December 24, 1991

SUBJECT: McGuire Nuclear Station
Offsite Dose Calculation Manual
Revision 33

The General Office Radwaste Processing & Management Staff is transmitting to you this date, Revision 33 of the Offsite Dose Calculation Manual. As this revision only affects McGuire Nuclear Station, the approval of other station managers is not required. Please update your copy No. 51, and discard the affected pages.

Instructions:

Please replace the entire contents of Section "B" with the attached pages.

NOTE: As this letter, with its attachments, contains "LOEP" information, please insert this letter in front of the December 23, 1991 letter.

Approval Date: 12/23/91	Approval Date: 12/18/91
Effective Date: 1/1/92	Effective Date: 1/1/92
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JMS/prm.091

APPENDIX B - TABLE OF CONTENTS

APPENDIX B

MCGUIRE NUCLEAR STATION

SITE SPECIFIC INFORMATION

B1.0 MCGUIRE NUCLEAR STATION RADWASTE SYSTEMS

B1.1 LIQUID RADWASTE PROCESSING

The liquid radwaste system at McGuire Nuclear Station (MNS) is used to collect and treat fluid chemical and radiochemical by-products of unit operation. The system produces effluents which can be reused in the plant or discharged in small, dilute quantities to the environment. The means of treatment vary with waste type and desired product in the various systems:

A) Filtration - Waste sources are filtered during processing. In some cases, such as the Floor Drain Tank (FDT) Subsystem of the Liquid Waste (WL) System, filtration may be the only treatment required.

B) Adsorption - Adsorption of halides and organic chemicals by activated charcoal (Carbon Filter) may be used in treating waste in the Laundry and Hot Shower Tank (LHST). The carbon filter is designed to remove organophosphates and free chlorine. Activated charcoal need not be used when these chemicals are not present (e.g., phosphate detergents are not used at the station). Ion exchange resin or other media may be used in the carbon filter vessel as desired.

C) Ion Exchange - Ion exchange is used to remove radioactive cations from solution, as in the case of either LHST or FDT waste in the WL System after removal of organics by carbon filtration (adsorption). Ion exchange is also used in removing both cations (cobalt, manganese) and anions (chloride, fluoride) from evaporator distillates in order to purify the distillates for reuse as makeup water. Distillate from the Waste Evaporator in the WL System and the Boron Recycle Evaporator in the Boron Recycle System (NB) can be treated by this method, as well as FDT, LHST waste, and reactor bleed.

D) Gas Stripping - Removal of gaseous radioactive fission products is accomplished in both the WL Evaporator and the NB Evaporator.

E) Distillation - Production of pure water from the waste by boiling it away from the contaminated solution which originally contained it is accomplished by both evaporators. Proper control of the process will yield water which can be reused for makeup. Polishing of this product can be achieved by ion exchange as pointed out above.

F) Concentration - In both the WL and NB Evaporators, dissolved chemicals are concentrated in the lower shell as water is boiled away. In the case of the WL Evaporator, the volume of water containing waste chemicals and radioactive cations is reduced so that the waste may be more easily and cheaply solidified and shipped for burial. In the NB Evaporator, the dilute boron is normally concentrated to 4% so that it may be reused for makeup to the reactor coolant system.

Figure B1.0-1 is a schematic representation of the liquid radwaste system at McGuire.

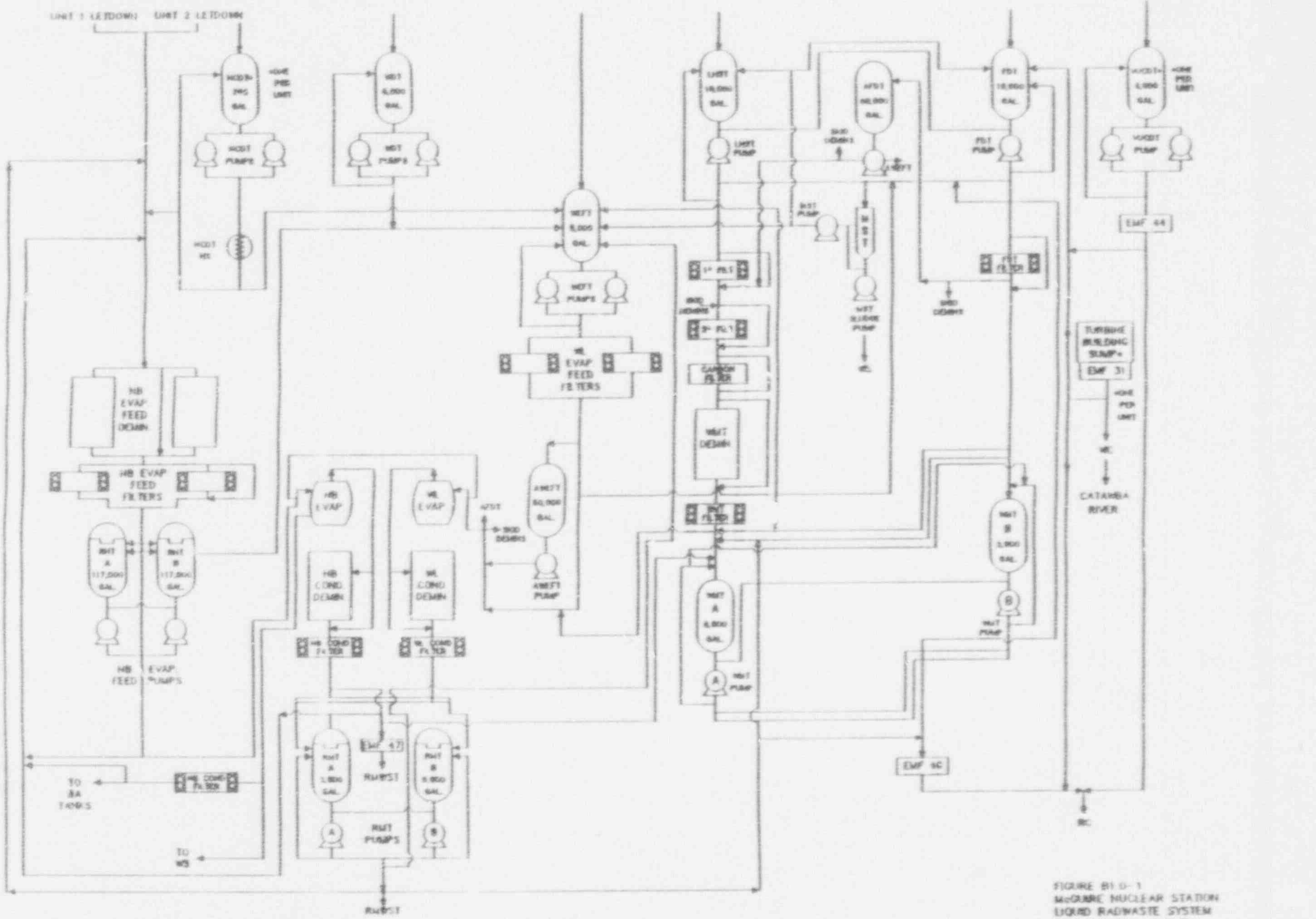

FIGURE 11.0-1
McGUIRE NUCLEAR STATION
LIQUID RADWASTE SYSTEM
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TABLE B1.0-1
ABBREVIATIONS

Systems:

- CM - Condensate Cooling
- KC - Component Cooling
- NB - Boron Recycle
- NC - Reactor Coolant
- WC - Conventional Waste Water Treatment
- WG - Waste Gas
- WL - Liquid Waste
- WM - Liquid Waste Monitor and Disposal

Terms:

- BA - Boric Acid Tank
- RC - Condenser Cooling Water
- CDT - Chemical Drain Tank
- ECST - Evaporator Concentrates Storage Tank
- FDT - Floor Drain Tank
- FWST - Fueling Water Storage Tank (formerly Refueling Water Storage Tank)
- LHST - Laundry and Hot Shower Tank
- MST - Mixing and Settling Tank
- NCDT - Reactor Coolant Drain Tank
- RBT - Resin Batching Tank
- RHT - Recycle Holdup Tank
- RMT - Recycle Monitor Tank
- RMWST - Reactor Makeup Water Storage Tank
- SRST - Spent Resin Storage Tank
- VUCDT - Ventilation Unit Condensate Drain Tank
- WDT - Waste Drain Tank
- WEFT - Waste Evaporator Feed Tank
- WMT - Waste Monitor Tank

B1.2 GASEOUS RADWASTE SYSTEMS

The gaseous waste disposal system for McGuire is designed with the capability of processing the fission-product gases from contaminated reactor coolant fluids resulting from operation. The design base for the system shown schematically in Fig. B1.0-2 is the retention, through the plant lifetime, of all the gaseous fission products to be discharged from the reactor coolant system to the chemical and volume control system and other plant systems to eliminate the need for intentional discharge of radioactive gases from the waste gas holdup tanks. Actual system operation is aimed at maximizing storage time for decay prior to infrequent releases. Unavoidable sources of low-level radioactive gaseous discharge to the environment will be from periodic purging operations of the containment, from the auxiliary building ventilation system, and through the secondary system air ejector. With respect to the former, the potential contamination is expected to arise from non-recyclable reactor coolant leakage. With respect to the air ejector, the potential source of contamination will be from leakage of the reactor coolant to the secondary system through defects in steam generator tubes. The gaseous waste disposal system includes two waste gas compressors, two catalytic hydrogen recombiners, six gas decay storage tanks for use during normal power generation, and two gas decay storage tanks for use during shutdown and startup operations.

B1.2.1 Gas Collection System

The gas collection system combines the waste hydrogen and fission gases from the volume control tanks, the boron recycle and liquid waste gas stripper evaporators, and other sources produced during normal operation or the gas collected during the shutdown degasification (high percentage of nitrogen) and cycles it through the catalytic recombiners to convert the hydrogen to water. After the water vapor is removed, the resulting gas stream is transferred from the recombiner into the gas decay tanks, where the accumulated activity may be contained in six approximately equal parts. From the decay tanks, the gas flows back to the compressor suction to complete the loop circuit.

B1.2.2 Containment and Auxiliary Building Ventilation

Nonrecyclable reactor coolant leakage occurring either inside the containment or inside the auxiliary building will generate gaseous activity. Gases resulting from leakage inside the containment will be contained until the containment is purged. The containment atmosphere will be circulated through a charcoal adsorber and a particulate filter prior to release to the atmosphere.

Gases resulting from leakage inside the auxiliary building are released, without further decay, to the atmosphere via the auxiliary building ventilation system. The ventilation exhaust from potentially contaminated areas in the auxiliary building is passed through charcoal adsorbers to reduce releases to the atmosphere upon a radiation monitor alarm.

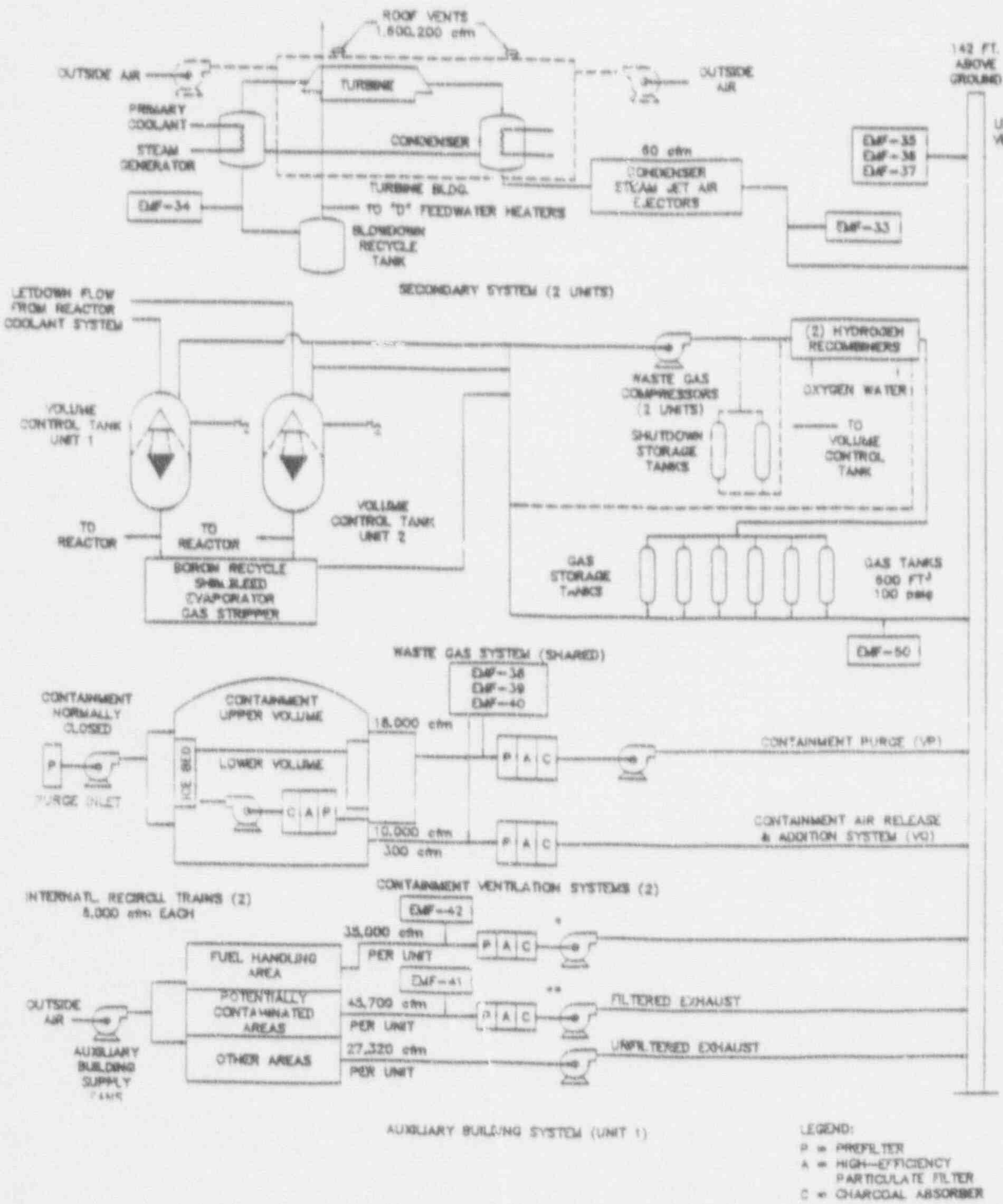
B1.2.3 Secondary Systems

The gases removed from the secondary system by the air ejectors are discharged to the unit vent. If the secondary system contains activity, the steam generator blowdown may be either discharged directly to the RC system or through demineralizers to reduce activity levels.

Gland leak-off steam, which represents a minor source of activity, is routed to the gland condenser. The non-condensable gases are passed through a vent stack to the roof; the condensables are condensed and drained to the condensate storage tank.

Figure B1.0-2 is a schematic representation of the gaseous radwaste system at McGuire.

UNIT 1



* FUEL HANDLING AREA IS NORMALLY UNFILTERED. UPON A RADIATION ALARM BY EMF-42, THE EXHAUST WILL BE DIVERTED TO THE FILTER MODE.

** POTENTIALLY CONTAMINATED AREAS OF THE AUXILIARY BUILDING ARE NORMALLY UNFILTERED. UPON A RADIATION ALARM BY EMF-41, THE EXHAUST WILL BE DIVERTED TO THE FILTERED MODE.

FIGURE 8.0-2
McGUIRE NUCLEAR STATION
GASEOUS RADWASTE SYSTEM
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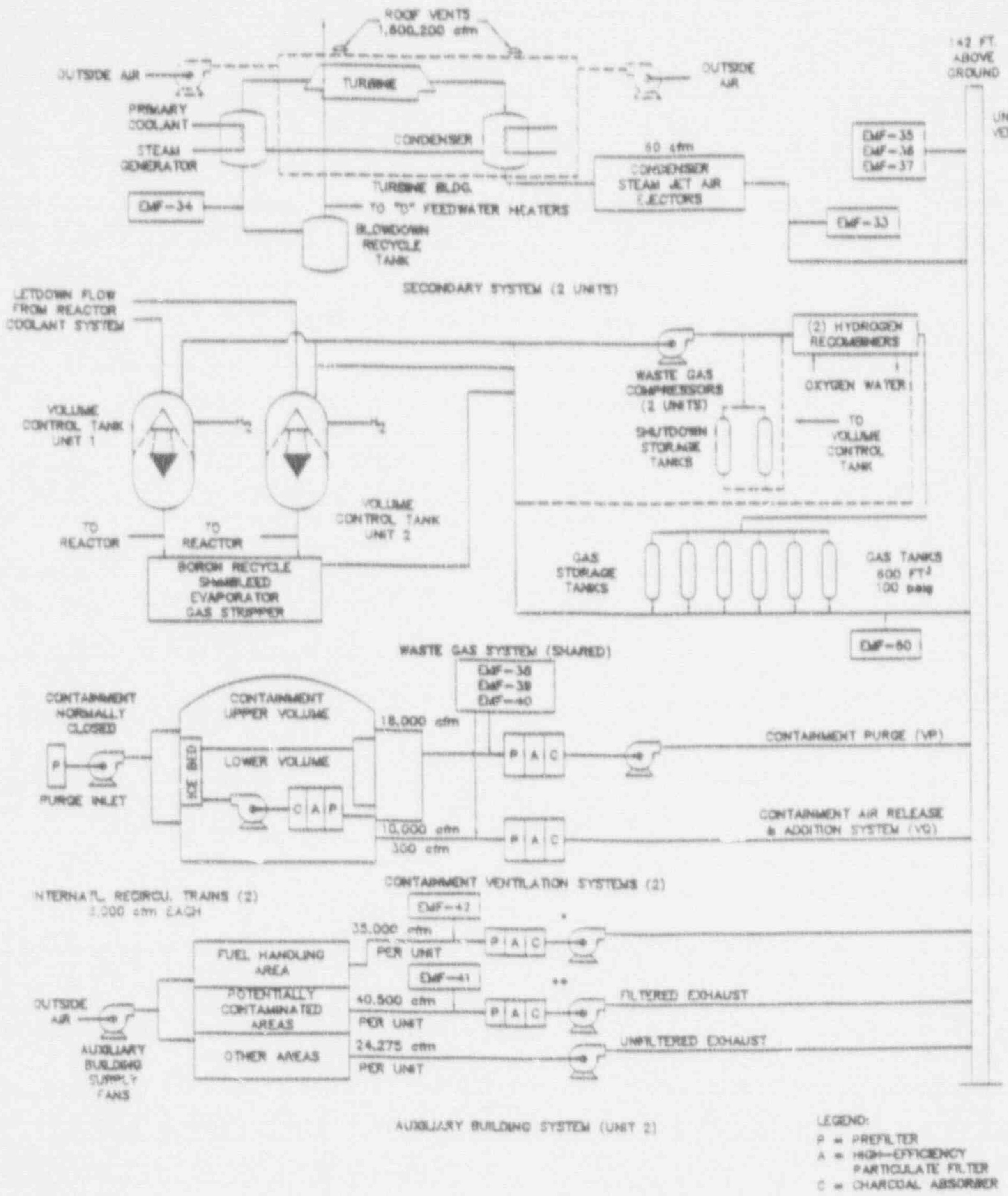
UNIT 2



* FUEL HANDLING AREA IS NORMALLY UNFILTERED. UPON A RADIATION ALARM BY EMF-42, THE EXHAUST WILL BE DIVERTED TO THE FILTER MODE.

** POTENTIALLY CONTAMINATED AREAS OF THE AUXILIARY BUILDING ARE NORMALLY UNFILTERED. UPON A RADIATION ALARM BY EMF-41, THE EXHAUST WILL BE DIVERTED TO THE FILTERED MODE.

FIGURE B1.0-2
McGUIRE NUCLEAR STATION
GASEOUS RADWASTE SYSTEM
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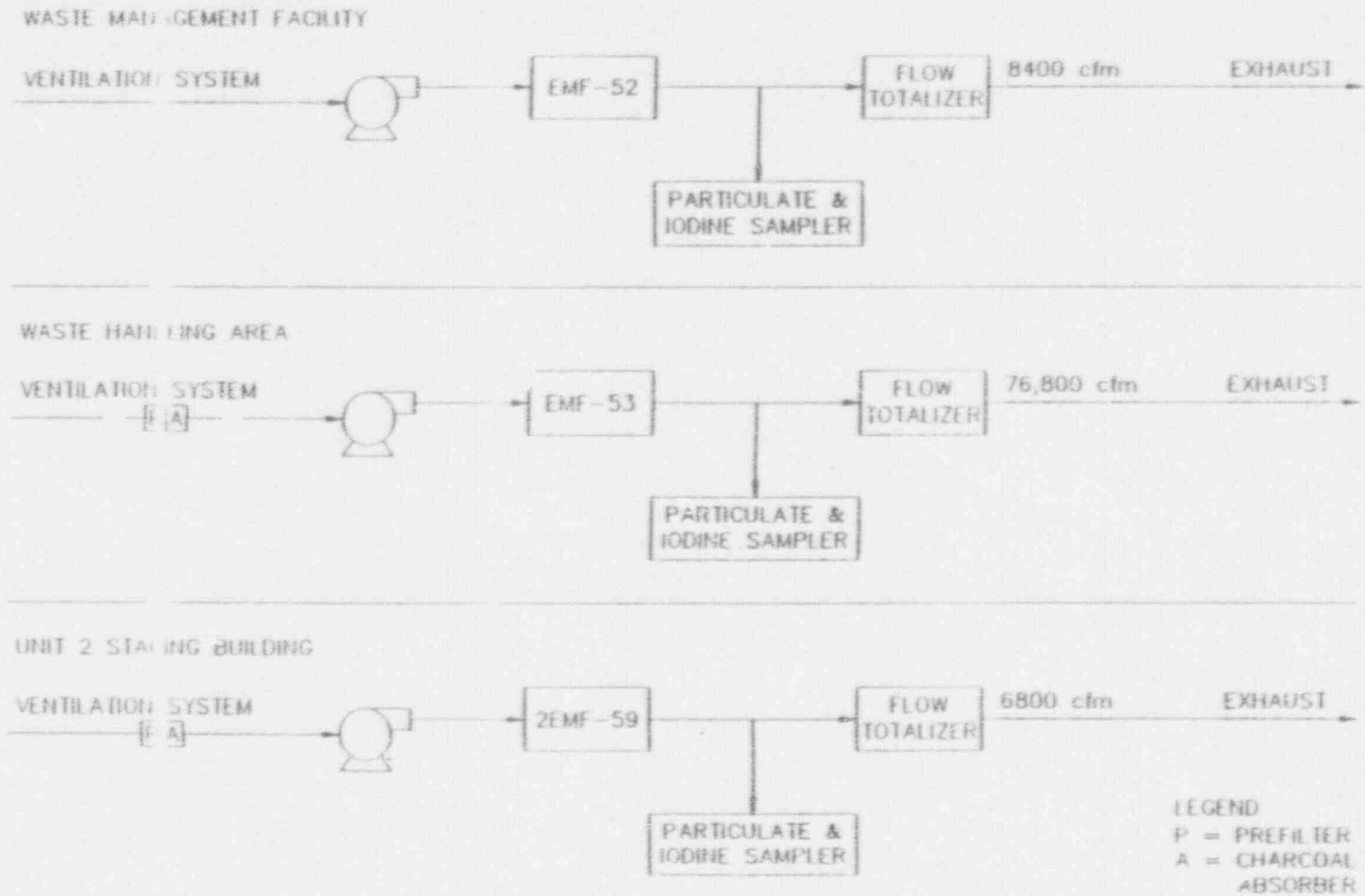

GASEOUS WASTE SYSTEM
McGUIRE NUCLEAR STATION
FIGURE B1.0-2
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B2.0 RELEASE RATE CALCULATION

Generic release rate calculations are presented in Section 1.0; these calculations will be used to calculate release rates for McGuire Nuclear Station.

B2.1 LIQUID RELEASE RATE CALCULATIONS

There are three potential release points at McGuire. Two of these release points, the waste liquid effluent line and the containment ventilation unit condensate effluent line, discharge into the condenser cooling water system; the third release point, the Turbine Building sump, can either be discharged into the condenser cooling water system or into the conventional waste water treatment system.

B2.1.1 Waste Liquid Effluent Line

For releases made via the waste liquid effluent line, the following calculation shall be performed to determine discharge flow, in gpm:

$$f \leq F \div \left(\sigma \sum_{i=1}^{n} \frac{C_i}{MPC_i}\right)$$

where:

f = the undiluted effluent flow, in gpm.

F = the dilution flow available depending on the number (1-8) of condenser cooling water (RC) pumps in service, in gpm.

where:

F = (2.50E+05 gpm/pump)(Number of RC pumps in service)

σ = The recirculation factor at equilibrium (dimensionless), 2.4

$$\sigma = 1 + \frac{Q_R}{Q_H} = 1 + \frac{3720}{2670} = 2.4$$

where:

Q_R = average dilution flow (3720 cfs)

Q_H = average flow past Cowans Ford Dam (2670 cfs)

C_i = the concentration of radionuclide, "i", in undiluted effluent as determined by laboratory analyses, in µCi/ml.

MPC_i = the concentration of radionuclide, "i", from 10CFR20, Appendix B, Table II, Column 2. If radionuclide, "i", is a dissolved noble gas, the MPC_i = 2.00E-04 µCi/ml.

B2.1.2 Containment Ventilation Unit Condensate Effluent Line

The containment ventilation unit condensate effluent line normally contains measurable activity above background and administrative controls have been implemented to assure that release limits are not exceeded; see section on radiation monitoring alarm/trip setpoints.

B2.1.3 Conventional Waste Water Treatment System Effluent Line

The conventional waste water treatment system effluent is normally considered nonradioactive; that is, it is unlikely the effluent will contain measurable activity above background. It is assumed that no activity is present in the effluent until indicated by radiation monitoring measurements and by periodic analyses of the composite sample collected on that line. Radiation monitoring alarm/trip setpoints assure that release limits are not exceeded; see section on radiation monitoring alarm/trip setpoints.

B2.1.4 Turbine Building Sump Discharge Line

Normally the discharge from the Turbine Building sump is considered non-radioactive; that is, it is unlikely the effluent will contain measurable activity above background, and will flow into the conventional waste water treatment system. It is assumed that no activity is present in the effluent until indicated by radiation monitoring measurements. If measurable activity is present in the effluent, sump discharge will be terminated and an alarm activated. At this time the discharge may be routed to the floor drain tank for processing or routed directly to the condenser cooling water (RC) flow; rather than the conventional waste water treatment system; administrative controls shall be implemented to assure that release limits are not exceeded; see section on radiation monitoring alarm/setpoints.

B2.2 GASEOUS RELEASE RATE CALCULATIONS

The unit vent is the release point for waste gas decay tanks, containment building purges, the condenser air ejector, and auxiliary building ventilation. The condenser air ejector effluent is normally considered nonradioactive; that is, it is unlikely the effluent will contain measurable activity above background. It is assumed that no activity is present in the condenser air ejector effluent until indicated by radiation monitoring measurements and by analyses of periodic samples collected on that line. Radiation monitoring alarm/trip setpoints in conjunction with administrative controls assure that release limits are not exceeded; see section B3.0 on radiation monitoring setpoints.

The following calculations, when solved for flowrate, are the release rates for noble gases and for radioiodines, particulates and other radionuclides with half-lives greater than 8 days; the most conservative of release rates calculated in B2.2.1 and B2.2.2 shall limit the release rate for a single release point.

B2.2.1 Noble Gases

$$\sum_i (K_i \, [(\overline{X/Q})\tilde{Q}_i] < 500 \text{ mrem/yr, and}$$

$$\sum_i (L_i + 1.1\, M_i) \; [(\overline{X/Q})\tilde{Q}_i] < 3000 \text{ mrem/yr}$$

where the terms are defined below.

B2.2.2 Radioiodines, Particulates, and Others

$$\sum_i P_i \, [W \, \tilde{Q}_i] < 1500 \text{ mrem/yr}$$

where:

K_i = The total body dose factor due to gamma emissions for each identified noble gas radionuclide, in mrem/yr per µCi/m³ from Table 1.2-1.

L_i = The skin dose factor due to beta emissions for each identified noble gas radionuclide, in mrem/yr per µCi/m³ from Table 1.2-1.

M_i = The air dose factor due to gamma emissions for each identified noble gas radionuclide, in mrad/yr per µCi/m³ from Table 1.2-1 (unit conversion constant of 1.1 mrem/mrad converts air dose to skin dose).

P_i = The dose parameter for radionuclides other than noble gases for the inhalation pathway, in mrem/yr per µCi/m³ and for the food and ground plane pathways, in m²•(mrem/yr) per µCi/sec from Table 1.2-2. The dose factors are based on the critical individual organ and most restrictive age group (child or infant).

$\tilde{Q}_i$ = The release rate of radionuclides, i, in gaseous effluent from all release points at the site, in µCi/sec.

$\overline{X/Q}$ = 7.2E-5 sec/m³. 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 annual average dispersion or deposition parameter for estimating the dose to an individual 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:

W = 2.9E-6 sec/m³, for the inhalation pathway. The location is the SE sector @ 1.0 miles.

W = 7.6E-9 meter^{-2}, for the food and gound plane pathways. The location is the SE sector @ 1.0 miles.

$\tilde{Q}_i$ $= kC_i f \cdot k = 4.72E{+}2 C_i f$

where:

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

f = the undiluted effluent flow, in cfm

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

k = conversion factor, 6E1 sec/min

B3.0 RADIATION MONITOR SETPOINTS

Using the generic calculations presented in Section 2.0, final effluent radiation monitoring setpoints are calculated for monitoring as required by the Technical Specifications.

All radiation monitors for McGuire are off-line except EMF-50 (Waste Gas System) which is in-line. These monitors alarm on low flow; the minimum flow alarm level for both the liquid monitors and the gas monitors is based on the manufacturer's recommendations. These monitors measure the activity in the liquid or gas volume exposed to the detector and are independent of flow rate if a minimum flow rate is assured.

Radiation monitoring setpoints calculated in the following sections are expressed in activity concentrations; in reality the monitor readout is in counts per minute. Station radiation monitor setpoint procedures which correlate concentration and counts per minute shall be based on the following relationship:

$$c = \frac{r}{2.22 \times 10e\ V}$$

where:

c = the gross activity, in μCi/ml
r = the count rate, in cpm
2.22 x 10 = the disintegration per minute per μCi
e = the counting efficiency, cpm/dpm
V = the volume of fluid exposed to the detector, in ml.

B3.1 LIQUID RADIATION MONITORS

B3.1.1 Waste Liquid Effluent Line

As described in Section B2.1.1 on release rate calculations for the waste liquid effluent, the release is controlled by limiting the flow rate of effluent from the station. Although the release rate is flow rate controlled, the radiation monitor setpoint shall be set to terminate the release if the effluent activity should exceed that determined by laboratory analysis and that used to calculate the release rate. When releases are not being made, a radiation monitor setpoint shall be calculated to assure that release limits are not exceeded. A typical setpoint is calculated as follows:

$$c \leq \frac{MPC \times F}{\sigma f} = 1.04E\text{-}4\ \mu Ci/ml$$

where:

c = the gross activity in undiluted effluent, in μCi/ml

f = the flow from the tank may vary from 0-120 gpm but, for this calculation, is assumed to be 100 gpm.

MPC = 1.0E-07 μCi/ml, the MPC for an unidentified mixture

σ = 2.4 (See Section 32.1.1)

F = the dilution flow is based on having only one condenser cooling water pump in service or 2.5E+5 gpm. Should the number of pumps in service increase, the setpoint may be recalculated.

B3.1.2 Containment Ventilation Unit Condensate Effluent Line

As described in Section B2.1.2 on release rate calculations for the containment ventilation unit condensate effluent, it is probable that the effluent will contain measurable activity above background. Since the tank contents can be discharged automatically, a maximum tank concentration, which also is the radiation monitor setpoint, is calculated to assure that release limits are not exceeded. A typical monitor setpoint and maximum tank concentration is calculated as follows:

$$c \leq \frac{MPC \times F}{\sigma f} = 1.04E\text{-}4\ \mu Ci/ml$$

where:

c = the gross activity in undiluted effluent, in μCi/ml

f = the flow from the tank may vary from 0-120 gpm but, for this calculation, is assumed to be 100 gpm

MPC = 1.0E-07 μCi/ml, the MPC for an unidentified mixture

σ = 2.4 (See Section B2.1.1)

F = the dilution flow is based on having only one condenser cooling pump in service or 2.5E+5 gpm. Should the number of pumps in service increase, the setpoint may be recalculated.

The above calculation will determine the maximum setpoint for this release point; releases and/or setpoints may be administratively controlled to assure that release limits are not exceeded since more than one release source may be released to the condenser cooling water.

B3.1.3 Conventional Waste Water Treatment System Discharge Line

As described in Section B2.1.3 on release rate calculations for the conventional waste water treatment system effluent, the effluent is normally considered non-radioactive; that is, it is unlikely the effluent will contain measurable activity above background. It is assumed that no activity is present in the effluent until indicated by radiation monitoring and by routine analysis of the composite sample collected on that line. Since the system discharges automatically, the maximum system concentration, which also is the radiation monitor setpoint, is calculated so that release limits are not exceeded. A typical monitor setpoint and maximum effluent concentration is calculated as follows:

$$c \leq \frac{MPC \times F}{\sigma f} = 5.36E\text{-}07\ \mu Ci/ml$$

where:

- c = the gross activity in undiluted effluent, in µCi/ml
- f = the flow rate of undiluted effluent which may vary from 0-6700 gpm, but is assumed to be 6700 gpm
- MPC = 1.0E-07 µCi/ml, the MPC for an unidentified mixture
- F = the flow past Cowan's Ford Dam may vary from 80 to 50,000 cfs, but is conservatively estimated at 80 cfs (3.59E+04 gpm), the minimum flow available
- σ = 1 [The Conventional Waste Water System discharge line is located downstream of Cowan's Ford Dam and, therefore, has no reconcentration (recirculation) factor associated with it.]

B3.1.4 <u>Turbine Building Sump Discharge Line to the Condenser Cooling Water (RC)</u>

As described in Section B2.1.4 on release rate calculations for the Turbine Building sump effluent, it is possible that the effluent will contain measurable activity above background. Since the sump contents can be discharged automatically to the RC, a maximum sump concentration, which also is the radiation monitor setpoint, is calculated to assure that release limits are not exceeded. A typical monitor setpoint and maximum sump concentration is calculated as follows:

$$c \leq \frac{MPC \times F}{\sigma f} = 5.21E\text{-}06\ \mu Ci/ml$$

where:

- c = the gross activity in undiluted effluent, in µCi/ml
- f = the flow rate of undiluted effluent which may vary from 0-2000 gpm, but is assumed to be 2000 gpm
- MPC = 1.0E-07 µCi/ml, the MPC for an unidentified mixture
- σ = 2.4 (See Section B2.1.1)
- F = the dilution flow is based on having only one condenser cooling pump in service or 2.5E+5 gpm. Should the number (1-8) of pumps in service increase, the setpoint may be recalculated.

The above calculation will determine the maximum setpoint for this release point; releases and/or setpoints may be administratively controlled to assure that release limits are not exceeded since more than one release source may be released to the condenser cooling water.

B3.2 GAS MONITORS

The following equation shall be used to calculate final effluent noble gas radiation monitor setpoints based on Xe-133:

$K(\overline{X/Q})\ \dot{Q}_i < 500$ (See section B2.2.1)

$\dot{Q}_i = 4.72E+2\ C_i f$ (See Section B2.2.2)

$C_i < 5.00E+01/f$

where:

C_i = the gross activity in undiluted effluent, in µCi/ml

f = the flow from the tank or building and varies for various release sources, in cfm

K = from Table 1.2-1 for Xe-133, 2.94E+2 mrem/yr per $\mu Ci/m^3$

$\overline{X/Q}$ = 7.2E-5 sec/m^3, as defined in Section B2.2.2.

B3.2.1 Unit Vent

As stated in Section B2.2, the unit vent is the release point for the waste gas system, containment purge ventilation system, the containment air release and addition system, the condenser air ejector, and auxiliary building ventilation. Since all of these releases are through the unit vent, the radiation monitor on the unit vent may be used to assure that station release limits are not exceeded.

For release from the containment air release and addition system and the containment purge ventilation system, a typical radiation monitor setpoint may be calculated as follows:

$C_i < 5.00E+01/f = 1.79E-03$ µCi/ml

where:

f = 28,000 cfm (containment purge)

For release from the containment air release and addition system, the waste gas decay tanks, the condenser air ejectors, and the auxiliary building ventilation system, a typical radiation monitor setpoint may be calculated as follows:

$C_i < 5.00E+01/f = 3.51E-04$ µCi/ml

where:

f = 142,500 cfm (auxiliary ventilation systems)

B3.2.2.2 Waste Management Facility (EMF-52)

Ventilation exhaust from the Waste Management Facility is not released through the unit vent and is considered a separate release point. This exhaust is normally considered non-radioactive; that is, it is possible but unlikely that the effluent will contain measurable activity above background. Since the exhaust is continuous, a maximum concentration of gases in the exhaust, which is also the radiation monitor setpoint, is calculated to assure compliance with release limits. A typical radiation monitor setpoint may be calculated as follows:

$$C < 5.00E+01/f = 5.95E-03$$

where:

f = 8400 cfm

B3.2.3 Waste Handling Area (EMF-53)

Ventilation exhaust from the Waste Handling Area is not released through the unit vent and is considered a separate release point. This exhaust is normally considered non-radioactive; that is, it is possible but unlikely that the effluent will contain measurable activity above background. Since the exhaust is continuous, a maximum concentration of gases in the exhaust, which is also the radiation monitor setpoint, is calculated to assure compliance with release limits. A typical radiation monitor setpoint may be calculated as follows:

$$C < 5.00E+01/f = 5.00E-04$$

where:

f = 100,000 cfm

B3.2.4 Unit 2 Staging Building (2EMF-59)

Ventilation exhaust from the Unit 2 Staging Building is not released through the unit vent and is considered a separate release point. This exhaust is normally considered non-radioactive; that is, it is possible but unlikely that the effluent will contain measurable activity above background. Since the exhaust is continuous, a maximum concentration of gases in the exhaust, which is also the radiation monitor setpoint, is calculated to assure compliance with release limits. A typical radiation monitor setpoint may be calculated as follows:

$$C < 5.00E+01/f = 7.35E-03$$

where:

f = 6800 cfm

B4.0 DOSE CALCULATIONS

B4.1 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 or the LADTAP and GASPAR computer program. Example input templates for McGuire LADTAP and GASPAR computer program calculations are provided in Figures B4.0-1 and B4.0-2. One of these methods shall also be used for any special reports.

Station long-term historical and dose projection calculations are periodically performed to determine the station's status with respect to meeting annual ALARA goals specified in the McGuire Nuclear Station Selected Licensing Commitment Manual. Such calculations are used to verify that adequate margin remains during a report period to allow normal station and radwaste system operation, including anticipated operational occurrences, for the remainder of the report period without exceeding applicable goals. Station dose projections can be performed using generic methodology, LADTAP and/or GASPAR, or simplified dose calculation methods presented in Section B4.3.

Dose calculations that are required for individual pre-release calculations, and/or abnormal releases shall not be calculated using simplified dose calculation methods. 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 sections or the LADTAP and/or GASPAR computer codes.

Fuel cycle dose calculations shall be performed annually or as required by special reports. Dose contributions shall be calculated using the methodology in the appropriate generic information sections or the LADTAP and GASPAR computer programs.

B4.2 DOSE MODELS FOR MAXIMUM EXPOSED INDIVIDUAL

B4.2.1 Liquid Effluents

Generic methodology for calculating liquid pathway exposures to the maximum individual is presented in Section 3.1.1. McGuire site specific parameters to be used in the generic methodology are presented as follows:

A_{ait} = Tables B4.0-3 through B4.0-6

$F_{\ell} = (f \times \sigma)/(F + f)$ (0.027 default for projections)

Where:

f = McGuire average liquid radwaste flow, gpm (100 default for projections).

σ = Recirculation factor at equilibrium, 2.4.

F = McGuire average dilution flow for period of interest, gpm (3.3E+03 default for projections - based on 1985 - 1990 worst-case projections).

An input template for McGuire LADTAP computer program calculations is provided in Figure B4.0-1. The input template includes default dilution parameters. Radionuclide release input (Ci/period) and optional non-default dilution flow (CFS) parameters are necessary to perform LADTAP calculations to determine offsite dose impact from specific releases during the period that dilution flow is averaged over.

B4.2.2 Gaseous Effluents

B4.2.2.1 Noble Gases

Gamma Air and Beta Air Dose

Generic methodology for calculating noble gas airborne pathway gamma air (D_γ) and beta air (D_β) doses is presented in Section 3.1.2.1. McGuire site specific parameters to be used in the generic methodology are presented as follows:

$(\overline{X/Q})$ = 7.2E-5 sec/m^3. The highest calculated annual average relative concentration for any area at or beyond the restricted area boundary. The location is the NNE sector @ 0.5 miles.

An input template for McGuire GASPAR computer program noble gas airborne pathway gamma air (D_γ) and beta air (D_β) dose calculations is provided in Figure B4.0-2, Location 1. The input template includes the maximum McGuire site specific annual average relative concentration parameters. Radionuclide release input (Ci/period) and optional non-default relative concentration parameters are necessary to perform GASPAR calculations to determine offsite dose impact from specific releases.

B4.2.2.2 Radioiodines, Particulates, and Other Radionuclides with T 1/2 > 8 Days

Generic methodology for calculating airborne pathway maximum organ (D_{MO}) exposures to the maximum individual is presented in Section 3.1.2.2. External exposure from deposited ground contamination and inhalation exposure pathways are considered to exist at all locations offsite. Food pathways (i.e., vegetable, meat and milk) are analyzed only at locations where site surveys have verified vegetable gardens, meat producing animals, or cow/goat milk producing animals exist, however. Therefore, the location of the maximum individual may vary depending on the mixture and levels of radionuclides released during a period of time. Additionally, the critical (or limiting) age group and organ will vary based on the location (i.e., combination of dose pathways contributing dose) and mixture/level of radionuclide releases during the release period.

Performing calculations separately for all potential maximum locations, age groups and organs assures that a maximum location is identified, and that a conservative estimate is obtained for maximum offsite dose impact to any organ or age group. McGuire site specific meteorological dispersion (X/Q) and deposition (D/Q) parameters and applicable terrestrial/food pathways for the potential maximum locations to be analyzed using generic methodology are presented in Table B4.0-7.

An input template for McGuire GASPAR computer program airborne pathway maximum organ (D_{MO}) dose calculations is provided in Figure B4.0-3, Locations 1 - 5. Radionuclide release input (Ci/period) and optional non-default meteorological parameters and pathway applicability flags are necessary to perform GASPAR calculations to determine offsite dose impact from specific releases.

B4.3 SIMPLIFIED DOSE ESTIMATE

B4.3.1 Liquid Effluents

For dose estimates, a simplified calculation based on the assumptions presented in Section B4.2.1 and operational source term data is presented below. Updated operational source term data shall be used to revise these calculations as necessary.

$$D_{WB} = 7.49E+5 \sum_{\ell=1}^{m} (F_{\ell})(T_{\ell}) (C_{Cs-134} + 0.59\ C_{Cs-137})$$

where:

$7.49E+5 = 1.14E+05\ (U_{aw}/D_w + U_{af}\ BF_i)\ DF_{ait}\ (1.27)$

where:

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

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

D_w = 1, dilution factor from the near field area to the nearest possible potable water intake (Hunterville 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)

1.27 = factor derived from the assumption that 79% of adult whole body dose is contributed by Cs-134 and Cs-137 via the fish and drinking water pathway or 100% ÷ 79% = 1.27

m = number of releases

where:

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

where:

f = liquid radwaste flow, in gpm

σ = recirculation factor at equilibrium, 2.4

F = dilution flow, in gpm

where:

T_{ℓ} = The length of time, in hours, over which C_{Cs-134}, C_{Cs-137}, and F_{ℓ} are averaged. (The time period during which all releases (m) are made)

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

B4.3.2 Gaseous Effluents

Meteorological data is provided in Tables B4.0-1 and B4.0-2.

B4.3.2.1 Noble Gases

For dose estimates, simplified dose calculations based on the assumptions in B4.2.2.1 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 62% of the gamma air dose and 81% of the beta air dose.

$$D_\gamma = 8.06E\text{-}10\ [\tilde{Q}]_{Xe\text{-}133}\ (1.61)$$

$$D_\beta = 2.40E\text{-}09\ [\tilde{Q}]_{Xe\text{-}133}\ (1.23)$$

where:

$\overline{X/Q}$ = 7.2E-05 sec/m^3, as defined in Section B2.2.2

8.06E-10 = (3.17E-8)(353) ($\overline{X/Q}$), derived from equation presented in Section 3.1.2.1.

2.40E-09 1.38E-09 = (3.17E-08) (1050) ($\overline{X/Q}$), derived from equation presented in Section 3.1.2.1.

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

1.61 = factor derived from the assumption that 62% of the gamma air dose is contributed by Xe-133.

1.23 = factor derived from the assumption that 81% of the beta air dose is contributed by Xe-133.

B4.3.2.2 Radioiodines, Particulates, and Other Radionuclides with T 1/2 > 8 days

For dose estimates, simplified dose calculations based on the assumptions in B4.2.2.2 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 81% of the dose results from H-3 ingested by the maximally exposed individual via the vegetable pathway at the controlling location. The simplified dose estimate to the thyroid of a child is:

$$D = 1.28E\text{-}4\ W\ (\tilde{Q})_{H\text{-}3}\ (1.23)$$

where:

W = 4.6E-6 = $\overline{X/Q}$ for food and ground plane pathway, in sec/m^3 from Table B4.0-1 for the controlling location (E sector at 1.0 miles).

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

1.28E-4 = (3.17E-08)(R_i^V [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.

1.23 = factor derived from the assumption that 81% 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.

B4.4 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 McGuire Nuclear Station must include gaseous dose contributions from Catawba Nuclear Station, which is located approximately thirty miles SSW of McGuire. For this dose assessment, the total body and maximum organ dose contributions to the maximum exposed individual from McGuire liquid releases and the combined Catawba and McGuire gaseous releases are estimated using the following calculations:

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

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

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 calendar year of interest, in mrem.

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

A fuel cycle dose calculation worksheet is provided in Figure B4.0-4.

B4.4.1 LIQUID EFFLUENTS

Liquid pathway dose estimates are calculated using generic methodology or the LADTAP computer program. The values for DWB(lo) and DMO(lo) liquid pathway does contributions are calculated based on the methodology, values and assumptions presented in Section B4.2.1.

B4.4.2 GASEOUS EFFLUENTS

Total Body

The methodology for calculating noble gas airborne pathway whole body exposures to the maximum individual, DWB, is derived from Section 3.1.2.1 generic methodology for gamma air and beta air dose calculations as follows:

$$D_\psi = 3.17E\text{-}8 \sum_{i=1} K_i \left[(\overline{X/Q})Q_i\right] \quad \text{mrem/yr}$$

Generic methodology parameters K_i are described in Section 1.2.1. The McGuire site specific parameter X/Q value is 7.2E-5 sec/m^3 as described in Section B4.2.2.1 for McGuire gamma air and beta air dose calculations. Dose contributions by Catawba via the airborne pathway to the McGuire fuel cycle whole body dose are trivial and need not be calculated unless a significant (beyond Tech Spec) release takes place at Catawba during the period of interest.

Maximum Organ

Airborne pathway maximum organ dose estimates are calculated using generic methodology or the GASPAR computer program. The maximum organ dose is established by calculating doses to all organs for each potential maximum offsite location identified in Table B4.0-7. A conservative estimate (i.e., overestimate) of the fuel cycle maximum organ dose is obtained by 1) determininig the locations with the highest exposure releases for each organ, 2) adding the highest exposure value for the airborne release to the same organ dose resulting from liquid releases, and 3) comparing values obtained when the liquid and airborne pathway components are added for all organs and age groups to determine the maximum (or limiting) organ and age group. Dose contributions by Catawba via the airborne pathway to the McGuire fueld cycle maximum organ dose are trivial and need not be calculated unless a significant (beyond Tech Spec) release takes place at Catawba during the period of interest.

TABLE B4.0-1

MCGUIRE NUCLEAR STATION

DISPERSION PARAMETER ($\overline{X/Q}$) FOR LONG TERM RELEASES > 500 HR/YR OR > 125 HR/QTR
(sec/m^3)

Distance to the control location, in miles

Sector	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0
S	1.3 E-5	3.4 E-6	1.4 E-6	7.4 E-7	4.7 E-7	3.3 E-7	2.4 E-7	1.9 E-7	1.5 E-7	1.3 E-7
SSW	1.6 E-5	4.2 E-6	1.7 E-6	9.0 E-7	5.7 E-7	4.0 E-7	3.0 E-7	2.3 E-7	1.9 E-7	1.5 E-7
SW	1.6 E-5	4.2 E-6	1.6 E-6	8.8 E-7	5.6 E-7	3.9 E-7	2.9 E-7	2.2 E-7	1.8 E-7	1.5 E-7
WSW	1.0 E-5	2.8 E-6	1.1 E-6	6.0 E-7	3.7 E-7	2.6 E-7	1.9 E-7	1.5 E-7	1.2 E-7	9.9 E-8
W	4.5 E-6	1.2 E-6	4.7 E-7	2.6 E-7	1.6 E-7	1.1 E-7	8.5 E-8	6.7 E-8	5.4 E-8	4.5 E-8
WNW	4.0 E-6	1.1 E-6	4.2 E-7	2.3 E-7	1.4 E-7	1.0 E-7	7.4 E-8	5.8 E-8	4.6 E-8	3.8 E-8
NW	9.0 E-6	2.4 E-6	9.7 E-7	5.3 E-7	3.3 E-7	2.3 E-7	1.7 E-7	1.4 E-7	1.1 E-7	9.2 E-8
NNW	1.4 E-5	3.6 E-6	1.5 E-6	8.1 E-7	5.2 E-7	3.7 E-7	2.8 E-7	2.2 E-7	1.8 E-7	1.5 E-7
N	5.8 E-5	1.5 E-5	6.1 E-6	3.4 E-6	2.2 E-6	1.6 E-6	1.2 E-6	9.6 E-7	7.8 E-7	6.6 E-7
NNE	7.2 E-5	1.8 E-5	7.5 E-6	4.2 E-6	2.8 E-6	2.0 E-6	1.5 E-6	1.2 E-6	9.7 E-7	8.1 E-7
NE	4.0 E-5	1.0 E-5	4.2 E-6	2.3 E-6	1.5 E-6	1.1 E-6	8.2 E-7	6.5 E-7	5.3 E-7	4.5 E-7
ENE	2.3 E-5	5.9 E-6	2.5 E-6	1.4 E-6	9.0 E-7	6.4 E-7	4.8 E-7	3.8 E-7	3.1 E-7	2.6 E-7
E	1.8 E-5	4.6 E-6	1.9 E-6	1.1 E-6	6.9 E-7	4.9 E-7	3.7 E-7	2.9 E-7	2.4 E-7	2.0 E-7
ESE	1.2 E-5	3.2 E-6	1.3 E-6	7.4 E-7	4.8 E-7	3.4 E-7	2.5 E-7	2.0 E-7	1.6 E-7	1.4 E-7
SE	1.1 E-5	2.9 E-6	1.2 E-6	6.6 E-7	4.2 E-7	3.0 E-7	2.2 E-7	1.8 E-7	1.4 E-7	1.2 E-7
SSE	7.7 E-6	2.1 E-6	8.5 E-7	4.6 E-7	3.0 E-7	2.1 E-7	1.5 E-7	1.2 E-7	9.9 E-8	8.2 E-8

TABLE B4.0-2

(1 of 1)

MCGUIRE NUCLEAR STATION

DEPOSITION PARAMETER ($\overline{D/Q}$) FOR LONG TERM RELEASES > 500 HR/YR OR > 125 HR/QTR
(m^{-2})

Sector	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0
	Distance to the control location, in miles									
S	4.9 E-8	1.2 E-8	4.3 E-9	2.1 E-9	1.3 E-9	8.2 E-10	5.8 E-10	4.3 E-10	3.3 E-10	2.6 E-10
SSW	7.1 E-8	1.7 E-8	6.2 E-9	3.1 E-9	1.8 E-9	1.2 E-9	8.3 E-10	6.2 E-10	4.8 E-10	3.8 E-10
SW	9.4 E-8	2.3 E-8	8.2 E-9	4.1 E-9	2.4 E-9	1.6 E-9	1.1 E-9	8.2 E-10	6.3 E-10	5.0 E-10
WSW	5.3 E-8	1.3 E-8	4.7 E-9	2.3 E-9	1.4 E-9	8.9 E-10	6.3 E-10	4.7 E-10	3.6 E-10	2.9 E-10
W	1.3 E-8	3.1 E-9	1.1 E-9	5.6 E-10	3.3 E-10	2.1 E-10	1.5 E-10	1.1 E-10	8.6 E-11	6.9 E-11
WNW	1.1 E-8	2.7 E-9	9.8 E-10	4.9 E-10	2.9 E-10	1.9 E-10	1.3 E-10	9.8 E-11	7.6 E-11	6.0 E-11
NW	1.9 E-8	4.7 E-9	1.7 E-9	8.4 E-10	5.0 E-10	3.2 E-10	2.3 E-10	1.7 E-10	1.3 E-10	1.0 E-10
NNW	2.3 E-8	5.7 E-9	2.1 E-9	1.0 E-9	6.0 E-10	3.9 E-10	2.6 E-10	2.0 E-10	1.6 E-10	1.3 E-10
N	9.3 E-8	2.3 E-8	8.1 E-9	4.0 E-9	2.4 E-9	1.6 E-9	1.1 E-9	8.1 E-10	6.3 E-10	5.0 E-10
NNE	1.3 E-7	3.2 E-8	1.1 E-8	5.7 E-9	3.3 E-9	2.2 E-9	1.5 E-9	1.1 E-9	8.8 E-10	7.0 E-10
NE	7.1 E-8	1.7 E-8	6.2 E-9	3.1 E-9	1.8 E-9	1.2 E-9	8.3 E-10	6.2 E-10	4.8 E-10	3.8 E-10
ENE	3.8 E-8	9.3 E-9	3.3 E-9	1.7 E-9	9.8 E-10	6.4 E-10	4.5 E-10	3.3 E-10	2.6 E-10	2.0 E-10
E	3.0 E-8	7.3 E-9	2.6 E-9	1.3 E-9	7.6 E-10	5.0 E-10	3.5 E-10	2.6 E-10	2.0 E-10	1.6 E-10
ESE	3.0 E-8	7.4 E-9	2.7 E-9	1.3 E-9	7.8 E-10	5.1 E-10	3.6 E-10	2.6 E-10	2.0 E-10	1.6 E-10
SE	3.1 E-8	7.6 E-9	2.7 E-9	1.3 E-9	7.9 E-10	5.2 E-10	3.7 E-10	2.7 E-10	2.1 E-10	1.7 E-10
SSE	2.7 E-8	6.5 E-9	2.3 E-9	1.2 E-9	6.8 E-10	4.5 E-10	3.1 E-10	2.3 E-10	1.8 E-10	1.4 E-10

TABLE B4.0-3

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LIQUID EFFLUENT DOSE - ADULT PARAMETERS
MCGUIRE NUCLEAR STATION
$A_{(T)}$ MREM/HR PER UCI/ML

NUCLIDE		BONE	LIVER	T. BODY	THYROID	KIDNEY	LUNG	GI-LLI
H	3	0.00E+00	8.96E+00	8.96E+00	8.96E+00	8.96E+00	8.96E+00	8.96E+00
NA	24	5.48E+02	5.48E+02	5.48E+02	5.48E+02	5.48E+02	5.48E+02	5.48E+02
CR	51	0.00E+00	0.00E+00	1.49E+00	8.94E-01	3.29E-01	1.98E+00	3.76E+02
MN	54	0.00E+00	4.76E+03	9.08E+02	0.00E+00	1.42E+03	0.00E+00	1.46E+04
MN	56	0.00E+00	1.20E+02	2.12E+01	0.00E+00	1.52E+02	0.00E+00	3.82E+03
FE	55	8.87E+02	6.13E+02	1.43E+02	0.00E+00	0.00E+00	3.42E+02	3.52E+02
FE	59	1.40E+03	3.29E+03	1.26E+03	0.00E+00	0.00E+00	9.19E+02	1.10E+04
CO	58	0.00E+00	1.51E+02	3.39E+02	0.00E+00	0.00E+00	0.00E+00	3.06E+03
CO	60	0.00E+00	4.34E+02	9.58E+02	0.00E+00	0.00E+00	0.00E+00	8.16E+03
NI	63	4.19E+04	2.91E+03	1.41E+03	0.00E+00	0.00E+00	0.00E+00	6.07E+02
NI	65	1.70E+02	2.21E+01	1.01E+01	0.00E+00	0.00E+00	0.00E+00	5.61E+02
CU	64	0.00E+00	1.6[illegible]E+01	7.93E+00	0.00E+00	4.26E+01	0.00E+00	1.44E+03
ZN	65	2.36E+04	7.50E+04	3.39E+04	0.00E+00	5.02E+04	0.00E+00	4.73E+04
BR	83	0.00E+00	0.00E+00	4.38E+01	0.00E+00	0.00E+00	0.00E+00	6.30E+01
BR	85	0.00E+00	0.00E+00	2.33E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RB	86	0.00E+00	1.03E+05	4.79E+04	0.00E+00	0.00E+00	0.00E+00	2.03E+04
RB	88	0.00E+00	2.95E+02	1.56E+02	0.00E+00	0.00E+00	0.00E+00	4.07E-09
RB	89	0.00E+00	1.95E+02	1.37E+02	0.00E+00	0.00E+00	0.00E+00	1.13E-11
SR	89	4.78E+04	0.00E+00	1.37E+03	0.00E+00	0.00E+00	0.00E+00	7.66E+03
SR	90	5.95E+05	0.00E+00	1.60E+05	0.00E+00	0.00E+00	0.00E+00	3.40E+04
SR	91	8.79E+02	0.00E+00	3.55E+01	0.00E+00	0.00E+00	0.00E+00	4.19E+03
SR	92	3.33E+02	0.00E+00	1.44E+01	0.00E+00	0.00E+00	0.00E+00	6.60E+03
Y	90	1.38E+00	0.00E+00	3.69E-02	0.00E+00	0.00E+00	0.00E+00	1.46E+04
Y	91 M	1.30E-02	0.00E+00	5.04E-04	0.00E+00	0.00E+00	0.00E+00	3.82E-02
Y	91	2.02E+01	0.00E+00	5.39E-01	0.00E+00	0.00E+00	0.00E+00	1.11E+04
Y	92	1.21E-01	0.00E+00	3.53E-03	0.00E+00	0.00E+00	0.00E+00	2.12E+03
Y	93	3.83E-01	0.00E+00	1.06E-02	0.00E+00	0.00E+00	0.00E+00	1.22E+04
ZR	95	2.77E+00	8.88E-01	6.01E-01	0.00E+00	1.39E+00	0.00E+00	2.82E+03
ZR	97	1.53E-01	3.09E-02	1.41E-02	0.00E+00	4.67E-02	0.00E+00	9.57E+03
NB	95	4.47E+02	2.49E+02	1.34E+02	0.00E+00	2.46E+02	0.00E+00	1.51E+06
MO	99	0.00E+00	4.62E+02	8.79E+01	0.00E+00	1.05E+03	0.00E+00	1.07E+03
TC	99 M	2.94E-02	8.32E-02	1.06E+00	0.00E+00	1.26E+00	4.07E-02	4.92E+01
TC	101	3.03E-02	4.36E-02	4.28E-01	0.00E+00	7.85E-01	2.23E-02	1.31E-13

TABLE B4.0-3

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LIQUID EFFLUENT DOSE - ADULT PARAMETERS
MCGUIRE NUCLEAR STATION
$A_{(I)}$ MREM/HR PER UCI/ML

NUCLIDE	BONE	LIVER	T. BODY	THYROID	KIDNEY	LUNG	GI-LLI
RU 103	1.98E+01	0.00E+00	8.54E+00	0.00E+00	7.57E+01	0.00E+00	2.31E+03
RU 105	1.65E+00	0.00E+00	6.52E-01	0.00E+00	2.13E+01	0.00E+00	1.01E+03
RU 106	2.95E+02	0.00E+00	3.73E+01	0.00E+00	5.69E+02	0.00E+00	1.91E+04
AG 110 M	1.42E+01	1.31E+01	7.80E+00	0.00E+00	2.58E+0[illegible]	0.00E+00	5.36E+03
TE 125	2.79E+03	1.01E+03	3.74E+02	8.39E+02	1.13E+04	0.00E+00	1.11E+04
TE 127 M	7.05E+03	2.52E+03	8.59E+02	1.80E+03	2.86E+04	0.00E+00	2.36E+04
TE 127	1.14E+02	4.11E+01	2.48E+01	8.48E+01	4.66E+02	0.00E+00	9.03E+03
TE 129 M	1.20E+04	4.47E+03	1.89E+03	4.11E+03	5.00E+04	0.00E+00	6.03E+04
TE 129	3.27E+01	1.23E+01	7.96E+00	2.51E+01	1.37E+02	0.00E+00	2.47E+01
TE 131 M	1.80E+03	8.81E+02	7.34E+02	1.39E+03	8.92E+03	0.00E+00	8.74E+04
TE 131	2.05E+[illegible]	8.57E+00	6.47E+00	1.69E+01	8.98E+01	0.00E+00	2.90E+00
TE 132	2.62E+03	1.70E+03	1.59E+03	1.87E+03	1.63E+04	0.00E+00	8.02E+04
I 130	9.01E+01	2.36E+02	1.05E+02	2.25E+04	4.15E+02	0.00E+00	2.29E+0[illegible]
I 131	4.96E+02	7.09E+02	4.06E+02	2.32E+05	1.22E+03	0.00E+00	1.87E+0[illegible]
I 132	2.42E+01	6.47E+01	2.26E+01	2.26E+03	1.03E+02	0.00E+00	1.22E+01
I 133	1.69E+02	2.94E+02	8.97E+01	4.32E+04	5.13E+02	0.00E+00	2.64E+02
I 135	5.28E+01	1.38E+02	5.10E+01	9.11E+03	2.22E+02	0.00E+00	1.56E+02
CS 134	3.03E+05	7.21E+05	5.89E+05	0.00E+00	2.33E+05	7.75E+04	1.26E+04
CS 136	3.17E+04	1.25E+05	9.01E+04	0.00E+00	6.97E+04	9.55E+03	1.42E+04
CS 137	3.88E+05	5.31E+05	3.48E+05	0.00E+00	1.80E+05	5.99E+04	1.03E+04
CS 138	2.69E+02	5.31E+02	2.63E+02	0.00E+00	3.90E+02	3.85E+01	2.27E-03
LA 142	1.83E-02	8.33E-03	2.07E-03	0.00E+00	0.00E+00	0.00E+00	6.08E+01
CE 141	8.01E-01	5.42E-01	6.15E-02	0.00E+00	2.52E-01	0.00E+00	2.07E+03
CE 143	1.41E-01	1.04E+02	1.16E-02	0.00E+00	4.60E-02	0.00E+00	3.90E+03
CE 144	4.18E+01	1.75E+01	2.24E+00	0.00E+00	1.04E+01	0.00E+00	1.41E+04
PR 143	1.32E+00	5.28E-01	6.52E-02	0.00E+00	3.05E-01	0.00E+00	5.77E+03
PR 144	4.31E-03	1.79E-03	2.19E-04	0.00E+00	1.01E-03	0.00E+00	6.19E-10
ND 147	9.00E-01	1.04E+00	6.22E-02	0.00E+00	6.08E-01	0.00E+00	4.99E+03
W 187	3.04E+02	2.55E+02	8.90E+01	0.00E+00	0.00E+00	0.00E+00	8.34E+04
NP 239	1.28E-01	1.25E-02	6.91E-03	0.00E+00	3.91E-02	0.00E+00	2.57E+03

TABLE B4.0-4

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LIQUID EFFLUENT DOSE - TEEN PARAMETERS
MCGUIRE NUCLEAR STATION
$A_{(i)}$ MREM/HR PER UCI/ML

NUCLIDE		BONE	LIVER	T. BODY	THYROID	KIDNEY	LUNG	GI-LLI
H	3	0.00E+00	6.34E+00	6.34E+00	6.34E+00	6.34E+00	6.34E+00	6.34E+00
NA	24	5.53E+02	5.53E+02	5.53E+02	5.53E+02	5.53E+02	5.53E+02	5.53E+02
CR	51	0.00E+00	0.00E+00	1.52E+00	8.46E-01	3.34E-01	2.17E+00	2.56E+02
MN	54	0.00E+00	4.65E+03	9.22E+02	0.00E+00	1.39E+03	0.00E+00	9.53E+03
MN	56	0.00E+00	1.24E+02	2.21E+01	0.00E+00	1.58E+02	0.00E+00	8.19E+03
FE	55	9.09E+02	6.45E+02	1.50E+02	0.00E+00	0.00E+00	4.09E+02	2.79E+02
FE	59	1.41E+03	3.30E+03	1.27E+03	0.00E+00	0.00E+00	1.04E+03	7.79E+03
CO	58	0.00E+00	1.45E+02	3.35E+02	0.00E+00	0.00E+00	0.00E+00	2.00E+03
CO	60	0.00E+00	4.20E+02	9.45E+02	0.00E+00	0.00E+00	0.00E+00	5.47E+03
NI	63	4.26E+04	3.01E+03	1.44E+03	0.00E+00	0.00E+00	0.00E+00	4.79E+02
NI	65	1.80E+02	2.30E+01	1.05E+01	0.00E+00	0.00E+00	0.00E+00	1.25E+03
CU	64	0.00E+00	1.72E+01	8.08E+00	0.00E+00	4.35E+01	0.00E+00	1.33E+03
ZN	65	2.13E+04	7.41E+04	3.46E+04	0.00E+00	4.74E+04	0.00E+00	3.14E+04
BR	83	0.00E+00	0.00E+00	4.73E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00
BR	85	0.00E+00	0.00E+00	2.51E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RB	86	0.00E+00	1.10E+05	5.19E+04	0.00E+00	0.00E+00	0.00E+00	1.63E+04
RB	88	0.00E+00	3.16E+02	1.68E+02	0.00E+00	0.00E+00	0.00E+00	2.71E-05
RB	89	0.00E+00	2.04E+02	1.44E+02	0.00E+00	0.00E+00	0.00E+00	3.12E-07
SR	89	4.97E+04	0.00E+00	1.42E+03	0.00E+00	0.00E+00	0.00E+00	5.91E+03
SR	90	5.06E+05	0.00E+00	1.35E+05	0.00E+00	0.00E+00	0.00E+00	2.63E+04
SR	91	9.11E+02	0.00E+00	3.62E+01	0.00E+00	0.00E+00	0.00E+00	4.13E+03
SR	92	3.44E+02	0.00E+00	1.47E+01	0.00E+00	0.00E+00	0.00E+00	8.77E+03
Y	90	1.42E+00	0.00E+00	3.83E-02	0.00E+00	0.00E+00	0.00E+00	1.17E+04
Y	91	1.34E-02	0.00E+00	5.11E-04	0.00E+00	0.00E+00	0.00E+00	6.32E-01
Y	91 M	2.09E+01	0.00E+00	5.59E-01	0.00E+00	0.00E+00	0.00E+00	8.55E+03
Y	92	1.26E-01	0.00E+00	3.63E-03	0.00E+00	0.00E+00	0.00E+00	3.44E+03
Y	93	3.97E-01	0.00E+00	1.09E-02	0.00E+00	0.00E+00	0.00E+00	1.21E+04
ZR	95	2.64E+00	8.34E-01	5.74E-01	0.00E+00	1.23E+00	0.00E+00	1.92E+03
ZR	97	1.52E-01	3.01E-02	1.39E-02	0.00E+00	4.56E-02	0.00E+00	8.15E+03
NB	95	4.50E+02	2.50E+02	1.37E+02	0.00E+00	2.42E+02	0.00E+00	1.07E+06
MO	99	0.00E+00	4.61E+02	8.78E+01	0.00E+00	1.05E+03	0.00E+00	8.25E+02
TC	99 M	2.84E-02	7.92E-02	1.03E+00	0.00E+00	1.18E+00	4.39E-02	5.20E+01
TC	101	3.08E-02	4.38E-02	4.30E-01	0.00E+00	7.92E-01	2.67E-02	7.48E-09

TABLE B4.0-4

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LIQUID EFFLUENT DOSE - TEEN PARAMETERS
MCGUIRE NUCLEAR STATION
$A_{(I)}$ MREM/HR PER UCI/ML

NUCLIDE		BONE	LIVER	T. BODY	THYROID	KIDNEY	LUNG	GI-LLI
RU	103	1.95E+01	0.00E+00	8.33E+00	0.00E+00	6.87E+01	0.00E+00	1.63E+03
RU	105	1.67E+00	0.00E+00	6.46E-01	0.00E+00	2.10E+01	0.00E+00	1.34E+03
RU	106	2.99E+02	0.00E+00	3.77E+01	0.00E+00	5.77E+02	0.00E+00	1.44E+04
AG	110 M	1.28E+01	1.21E+01	7.36E+00	0.00E+00	2.31E+01	0.00E+00	3.40E+03
TE	125 M	3.02E+03	1.09E+03	4.03E+02	8.43E+02	0.00E+00	0.00E+00	8.90E+03
TE	127 M	7.62E+03	2.70E+03	9.06E+02	1.81E+03	3.09E+04	0.00E+00	1.90E+04
TE	127	1.24E+02	4.41E+01	2.68E+01	8.59E+01	5.04E+02	0.00E+00	9.61E+03
TE	129 M	1.28E+04	4.77E+03	2.03E+03	4.14E+03	5.37E+04	0.00E+00	4.82E+04
TE	129	3.53E+01	1.32E+01	8.59E+00	2.52E+01	1.48E+02	0.00E+00	1.93E+02
TE	131 M	1.92E+03	9.22E+02	7.69E+02	1.39E+03	9.61E+03	0.00E+00	7.40E+04
TE	131	2.20E+01	9.06E+00	6.87E+00	1.69E+01	9.61E+01	0.00E+00	1.80E+00
TE	132	2.75E+03	1.74E+03	1.64E+03	1.84E+03	1.67E+04	0.00E+00	5.51E+04
I	130	8.81E+01	2.55E+02	1.02E+02	2.08E+04	3.92E+02	0.00E+00	1.96E+02
I	131	5.00E+02	7.00E+02	3.76E+02	2.04E+05	1.21E+03	0.00E+00	1.39E+02
I	132	2.39E+01	6.24E+01	2.24E+01	2.10E+03	9.83E+01	0.00E+00	2.72E+01
I	133	1.72E+02	2.92E+02	8.89E+01	4.07E+04	5.11E+02	0.00E+00	2.21E+02
I	135	5.22E+01	1.34E+02	4.98E+01	8.64E+03	2.12E+02	0.00E+00	1.49E+02
CS	134	3.10E+05	7.30E+05	3.39E+05	0.00E+00	2.32E+05	8.86E+04	9.08E+03
CS	136	3.18E+04	1.25E+05	8.41E+04	0.00E+00	6.82E+04	1.07E+04	1.01E+04
CS	137	4.15E+05	5.52E+05	1.92E+05	0.00E+00	1.88E+05	7.30E+04	7.86E+03
CS	138	2.88E+02	5.52E+02	2.76E+02	0.00E+00	4.08E+02	4.74E+01	2.51E-01
BA	139	9.10E+00	6.40E-03	2.65E-01	0.00E+00	6.03E-03	4.41E-03	8.11E+01
BA	140	1.86E+03	2.28E+00	1.20E+02	0.00E+00	7.72E-01	1.53E+00	2.87E+03
BA	141	4.39E+00	3.28E-03	1.47E-01	0.00E+00	3.04E-03	2.24E-03	9.36E-06
BA	142	1.96E+00	1.96E-03	1.20E-01	0.00E+00	1.66E-03	1.30E-03	6.01E-12
LA	140	3.61E-01	1.77E-01	4.72E-02	0.00E+00	0.00E+00	0.00E+00	1.02E+04
LA	142	1.86E-02	8.25E-03	2.05E-03	0.00E+00	0.00E+00	0.00E+00	2.51E+02
CE	141	7.98E-01	5.32E-01	6.12E-02	0.00E+00	2.51E-01	0.00E+00	1.52E+03
CE	143	1.41E-01	1.03E+02	1.15E-02	0.00E+00	4.60E-02	0.00E+00	3.08E+03
CE	144	4.17E+01	1.73E+01	2.24E+00	0.00E+00	1.03E+01	0.00E+00	1.05E+04
PR	143	1.36E+00	5.43E-01	6.76E-02	0.00E+00	3.15E-01	0.00E+00	4.47E+03
PR	144	4.46E-03	1.83E-03	2.26E-04	0.00E+00	1.05E-03	0.00E+00	4.92E-06
ND	147	9.73E-01	1.06E+00	6.34E-02	0.00E+00	6.21E-01	0.00E+00	3.82E+03
W	187	3.28E+02	2.67E+02	9.37E+01	0.00E+00	0.00E+00	0.00E+00	7.24E+04
NP	239	1.34E-01	1.27E-02	7.04E-03	0.00E+00	3.98E-02	0.00E+00	2.04E+03

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LIQUID EFFLUENT DOSE - CHILD PARAMETERS
MCGUIRE NUCLEAR STATION
$A_{(I)}$ MREM/HR PER UCI/ML

NUCLIDE		BONE	LIVER	T. BODY	THYROID	KIDNEY	LUNG	GI-LLI
H	3	0.00E+00	1.19E+01	1.19E+01	1.19E+01	1.19E+01	1.19E+01	1.19E+01
NA	24	7.93E+02	7.93E+02	7.93E+02	7.93E+02	7.93E+02	7.93E+02	7.93E+02
CR	51	0.00E+00	0.00E+00	1.92E+00	1.06E+00	2.91E-01	1.94E+00	1.02E+02
MN	54	0.00E+00	3.99E+03	1.06E+03	0.00E+00	1.12E+03	0.00E+00	3.35E+03
MN	56	0.00E+00	1.25E+02	2.81E+01	0.00E+00	1.51E+02	0.00E+00	1.80E+04
FE	55	1.57E+03	8.34E+02	2.59E+02	0.00E+00	0.00E+00	4.72E+02	1.55E+02
FE	59	2.26E+03	3.65E+03	1.82E+03	0.00E+00	0.00E+00	1.06E+03	3.80E+03
CO	58	0.00E+00	1.75E+02	5.37E+02	0.00E+00	0.00E+00	0.00E+00	1.02E+03
CO	60	0.00E+00	5.16E+02	1.52E+03	0.00E+00	0.00E+00	0.00E+00	2.86E+03
NI	63	7.36E+04	3.94E+03	2.50E+03	0.00E+00	0.00E+00	0.00E+00	2.65E+02
NI	65	3.04E+02	2.86E+01	1.67E+01	0.00E+00	0.00E+00	0.00E+00	3.50E+03
CU	64	0.00E+00	2.39E+01	1.44E+01	0.00E+00	5.77E+01	0.00E+00	1.12E+03
ZN	65	2.23E+04	5.95E+04	3.70E+04	0.00E+00	3.75E+04	0.00E+00	1.05E+04
BR	83	0.00E+00	0.00E+00	6.64E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00
BR	85	0.00E+00	0.00E+00	3.54E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RB	86	0.00E+00	1.09E+05	6.72E+04	0.00E+00	0.00E+00	0.00E+00	7.03E+03
RB	88	0.00E+00	3.10E+02	2.15E+02	0.00E+00	0.00E+00	0.00E+00	1.52E+01
RB	89	0.00E+00	1.91E+02	1.70E+02	0.00E+00	0.00E+00	0.00E+00	1.66E+00
SR	89	1.08E+05	0.00E+00	3.08E+03	0.00E+00	0.00E+00	0.00E+00	4.18E+03
SR	90	9.24E+05	0.00E+00	2.48E+05	0.00E+00	0.00E+00	0.00E+00	1.87E+04
SR	91	1.96E+03	0.00E+00	7.41E+01	0.00E+00	0.00E+00	0.00E+00	4.33E+03
SR	92	7.38E+02	0.00E+00	2.96E+01	0.00E+00	0.00E+00	0.00E+00	1.40E+04
Y	90	3.20E+00	0.00E+00	8.56E-02	0.00E+00	0.00E+00	0.00E+00	9.10E+03
Y	91 M	2.97E-02	0.00E+00	1.08E-03	0.00E+00	0.00E+00	0.00E+00	5.82E+01
Y	91	4.68E+01	0.00E+00	1.25E+00	0.00E+00	0.00E+00	0.00E+00	6.24E+03
Y	92	2.80E-01	0.00E+00	8.01E-03	0.00E+00	0.00E+00	0.00E+00	8.09E+03
Y	93	8.87E-01	0.00E+00	2.44E-02	0.00E+00	0.00E+00	0.00E+00	1.32E+04
ZR	95	7.05E+00	1.55E+00	1.38E+00	0.00E+00	2.22E+00	0.00E+00	1.62E+03
ZR	97	4.25E-01	6.13E-02	3.62E-02	0.00E+00	8.81E-02	0.00E+00	9.29E+03
NB	95	5.32E+02	2.07E+02	1.48E+02	0.00E+00	1.95E+02	0.00E+00	3.83E+05
MO	99	0.00E+00	8.78E+02	2.17E+02	0.00E+00	1.8[illegible]	0.00E+00	7.26E+02
TC	99 M	6.46E-02	1.27E-01	2.10E+00	0.00E+00	1.84E+[illegible]	6.43E-02	7.20E+01

TABLE B4.0-5

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LIQUID EFFLUENT DOSE - CHILD PARAMETERS
MCGUIRE NUCLEAR STATION
$A_{(i)}$ MREM/HR PER UCI/ML

NUCLIDE		BONE	LIVER	T. BODY	THYROID	KIDNEY	LUNG	GI-LLI
TC	101	7.48E-02	7.83E-02	9.93E-01	0.00E+00	1.34E+00	4.14E-02	2.49E-01
RU	103	4.83E+01	0.00E+00	1.85E+01	0.00E+00	1.21E+02	0.00E+00	1.25E+03
RU	105	4.26E+00	0.00E+00	1.54E+00	0.00E+00	3.74E+01	0.00E+00	2.78E+03
RU	106	7.72E+02	0.00E+00	9.64E+01	0.00E+00	1.04E+03	0.00E+00	1.20E+04
AG	110 M	3.23E+01	2.18E+01	1.74E+01	0.00E+00	4.06E+01	0.00E+00	2.60E+03
TE	125 M	4.25E+03	1.15E+03	5.67E+02	1.19E+03	0.00E+00	0.00E+00	4.10E+03
TE	127 M	1.08E+04	2.90E+03	1.28E+03	2.58E+03	3.07E+04	0.00E+00	8.72E+03
TE	127	1.76E+02	4.73E+01	3.77E+01	1.22E+02	5.00E+02	0.00E+00	6.86E+03
TE	129 M	1.82E+04	5.07E+03	2.82E+03	5.85E+03	5.33E+04	0.00E+00	2.21E+04
TE	129	5.00E+01	1.39E+01	1.19E+01	3.56E+01	1.46E+02	0.00E+00	3.11E+03
TE	131 M	2.68E+03	9.28E+02	9.88E+02	1.91E+03	8.98E+03	0.00E+00	3.77E+04
TE	131	3.09E+01	9.43E+00	9.21E+00	3.37E+01	9.36E+01	0.00E+00	1.63E+02
TE	132	3.77E+03	1.67E+03	2.01E+03	2.43E+03	1.55E+04	0.00E+00	1.68E+04
I	130	2.04E+02	4.13E+02	2.13E+02	4.55E+04	6.17E+02	0.00E+00	1.93E+02
I	131	1.20E+03	1.21E+03	6.87E+02	4.00E+05	1.99E+03	0.00E+00	1.08E+02
I	132	5.60E+01	1.03E+02	4.73E+01	4.77E+03	1.57E+02	0.00E+00	1.21E+02
I	133	4.14E+02	5.12E+02	1.94E+02	9.51E+04	8.53E+02	0.00E+00	2.06E+02
I	135	1.22E+02	2.20E+02	1.04E+02	1.95E+04	3.38E+02	0.00E+00	1.68E+02
CS	134	3.82E+05	6.26E+05	1.32E+05	0.00E+00	1.94E+05	6.97E+04	3.38E+03
CS	136	3.83E+04	1.05E+05	6.82E+04	0.00E+00	5.61E+04	8.37E+03	3.70E+03
CS	137	5.33E+05	5.11E+05	7.54E+04	0.00E+00	1.66E+05	5.99E+04	3.20E+03
CS	138	3.72E+02	5.17E+02	3.28E+02	0.00E+00	3.64E+02	3.92E+01	2.38E+02
BA	139	2.54E+01	1.35E-02	7.35E-01	0.00E+00	1.18E-02	7.97E-03	1.46E+03
BA	140	5.09E+03	4.46E+00	2.97E+02	0.00E+00	1.45E+00	2.66E+00	2.58E+03
BA	141	1.23E+01	6.86E-03	3.99E-01	0.00E+00	5.94E-03	4.03E-02	6.99E+00
BA	142	5.36E+00	3.85E-03	2.99E-01	0.00E+00	3.12E-03	2.27E-03	6.99E-02
LA	140	7.86E-01	2.75E-01	9.26E-02	0.00E+00	0.00E+00	0.00E+00	7.66E+03
LA	142	4.08E-02	1.30E-02	4.07E-03	0.00E+00	0.00E+00	0.00E+00	2.58E+03
CE	141	2.34E+00	1.17E+00	1.73E-01	0.00E+00	5.11E-01	0.00E+00	1.46E+03
CE	143	4.12E-01	2.23E+02	3.24E-02	0.00E+00	9.37E-02	0.00E+00	3.27E+03
CE	144	1.23E+02	3.84E+01	6.54E+00	0.00E+00	2.13E+01	0.00E+00	1.00E+04
PR	143	3.06E+00	9.18E-01	1.52E-01	0.00E+00	4.97E-01	0.00E+00	3.30E+03
PR	144	1.00E-02	3.10E-03	5.05E-04	0.00E+00	1.64E-03	0.00E+00	6.68E+00
ND	147	2.17E+00	1.76E+00	1.36E-01	0.00E+00	9.65E-01	0.00E+00	2.79E+03
W	187	4.30E+02	2.55E+02	1.14E+02	0.00E+00	0.00E+00	0.00E+00	3.58E+04
NP	239	3.47E-01	2.49E-02	1.75E-02	0.00E+00	7.19E-02	0.00E+00	1.84E+03

TABLE B4.0-6

(1 of 2)

LIQUID EFFLUENT DOSE - INFANT PARAMETERS
MCGUIRE NUCLEAR STATION
$A_{(i)}$ MREM/HR PER UCI/ML

NUCLIDE		BONE	LIVER	T. BODY	THYROID	KIDNEY	LUNG	GI-LLI
H	3	0.00E+00	1.16E+01	1.16E+01	1.16E+01	1.16E+01	1.16E+01	1.16E+01
NA	24	3.80E+02	3.80E+02	3.80E+02	3.80E+02	3.80E+02	3.80E+02	3.80E+02
CR	51	0.00E+00	0.00E+00	5.30E-01	3.46E-01	7.56E-02	6.73E-01	1.55E+01
MN	54	0.00E+00	7.49E+02	1.70E+02	0.00E+00	1.66E+02	0.00E+00	2.75E+02
MN	56	0.00E+00	3.08E+01	5.30E+00	0.00E+00	2.64E+01	0.00E+00	2.80E+03
FE	55	5.23E+02	3.38E+02	9.03E+01	0.00E+00	0.00E+00	1.65E+02	4.29E+01
FE	59	1.16E+03	2.02E+03	7.98E+02	0.00E+00	0.00E+00	5.98E+02	9.67E+02
CO	58	0.00E+00	1.35E+02	3.38E+02	0.00E+00	0.00E+00	0.00E+00	3.37E+02
CO	60	0.00E+00	4.06E+02	9.59E+02	0.00E+00	0.00E+00	0.00E+00	9.67E+02
NI	63	2.39E+04	1.47E+03	8.28E+02	0.00E+00	0.00E+00	0.00E+00	7.34E+01
NI	65	1.77E+02	2.00E+01	9.10E+00	0.00E+00	0.00E+00	0.00E+00	1.52E+03
CU	64	0.00E+00	2.29E+01	1.06E+01	0.00E+00	3.87E+01	0.00E+00	4.70E+02
ZN	65	6.92E+02	2.37E+03	1.09E+03	0.00E+00	1.15E+03	0.00E+00	2.01E+03
BR	83	0.00E+00	0.00E+00	1.37E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00
BR	85	0.00E+00	0.00E+00	7.30E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RB	86	0.00E+00	6.40E+03	3.16E+03	0.00E+00	0.00E+00	0.00E+00	1.64E+02
RB	88	0.00E+00	1.87E+01	1.03E+01	0.00E+00	0.00E+00	0.00E+00	1.82E+01
RB	89	0.00E+00	1.08E+01	7.41E+00	0.00E+00	0.00E+00	0.00E+00	3.66E+00
SR	89	9.44E+04	0.00E+00	2.71E+03	0.00E+00	0.00E+00	0.00E+00	1.94E+03
SR	90	4.70E+05	0.00E+00	1.27E+05	0.00E+00	0.00E+00	0.00E+00	8.69E+03
SR	91	1.88E+03	0.00E+00	6.81E+01	0.00E+00	0.00E+00	0.00E+00	2.23E+03
SR	92	7.22E+02	0.00E+00	2.68E+01	0.00E+00	0.00E+00	0.00E+00	7.79E+03
Y	90	3.27E+00	0.00E+00	8.77E-02	0.00E+00	0.00E+00	0.00E+00	4.51E+03
Y	91 M	3.05E-02	0.00E+00	1.04E-03	0.00E+00	0.00E+00	0.00E+00	1.02E+02
Y	91	4.25E+01	0.00E+00	1.13E+00	0.00E+00	0.00E+00	0.00E+00	3.05E+03
Y	92	2.88E-01	0.00E+00	8.09E-03	0.00E+00	0.00E+00	0.00E+00	5.49E+03
Y	93	9.14E-01	0.00E+00	2.49E-02	0.00E+00	0.00E+00	0.00E+00	7.22E+03
ZR	95	7.75E+00	1.89E+00	1.34E+00	0.00E+00	2.04E+00	0.00E+00	9.41E+02
ZR	97	5.57E-01	9.56E-02	4.36E-02	0.00E+00	9.63E-02	0.00E+00	6.09E+03
NB	95	1.58E+00	6.51E-01	3.76E-01	0.00E+00	4.66E-01	0.00E+00	5.49E+02
MO	99	0.00E+00	1.28E+03	2.49E+02	0.00E+00	1.91E+03	0.00E+00	4.21E+02
TC	99 M	7.22E-02	1.49E-01	1.92E+00	0.00E+00	1.60E+00	7.79E-02	4.33E+01
TC	101	8.54E-02	1.08E-01	1.06E+00	0.00E+00	1.28E+00	5.87E-02	1.83E+01

TABLE B4.0-6

(2 of 2)

LIQUID EFFLUENT DOSE – INFANT PARAMETERS
MCGUIRE NUCLEAR STATION
$A_{(i)}$ MREM/HR PER UCI/ML

NUCLIDE	BONE	LIVER	T. BODY	THYROID	KIDNEY	LUNG	GI-LLI
RU 103	5.57E+01	0.00E+00	1.86E+01	0.00E+00	1.16E+02	0.00E+00	6.77E+02
RU 105	5.12E+00	0.00E+00	1.72E+00	0.00E+00	3.76E+01	0.00E+00	2.04E+03
RU 106	9.07E+02	0.00E+00	1.13E+02	0.00E+00	1.07E+03	0.00E+00	6.88E+03
AG 110 M	3.75E+01	2.73E+01	1.81E+01	0.00E+00	3.91E+01	0.00E+00	1.42E+03
TE 125 M	8.77E+02	2.93E+02	[illegible]	2.95E+02	0.00E+00	0.00E+00	4.18E+02
TE 127 M	2.20E+03	7.30E+02	2.66E+02	6.36E+02	5.42E+03	0.00E+00	8.88E+02
TE 127	3.76E+01	1.26E+01	8.09E+00	3.06E+01	9.18E+01	0.00E+00	7.90E+02
TE 129 M	3.76E+03	1.29E+03	5.79E+02	1.44E+03	9.41E+03	0.00E+00	2.25E+03
TE 129	1.07E+01	3.68E+00	2.49E+00	8.95E+00	2.66E+01	0.00E+00	8.54E+02
TE 131 M	5.72E+02	2.30E+02	1.90E+02	4.66E+02	1.58E+03	0.00E+00	3.87E+03
TE 131	6.62E+00	2.45E+00	1.86E+00	5.91E+00	1.69E+01	0.00E+00	2.67E+02
TE 132	7.82E+02	3.87E+02	3.62E+02	5.72E+02	2.42E+03	0.00E+00	1.43E+03
I 130	2.26E+02	4.97E+02	1.99E+02	5.57E+04	5.45E+02	0.00E+00	1.06E+02
I 131	1.35E+03	1.59E+03	7.00E+02	5.23E+05	1.86E+03	0.00E+00	5.66E+01
I 132	6.24E+01	1.27E+02	4.51E+01	5.94E+03	1.41E+02	0.00E+00	1.03E+02
I 133	4.70E+02	6.85E+02	2.01E+02	1.25E+05	8.05E+02	0.00E+00	1.16E+02
I 135	1.37E+02	2.72E+02	9.93E+01	2.44E+04	3.04E+02	0.00E+00	9.86E+01
CS 134	1.42E+04	2.64E+04	2.67E+03	0.00E+00	6.81E+03	2.79E+03	7.19E+01
CS 136	1.73E+03	5.08E+03	1.90E+03	0.00E+00	2.02E+03	4.14E+02	7.71E+01
CS 137	1.96E+04	2.30E+04	1.63E+03	0.00E+00	6.17E+03	2.50E+03	7.19E+01
CS 138	1.81E+01	2.94E+01	1.43E+01	0.00E+00	1.47E+01	2.29E+00	4.70E+01
BA 139	3.31E+01	2.20E-02	9.59E-01	0.00E+00	1.32E-02	1.33E-02	2.10E+03
BA 140	6.43E+03	6.43E+00	3.31E+02	0.00E+00	1.53E+00	3.95E+00	1.58E+03
BA 141	1.60E+01	1.09E-02	5.04E-01	0.00E+00	6.58E-03	6.66E-03	1.95E+02
BA 142	6.92E+00	5.76E-03	3.41E-01	0.00E+00	3.31E-03	3.48E-03	2.86E+01
LA 140	7.94E-01	3.13E-01	8.05E-02	0.00E+00	0.00E+00	0.00E+00	3.68E+03
LA 142	4.14E-02	1.52E-02	3.64E-03	0.00E+00	0.00E+00	0.00E+00	2.58E+03
CE 141	2.96E+00	1.81E+00	2.13E-01	0.00E+00	5.57E-01	0.00E+00	9.33E+02
CE 143	5.57E-01	3.69E+02	4.21E-02	0.00E+00	1.08E-01	0.00E+00	2.16E+03
CE 144	1.12E+02	4.59E+01	6.28E+00	0.00E+00	1.85E+01	0.00E+00	6.43E+03
PR 143	3.06E+00	1.14E+00	1.52E-01	0.00E+00	4.25E-01	0.00E+00	1.61E+03
PR 144	1.03E-02	3.99E-03	5.19E-04	0.00E+00	1.44E-03	0.00E+00	1.85E+02
ND 147	2.08E+00	2.14E+00	1.31E-01	0.00E+00	8.24E-01	0.00E+00	1.35E+03
W 187	3.40E+01	2.36E+01	8.16E+00	0.00E+00	0.00E+00	0.00E+00	1.39E+03
NP 239	4.18E-01	3.74E-02	2.11E-02	0.00E+00	7.45E-02	0.00E+00	1.08E+03

Table B4.0-7 - Meteorological Parameter and Applicable Pathways for Potential Worst-case Offsite Locations

Ground Level Release Worst-Case Locations *

	$(\overline{X/Q})$	$(\overline{D/Q})$	Applicable Food Pathways**
(1) Inhalation, Ground Site Boundary, NNE	7.2E-5	1.3E-7	
(2) Garden, 0.75 mi, E	1.8E-5	3.0E-8	Veg, Meat, Milk
(3) Meat Animal, 3.5 mi, SSW	3.0E-7	8.3E-10	Veg, Meat
(4) Milk Animal, 2.8 mi, ESE	4.8E-7	7.8E-10	Veg, Milk
(5) Combination, 2.8 mi, ESE	4.8E-7	7.8E-10	Veg, Meat, Cow Milk

* Based on August 1991 Land Use Census Data (See Table B4.0-8)

** The food pathways to be included for exposure contribution to the maximum individual at this location. Inhalation and ground exposure pathways also considered at all locations.

TABLE B4.0-8

PATHWAY APPLICABILITY FOR ALL LOCATIONS BASED ON SITE SURVEY
MCGUIRE NUCLEAR STATION
(1 of 1)

Distance to the control location in miles

SECTOR	0-0.5*	0.5-1.0	1.0-1.5	1.5-2.0	2.0-2.5	2.5-3.0	3.0-3.5	3.5-4.0	.0-4.5	4.5-5.0**
N	X	X	X	X	X	V	V	V	V	VCMG
NNE	X	X	X	X	X	V	V	V	V	VCMG
NE	X	X	X	X	V	V	V	V	V	VCMG
ENE	X	X	X	X	V	V	V	VC	VCM	VCMG
E	X	V	V	V	V	VCG	VCG	VCG	VCMG	VCMG
ESE	X	V	V	V	V	VC	VC	VC	VC	VCMG
SE	X	X	X	X	X	X	V	VM	VM	VCMG
SSE	X	X	X	V	V	VCM	VCM	VCM	VCM	VCMG
S	X	X	V	V	V	V	V	V	V	VCMG
SSW	X	X	X	X	X	X	V	VM	VM	VCMG
SW	X	X	X	X	X	X	X	X	V	VCMG
WSW	X	X	V	V	V	V	V	V	V	VCMG
W	X	X	V	V	V	V	VM	VM	VM	VCMG
WNW	X	X	X	V	V	V	V	V	V	VCMG
NW	X	X	X	V	V	V	V	V	V	VCMG
NNW	X	X	X	X	X	X	V	V	V	VCMG

PATHWAYS: X - None V - VEGETABLE M - MEAT G - GOAT MILK C - COW MILK

* No pathways exist within the Site Boundary (Exclusion Area Boundary)

** Since there is no site survey data outside of 5 miles from the plant, it is conservative to assume that a Vegetable, Meat, Cow, and Goat pathway exists at every 5 mile location.

FIGURE B4.0-1

MCGUIRE LADTAP INPUT TEMPLATE
FOR LIQUID RADIONUCLIDE RELEASE OFFSITE DOSE CALCULATIONS

```
****** ***************************** TOP OF DATA ******************************
=COLS> ----+----1----+----2----+----3----+----4----+----5----+----6----+----7--
       LADTAP INPUT FOR MCGUIRE ODCM METHOD - DEFAULT DILUTION
              0   3.3E+03       1.0          1
            1.0
       LIQUID RELEASE SOURCE TERMS - CURIES PER RELEASE PERIOD
       H 3         0.00E+00
       NA24        0.00E+00
       CR51        0.00E+00
       MN54        0.00E+00
       MN56        0.00E+00
       FE55        0.00E+00
       FE59        0.00E+00
       CO58        0.00E+00
       CO60        0.00E+00
       NI63        0.00E+00
       NI65        0.00E+00
       CU64        0.00E+00
       ZN65        0.00E+00
       ZN69        0.00E+00
       BR83        0.00E+00
       BR85        0.00E+00
       RB86        0.00E+00
       RB88        0.00E+00
       RB89        0.00E+00
       SR89        0.00E+00
       SR90        0.00E+00
       SR91        0.00E+00
       SR92        0.00E+00
       Y 90        0.00E+00
       Y 91 M      0.00E+00
       Y 91        0.00E+00
       Y 92        0.00E+00
       Y 93        0.00E+00
       ZR95        0.00E+00
       ZR97        0.00E+00
       NB95        0.00E+00
       MO99        0.00E+00
       TC99 M      0.00E+00
       TC101       0.00E+00
       RU103       0.00E+00
       RU105       0.00E+00
       RU106       0.00E+00
       AG110M      0.00E+00
       TE125M      0.00E+00
       TE127M      0.00E+00
       TE127       0.00E+00
       TE129M      0.00E+00
       TE129       0.00E+00
       TE131M      0.00E+00
       TE131       0.00E+00
       TE132       0.00E+00
       I 130       0.00E+00
       I 131       0.00E+00
       I 132       0.00E+00
       I 133       0.00E+00
       I 135       0.00E+00
       CS134       0.00E+00
       CS136       0.00E+00
       CS137       0.00E+00
       CS138       0.00E+00
       BA139       0.00E+00
       BA140       0.00E+00
       BA141       0.00E+00
       BA142       0.00E+00
```

FIGURE B4.0-1 (Cont'd)

MCGUIRE LADTAP INPUT TEMPLATE
FOR LIQUID RADIONUCLIDE RELEASE OFFSITE DOSE CALCULATIONS

```
=COLS> ----+----1----+----2----+----3----+----4----+----5----+----6----+----7--
       LA140      0.00E+00
       LA142      0.00E+00
       CE141      0.00E+00
       CE143      0.00E+00
       CE144      0.00E+00
       PR143      0.00E+00
       PR144      0.00E+00
       ND147      0.00E+00
       W 187      0.00E+00
       NP239      0.00E+00
                1 2.67E+03  5.44E+09
                       0.3     .4167     .4167     .4167       0.0       0.0
****** **************************** BOTTOM OF DATA ****************************
```

FIGURE B4.D-2

MCGUIRE GASPAR INPUT TEMPLATE
FOR NOBLE GAS RADIONUCLIDE RELEASE WORST-CASE LOCATION

```
****** ***************************** TOP OF DATA ******************************
=COLS> ----+----1----+----2----+----3----+----4----+----5----+----6----+----7--
GASPAR INPUT FOR MCGUIRE ODCM METHOD - MAX NOBLE GAS DOSE CALCULATIONS
 0          0.0        0.0        0.0        0.0
 1 1
        1.0      1.0      1.0    0.76      1.0
NOBLE GAS SOURCE TERM - CURIES PER RELEASE PERIOD
          1.0
   AR41        0.00E+00
   KR83 M      0.00E+00
   KR85        0.00E+00
   KR85 M      0.00E+00
   KR87        0.00E+00
   KR88        0.00E+00
   KR90        0.00E+00
   XE131M      0.00E+00
   XE133       0.00E+00
   XE133M      0.00E+00
   XE135       0.00E+00
   XE135M      0.00E+00
   XE137       0.00E+00
   XE138       0.00E+00

   LOCATION 1        NNE 0.50     7.2E-05   7.2E-05   7.2E-05   1.3E-07
****** **************************** BOTTOM OF DATA ****************************
```

FIGURE B4.0-3

MCGUIRE GASPAR INPUT TEMPLATE
FOR PARTICULATE, IODINE AND OTHER NUCLIDES WORST-CASE LOCATIONS

```
****** ***************************** TOP OF DATA ******************************
=COLS> ----+----1----+----2----+----3----+----4----+----5----+----6----+----7--
000001 GASPAR INPUT FOR MCGUIRE ODCM METHOD - PART, I, AND OTHER - INHALATION
000002  0          0.0        0.0        0.0        0.0
000003  1 1
000004       1.0      1.0      1.0    0.76      1.0
000005 PART, I AND OTHER NUCLIDES SOURCE - CURIES PER RELEASE PERIOD
000006         1.0
000007    H 3       0.00E+00
000008    CR51      0.00E+00
000009    MN54      0.00E+00
000010    FE55      0.00E+00
000011    FE59      0.00E+00
000012    CO58      0.00E+00
000013    CO60      0.00E+00
000014    ZN65      0.00E+00
000015    SR89      0.00E+00
000016    SR90      0.00E+00
000017    ZR95      0.00E+00
000018    MO99      0.00E+00
000019    I 131     0.00E+00
000020    I 133     0.00E+00
000021    CS134     0.00E+00
000022    CS136     0.00E+00
000023    CS137     0.00E+00
000024    BA140     0.00E+00
000025    CE141     0.00E+00
000026    CE144     0.00E+00
000027
000028    LOCATION 1       NNE 0.50     7.2E-05   7.2E-05   7.2E-05   1.3E-07
000029
000030
000031
****** **************************** BOTTOM OF DATA ****************************
```

FOR OTHER LOCATIONS, REPLACE FOLLOWING INPUT LINES:

LOCATION 2 - WORST VEGETABLE GARDEN

```
000001 GASPAR INPUT FOR MCGUIRE ODCM METHOD - PART, I, AND OTHER - GARDEN
000002  0          1.0        1.0        1.0        1.0
000028    LOCATION 2        E   0.75     1.8E-05   1.8E-05   1.8E-05   3.0E-08
```

LOCATION 3 - WORST MEAT ANIMAL

(Enveloped by Location 2)

LOCATION 4 - WORST MILK ANIMAL

(Enveloped by Location 2)

LOCATION 5 - WORST COMBINATION

(Enveloped by Location 2)

Figure B4.0-4 - Fuel Cycle Dose Calculation Worksheet For Potential Worst-Case Offsite Locations

Ground Level Release Worst-Case Locations *

	$(\overline{X/Q})$	$(\overline{D/Q})$	Applicable Food Pathways**
(1) Inhalation, Ground Site Boundary, NNE	7.2E-5	1.3E-7	
(2) Garden, 0.75 mi, E	1.8E-5	3.0E-8	Veg, Meat, Milk
(3) Meat Animal, 3.5 mi, SSW	3.0E-7	8.3E-10	Veg, Meat
(4) Milk Animal, 2.8 mi, ESE	4.8E-7	7.8E-10	Veg, Milk
(5) Combination, 2.8 mi, ESE	4.8E-7	7.8E-10	Veg, Meat, Cow Milk

* Based on August 1991 Land Use Census Data (See Table B4.0-8)

** The food pathways to be included for exposure contribution to the maximum individual at this location. Inhalation and ground exposure pathways also considered at all locations.

Figure B4.0-4 (Cont'd) - Fuel Cycle Dose Calculation Worksheet for Organ Doses

Adult Age Group

Location 1 - Worst-Case Inhalation/Ground Location *

	Bone	Liver	T.Body	Thyroid	Kidney	Lung	GI-LLI
$D_{a,o}(l_m)$							
$D_{a,o}(g_m)$							
$D_{a,o}(g_c)$							
$D_{a,o}(T)$							

Location 2 - Worst-Case Vegetable Garden Location *

	Bone	Liver	T.Body	Thyroid	Kidney	Lung	GI-LLI
$D_{a,o}(l_m)$							
$D_{a,o}(g_m)$							
$D_{a,o}(g_c)$							
$D_{a,o}(T)$							

Location 3 - Worst-Case Meat Animal Location *

	Bone	Liver	T.Body	Thyroid	Kidney	Lung	GI-LLI
$D_{a,o}(l_m)$							
$D_{a,o}(g_m)$							
$D_{a,o}(g_c)$							
$D_{a,o}(T)$							

Location 4 - Worst-Case Milk Animal Location *

	Bone	Liver	T.Body	Thyroid	Kidney	Lung	GI-LLI
$D_{a,o}(l_m)$							
$D_{a,o}(g_m)$							
$D_{a,o}(g_c)$							
$D_{a,o}(T)$							

Figure B4.0-4 (Cont'd) - Fuel Cycle Dose Calculation Worksheet for Organ Doses

Location 5_1 - Worst-Case Combination 1,2...N Location(s) *

	Bone	Liver	T.Body	Thyroid	Kidney	Lung	GI-LLI
$D_{a,o}(l_m)$	____	____	____	____	____	____	____
$D_{a,o}(g_m)$	____	____	____	____	____	____	____
$D_{a,o}(g_c)$	____	____	____	____	____	____	____
$D_{a,o}(T)$	____	____	____	____	____	____	____

Location 5_2 - Worst-Case Combination 1,2...N Location(s) *

	Bone	Liver	T.Body	Thyroid	Kidney	Lung	GI-LLI
$D_{a,o}(l_m)$	____	____	____	____	____	____	____
$D_{a,o}(g_m)$	____	____	____	____	____	____	____
$D_{a,o}(g_c)$	____	____	____	____	____	____	____
$D_{a,o}(T)$	____	____	____	____	____	____	____

Location 5_N - Worst-Case Combination 1,2...N Location(s) *

	Bone	Liver	T.Body	Thyroid	Kidney	Lung	GI-LLI
$D_{a,o}(l_m)$	____	____	____	____	____	____	____
$D_{a,o}(g_m)$	____	____	____	____	____	____	____
$D_{a,o}(g_c)$	____	____	____	____	____	____	____
$D_{a,o}(T)$	____	____	____	____	____	____	____

Adult Organ Maximums**

Maximum Total

	Bone	Liver	T.Body	Thyroid	Kidney	Lung	GI-LLI
$D_{a,o}(T_{max})$	____	____	____	____	____	____	____

B5.0 RADIOLOGICAL ENVIRONMENTAL MONITORING

The radiological environmental monitoring program shall be conducted in accordance with Selected Licensee Commitment Manual Section 16.11-13. The monitoring program locations and analyses are given in Tables B5.0-1 through B5.0-3 and Figure B5.0-1 Site specific characteristics make groundwater sampling unnecessary. Groundwater recharge is from Lake Norman and local precipitation. The groundwater gradient flows directly to the Catawba River; therefore, contamination of groundwater from liquid effluents is highly improbable. Additionally, two site boundary TLD locations in the N and NNW sectors do not exist since the required locations are over water. However, special interest TLD's have been placed in these sectors on the discharge canal at 0.3 and 0.2 miles, respectively.

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 06/13/91 - 06/24/91.

The 1991 land use census also identified the following location where environmental monitoring samples were required but were not available for collection.

DISTANCE	DIRECTION	SAMPLE TYPE	REASON FOR NOT OBTAINING
2.6 miles	East	Goat Milk	Not used for human consumption

TABLE B5.0-1
(1 of 1)
MCGUIRE RADIOLOGICAL MONITORING PROGRAM SAMPLING LOCATIONS
(TLD LOCATIONS)

	SAMPLING LOCATION DESCRIPTION *			SAMPLING LOCATION DESCRIPTION *	
143	SITE BOUNDARY	(0.3 MILES NW)	163	4-5 MILE RADIUS	(5.0 MILES SE)
144	SITE BOUNDARY	(0.4 MILES NNE)	164	4-5 MILE RADIUS	(4.5 MILES SSE)
145	SITE BOUNDARY	(0.5 MILES NE)	165	4-5 MILE RADIUS	(5.0 MILES S)
146	SITE BOUNDARY	(0.5 MILES ENE)	166	4-5 MILE RADIUS	(5.2 MILES SSW)
147	SITE BOUNDARY	(0.4 MILES E)	167	4-5 MILE RADIUS	(4.9 MILES SW)
148	SITE BOUNDARY	(0.5 MILES ESE)	168	4-5 MILE RADIUS	(4.7 MILES WSW)
149	SITE BOUNDARY	(0.6 MILES SE)	169	4-5 MILE RADIUS	(4.4 MILES W)
150	SITE BOUNDARY	(0.5 MILES SE)	170	4-5 MILE RADIUS	(4.5 MILES WNW)
151	SITE BOUNDARY	(0.4 MILES S)	171	4-5 MILE RADIUS	(4.5 MILES NW)
152	SITE BOUNDARY	(0.5 MILES SSW)	172	4-5 MILE RADIUS	(5.2 MILES NNW)
153	SITE BOUNDARY	(0.5 MILES SW)	173	SPECIAL INTEREST	(8.5 MILES NNW)
154	SITE BOUNDARY	(0.5 MILES W)	174	SPECIAL INTEREST	(8.7 MILES WNW)
155	SITE BOUNDARY	(0.5 MILES WNW)	175	CONTROL	(12.7 MILES WNW)
156	SITE BOUNDARY	(0.5 MILES WNW)	176	SPECIAL INTEREST	(11.0 MILES SW)
157	4-5 MILE RADIUS	(4.8 MILES N)	177	SPECIAL INTEREST	(8.6 MILES S)
158	4-5 MILE RADIUS	(4.4 MILES NNE)	178	SPECIAL INTEREST	(9.2 MILES SE)
159	4-5 MILE RADIUS	(5.0 MILES NE)	179	SPECIAL INTEREST	(10.4 MILES ESE)
160	4-5 MILE RADIUS	(4.9 MILES ENE)	180	SPECIAL INTEREST	(11.5 MILES NNE)
161	4-5 MILE RADIUS	(4.7 MILES E)	181	SPECIAL INTEREST	(6.7 MILES NE)
162	4-5 MILE RADIUS	(4.6 MILES ESE)	182	SPECIAL INTEREST	(6.0 MILES NE)
			183	SPECIAL INTEREST	(5.5 MILES S)
			186	SPECIAL INTEREST	(0.2 MILES NNW)
			187	SPECIAL INTEREST	(0.3 MILES N)
			189	SITE BOUNDARY	(0.4 MILES SSE)
			190	SITE BOUNDARY	(0.5 MILES WSW)

* All TLD samples are collected quarterly

TABLE B5.0-2
(1 of 1)
MCGUIRE RADIOLOGICAL MONITORING PROGRAM SAMPLING LOCATIONS
(OTHER SAMPLING LOCATIONS)

CODE:

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

	SAMPLING LOCATION DESCRIPTION	Control Locations	Air Radioiodines and Particulates	Surface Water	Drinking Water	Shoreline Sediment	Food Products	Fish	Milk	Broadleaf Vegetation
120	Site Boundary (0.4 mi NNE)		W							M
121	Site Boundary (0.5 mi NE)		W							
125	Site Boundary (0.4 mi SW)		W							M
128	Discharge Canal Bridge (0.4 mi ENE)			BW						
129	Discharge Canal Entrance to Lake Norman (0.6 mi ENE)					SA		SA		
130	Hwy. 73 Bridge Downstream (0.6 mi SW)					SA				
131	Cowans Ford Dam (0.7 mi W)			BW						
132	Charlotte Municipal Water Supply (11.2 mi SSE)				BW					
133	Cornelius (5.2 mi NE)		W							
134	East Lincoln Junior High School (8.7 mi WNW)	X	W							M
135	Plant Marshall Intake Canal (12.0 mi N)	X		BW						
136	Mooresville Municipal Water Supply (12.5 mi NNE)	X			BW					
137	Pinnacle Access Area (12.0 mi N)	X				SA		SA		
138	Henry Cook Dairy (2.75 mi ESE)								SM	
139	William Cook Dairy (2.6 mi E)								SM	
140	Kidd Dairy-Cows (2.8 mi SSE)								SM	
141	Lynch Dairy-Cows (14.8 mi WNW)	X							SM	
142	Davidson Municipal Water Supply (7.5 mi NE)				BW					
158	4-5 Mile Radius (5.0 mi NNE)									M
184	5 Mile Radius - Gardens (2.5 mi ENE)						M(a)			
185	5 Mile Radius - Gardens (4.9 mi N) - Special Interest (deleted 01/01/92)						M(a)			
188	5 Mile Radius - Gardens (2.8 mi N) - Special Interest						M(a)			

(a) during harvest season

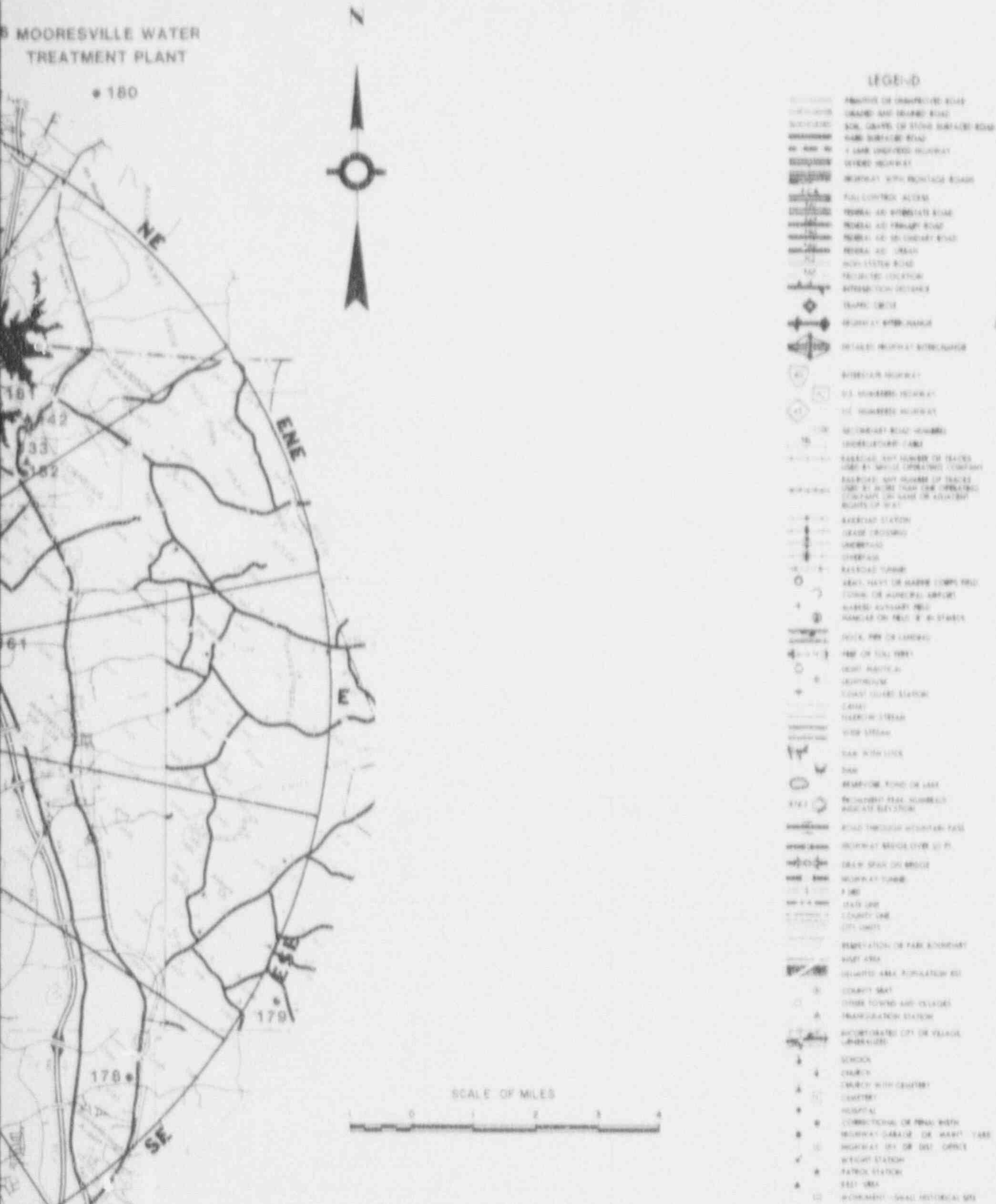
TABLE B5.0-3
(1 of 1)

MCGUIRE RADIOLOGICAL MONITORING PROGRAM ANALYSES

SAMPLE MEDIUM	ANALYSIS SCHEDULE	ANALYSES GAMMA ISOTOPIC	TRITIUM	LOW LEVEL I-131	GROSS BETA	TLD
1. Air Radioiodine and Particulates	Weekly	X X			X	
2. Direct Radiation	Quarterly					X
3. Surface Water	Biweekly			X		
	Monthly Composite	X				
	Quarterly Composite		X			
4. Drinking Water	Biweekly			X		
	Monthly Composite	X			X	
	Quarterly Composite		X			
5. Shoreline Sediment	Semiannually	X				
6. Milk	Semimonthly	X		X		
7. Fish	Semiannually	X				
8. Broadleaf Vegetation	Monthly	X				
9. Food Products	Monthly [a]	X				

(a) during harvest season

135 ▲ PLANT MARSHALL
137
PINNACLE ACCESS
N
NNW
NNE
WNW
W
WSW
SW
SSW
10 MILE
S
SSE
EXCLUSION AREA
141
175
173
172
174
134
170
169
168
167
139
138
162
140
163
164
166
165
183
176
177
132



● TLD LOCATIONS
▲ ALL OTHER SAMPLING LOCATIONS

CHARLOTTE WATER WORKS

SI APERTURE CARD

Also Available On Aperture Card

MCGUIRE NUCLEAR STATION

MONITORING PROGRAM LOCATIONS

FIGURE B5.0-1

(1 OF 2)

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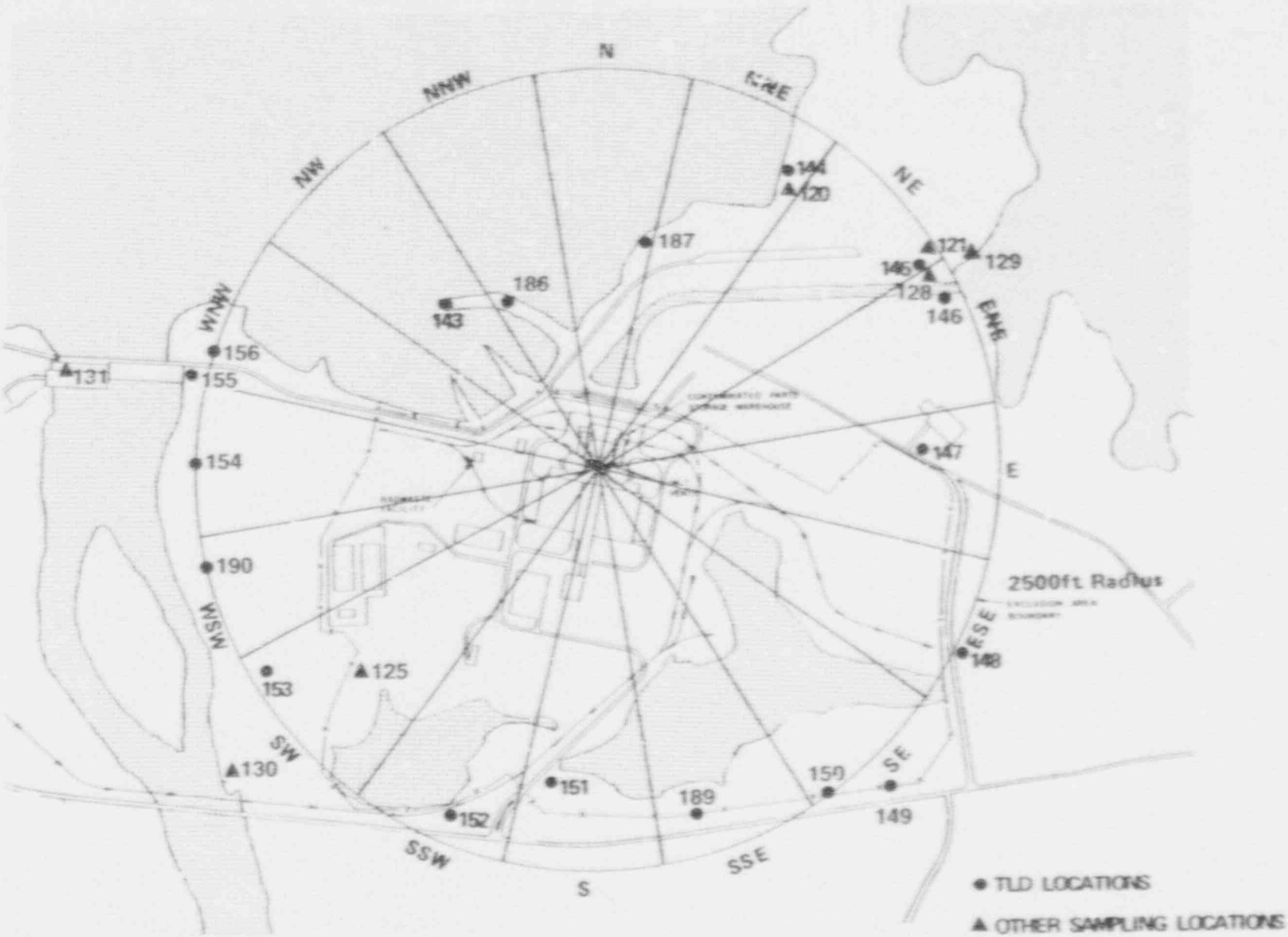

Figure B5.01
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