose calculation given below:

$$D_{MO}(g_m) = (1.84E+04) (w) (\tilde{Q}_{H-3})$$

where:

w = 1.5E-07 = $\overline{X/Q}$ for the food and ground plane pathway, in sec m/^{3}, for a location 5 miles SSW of the McGuire site (Table B4.0-1)

$\tilde{Q}_{H-3}$ = The total H-3 activity released from McGuire during the calender year of interest, in uCi.

7.23E-05 = (3.17E-08) ($R_i^G[\overline{X/Q}]$) with appropriate substitutions for the adult-vegetable garden pathway, $R_i^V[\overline{X/Q}]$ for H-3. See Section 3.1.2.2.

2.94 = The factor derived from the conservative assumption (based on historical data) that 34% of the total inhalation, food and ground plane pathway dose to the maximally exposed individual is contributed by H-3 via the vegetable pathway.

C4.4.2.2 Catawba's Gaseous Contribution

Based on operational history, the Catawba fuel cycle maximum exposed individual whole body dose resulting from Catawba's gaseous effluent releases ($D_{WB}(g_c)$) is estimated using the simplified dose calculation given below:

$$D_{WB}(g_c) = (9.32E-06) (w) (\tilde{Q}_{Xe-133}) (S_F) (1.24)$$

where:

w = 3.10E-05, ($\overline{X/Q}$) for the plume immersion factor pathway factor which corresponds to a location 0.5 miles NNE of the Catawba site (see Table C4.0-1)

$\tilde{Q}_{Xe-133}$ = The total Xe-133 activity released from Catawba during the calender year of interest, in uCi.

9.32E-06 = (3.17E-08) ($K_i[\overline{X/Q}]$), with appropriate substitutions for whole body exposure in a semi-infinite cloud of Xe-133. See Section 1.2.1.

S_F = 0.7 = External radiation shielding factor for individuals.

1.24 = The factor derived from the conservative assumption (based on historical data) that 81% of the whole body dose to the maximally exposed individual is contributed by Xe-133.

Based on design basis operation, the Catawba fuel cycle maximum exposed individual maximum organ dose (Adult-GI-LLI) resulting from Catawba's gaseous effluent releases ($D_{MO}(g_c)$) is estimated using the simplified dose calculation given below:

$$D_{MO}(g_c) = (7.23E-05) (w) (\tilde{Q}_{H-3}) (1.59)$$

where:

w = 1.5E-05 = $\overline{X/Q}$ for the food and ground plane pathway in m^{-2}, for a location 0.5 miles ENE of the Catawba site (see Table C4.0-1).

$\tilde{Q}_{H-3}$ = The total H-3 activity released from Catawba during the calender year of interest, in uCi.

7.23E-05 = (3.17E-08) ($R_i^V[\overline{X/Q}]$) with appropriate substitutions for the adult-vegetable garden pathway factor, $R_i^V[\overline{X/Q}]$ for H-3. See Section 3.1.2.2.

1.59 = The factor derived from the assumption that 63% of the total inhalation, food and ground plane pathway dose to the maximally exposed individual is contributed by H-3 via the vegetable garden pathway.

C5.0 Radiological Environmental Monitoring

The Radiological Environmental Monitoring Program shall be conducted in accordance with Technical Specification, Section 3/4.12.

The monitoring program locations and analyses are given in Tables C5.0-1 through C5.0-3 and Figure C5.0-1.

The laboratory performing the radiological environmental analyses shall participate in an interlaboratory comparison program which has been approved by the NRC. This program is the Environmental Protection Agency's (EPA's) Environmental Radioactivity Laboratory Intercomparison Studies (crosscheck) Program, our participation code is CP.

The dates of the land-use census that was used to identify the controlling receptor locations was 08/01/88 - 08/02/88.

TABLE C5.0-1
(1 of 1)
CATAWBA RADIOLOGICAL MONITORING PROGRAM SAMPLING LOCATIONS

(TLD LOCATIONS)

SAMPLING LOCATION DESCRIPTION			SAMPLING LOCATION DESCRIPTION		
200	SITE BOUNDARY	(0.7M NNE)	232	4-5 MILE RADIUS	(4.1M NE)
201	SITE BOUNDARY	(0.5M NE)	233	4-5 MILE RADIUS	(4.0M ENE)
202	SITE BOUNDARY	(0.6M ENE)	234	4-5 MILE RADIUS	(4.5M E)
203	SITE BOUNDARY	(0.5M SE)	235	4-5 MILE RADIUS	(4.0M ESE)
204	SITE BOUNDARY	(0.5M SSW)	236	4-5 MILE RADIUS	(4.2M SE)
205	SITE BOUNDARY	(0.6M SW)	237	4-5 MILE RADIUS	(4.8M SSE)
206	SITE BOUNDARY	(0.7M WNW)	238	4-5 MILE RADIUS	(4.2M S)
207	SITE BOUNDARY	(0.8M NNW)	239	4-5 MILE RADIUS	(4.6M SSW)
212	SPECIAL INTEREST	(3.3M E)	240	4-5 MILE RADIUS	(4.1M SW)
217	CONTROL	(10.0M SSE)	241	4-5 MILE RADIUS	(4.7M WSW)
222	SITE BOUNDARY	(0.7M N)	242	4-5 MILE RADIUS	(4.6M W)
223	SITE BOUNDARY	(0.5M E)	243	4-5 MILE RADIUS	(4.6M WNW)
224	SITE BOUNDARY	(0.7M ESE)	244	4-5 MILE RADIUS	(4.1M NW)
225	SITE BOUNDARY	(0.5M SSE)	245	4-5 MILE RADIUS	(4.2M NNW)
226	SITE BOUNDARY	(0.5M S)	246	SPECIAL INTEREST	(8.1M ENE)
227	SITE BOUNDARY	(0.5M WSW)	247	CONTROL	(7.5M ESE)
228	SITE BOUNDARY	(0.6M W)	248	SPECIAL INTEREST	(7.0M SSE)
229	SITE BOUNDARY	(0.9M NW)	249	SPECIAL INTEREST	(8.1M S)
230	4-5 MILE RADIUS	(4.4M N)	250	SPECIAL INTEREST	(10.3M WSW)
231	4-5 MILE RADIUS	(4.2M NNE)	251	CONTROL	(9.8M WNW)

TABLE C[illegible]-2
(1 of 1)
CATAWBA RADIOLOGICAL MONITORING PROGRAM SAMPLING LOCATIONS
(OTHER SAMPLING LOCATIONS)

CODE:

W - Weekly SM - Semimonthly
BW - Biweekly Q - Quarterly
M - Monthly SA - Seminannually

Sampling Location Description		Air Radio-iodines and Particulates	Surface Water	Drinking Water	Shoreline Sediment	Milk	Fish	Broadleaf Vegetation	Groundwater	Food Products
200	Site Boundary (0.7m NNE)	W						M	Q	
201	Site Boundary (0.5m NE)	W						M		
203	Site Boundary (0.5m SE) Deleted							M		
205	Site Boundary (0.6m SW)	W								
208	Discharge Canal (0.5m S)		BW		SA		SA			
209	Dairy (7.0m SSW)					SM				
210	Ebenezer Access (2.4m SE)				SA					
211	Wylie Dam (4.0m ESE)		BW							
212	Tega Cay (3.3m E)	W								
213	Fort Mill Water Supply (7.5m ESE)			BW						
214	Rock Hill Water Supply (7.3m SSE)			BW						
215	Camp Steere - Hwy 49 (4.1m NNE) Control		BW		SA					
216	Hwy 49 Bridge (4.0m NNE) Control						SA			
217	Rock Hill Substation (10.0m SSE) Control	W						M		
218	Belmont Water Supply (13.5m N) Control			BW						
219	Dairy (6.0m SW)					SM				
220	Dairy (8.0m WSW) Deleted					SM				
221	Dairy (13.0m NW) Control					SM				
226	Site Boundary (0.5m S)							M		
252	Residence (0.8m W)								Q	
253	Gardens (5-mile radius)									M[(a)]

(a) during harvest season