ODCM

Offsite Dose Calculation Manual

for

Ginna Station

Rochester Gas and Electric Corporation
Revision 9

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   a. The release of radioactive liquid effluents shall be such that the concentration in the circulating water discharge when averaged over one hour does not exceed ten times the concentration values specified in Appendix B, Table 2, Column 2 to 10 CFR Part 20.1001 - 20.2402. For dissolved or entrained noble gases, the total activity due to dissolved or entrained noble gases shall not exceed 2 E-04 uCi/ml. If the concentration of radioactive material in the circulating water discharge exceeds these limits, measures shall be initiated to restore the concentration to within these limits as soon as practicable. If the concentration when averaged over one hour exceeds twenty times the applicable concentrations specified in Appendix B of 10CFR Part 20, Table 2, Column 2, at the point of entry to receiving waters, submit to the commission a special report within 30 days.

   b. The radioactivity content of each batch of radioactive liquid waste to be discharged shall be determined prior to release by sampling and analysis in accordance with Table I-1. The results of pre-release analyses shall be used with the calculational methods in Section I.D to assure that the concentration at the point of release is limited to the values in Specification I.A.1.a.

      Post-release analyses of samples composited from batch releases shall be performed in accordance with Table I-1. The results of the post-release analyses shall be used with the calculational methods in Section I.D to assure that the dose commitments from liquids are limited to the values in Specification I.A.2.a.

2. Dose (10 CFR 50 Appendix I)

   a. The dose or dose commitment to an individual from radioactive materials in liquid effluents released to unrestricted areas shall be limited:

      (i) during any calendar quarter to < 1.5 mrem to the total body and to < 5 mrem to any organ, and

      (ii) during any calendar year to < 3 mrem to the total body and to < 10 mrem to any organ.

b. Whenever the calculated dose resulting from the release of radioactive materials in liquid effluents exceeds the quarterly limits of I.A.2.a(i), a Special Report shall be submitted to the Commission within thirty days which includes the following information:

   (i) identification of the cause for exceeding the dose limit;

   (ii) corrective actions taken and/or to be taken to reduce the releases of radioactive material in liquid effluents to assure that subsequent releases will remain within the above limits;

   (iii) The results of the radiological analyses of the nearest public drinking water source, and an evaluation of the radiological impact due to licensee releases on finished drinking water with regard to the requirements of 40 CFR 141, Safe Drinking Water Act.

c. Cumulative dose contributions from liquid effluents shall be determined at least once per 31 days.

d. During any month when the calculated dose to an individual exceeds 1/48 the annual limit (0.06 mrem to the total body or 0.2 mrem to any organ), projected cumulative dose contributions from liquid effluents shall be determined for that month and at least once every 31 days for the next 3 months.

3. Dose (40 CFR Part 190)

a. If the calculated dose from the release of radioactive materials from the plant in liquid effluents exceeds twice the limits of Specification I.A.2.a, a Special Report shall be submitted to the Commission within thirty days and subsequent releases shall be limited so that the dose or dose commitment to a real individual is limited to < 25 mrem to the total body or any organ (except thyroid, which is limited to < 75 mrem) for the calendar year that includes the release(s) covered by this report.

b. This report shall include an analysis which demonstrates that radiation exposures to all real individuals from the plant are less than the 40 CFR Part 190 limits. Otherwise, the report shall request a variance from the Commission to permit releases to exceed 40 CFR Part 190. Submittal of the report is considered a timely request by the NRC, and a variance is granted until staff action on the request is complete.

Table I-1
Radioactive Liquid Waste Sampling and Analysis Program

Liquid Release Type	Sampling (f) Frequency	Minimum Analysis Frequency	Type of Activity Analysis	Lower Limit of Detection (LLD) (uCi/ml) (a)
Batch Release				
Batch Waste Release Tanks (b)	PR Each Batch	PR Each Batch	Principal Gamma Emitters (d) and I-131 or Gross Beta-gamma *	5 E-07 1 E-06
	PR One Batch/M	M	Dissolved and Entrained Gases (Gamma Emitters)	1 E-05
	PR Each Batch	M Composite (c)	H-3 Gross Alpha	1 E-05 1 E-07
	PR Each Batch	Q Composite (c)	Sr-89 Sr-90 Fe-55	5 E-08 1 E-06
Continuous Release (e)				
Retention Tank	Continuous	W Composite (c)	Principal Gamma Emitters (d) I-131	5 E-07 1 E-06
Service Water (CV Fan Cooler and SFP HX lines)	Continuous	M or S ** Grab	Gross Beta-gamma	1 E-07

* If gross beta is performed for batch releases, then a weekly composite shall also be analyzed for Principal Gamma Emitters and I-131.

** Service water samples shall be taken and analyzed once per 12 hours if alarm setpoint is reached on continuous monitor.

Table Notation

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

For a particular measurement system (which may include radiochemical separation):

$$LLD = \frac{(4.66)\,(S_b)}{(Y)\,(E)\,(V)\,(2.22\ E{+}06)}$$

Where: LLD is the lower limit of detection as defined above as uCi per unit mass or volume

S_b is the standard deviation of the background counting rate or of the counting rate of a blank sample as appropriate as counts per disintegration

V is the sample size in units of mass or volume

E is the counting efficiency

Y is the fractional radiochemical yield when applicable

2.22 E+06 is the number of disintegrations per minute per uCi

The value of S_b used in the calculation of the LLD for a particular measurement system shall be based on the actual observed variance of the background counting rate or the counting rate of the blank samples, as appropriate, rather than on an unverified theoretically predicted variance. In calculating the LLD for a radionuclide determined by gamma-ray spectrometry, the background shall include the typical contribution of other radionuclides normally present in the samples. Typical values of E, V and Y should be used in the calculation.

The background count rate is calculated from the background counts that are determined to be within ± one FWHM energy band about the energy of the gamma ray peak used for the quantitative analysis for this radionuclide. The LLD is defined as an *a priori* (before the fact) limit representing the capability of a measurement system and not as an *a posteriori* (after the fact) limit for a particular measurement, the minimum detectable activity (MDA). Decay correction is not incorporated into the LLD, but is into the MDA.

Analyses shall be performed in such a manner that the stated LLDs will be achieved under routine conditions. Occasionally background fluctuations, unavoidable small sample sizes, the presence of interfering nuclides, or other uncontrollable circumstances may render these LLDs unachievable. When circumstances result in LLDs higher than required, the reasons shall be documented in the Annual Radioactive Effluent Report.

(b) A batch release is the discharge of liquid wastes of a discrete volume.

(c) A composite sample is one is which the quantity of liquid sampled is proportional to the quantity of liquid waste discharged and in which the method of sampling employed results in a specimen which is representative of the liquids released. Decay corrections are calculated from the midpoint of the sampling period.

(d) The principal gamma emitters for which the LLD specification will apply are exclusively the following radionuclides:

Mn-54, Fe-59, Co-58, Co-60, Zn-65, Cs-134, Cs-137 and Ce-141.

This list does not mean that only these nuclides are to be detected and reported. Other nuclides which are measurable and identifiable, together with the above nuclides, shall also be identified and reported. Nuclides which are below the LLD for the analyses should be reported as less than the LLD and should not be reported as being present at the LLD level. The less than values should not be used in the required dose calculations. When unusual circumstances result in LLDs higher than required, the reasons shall be documented in the Annual Radioactive Effluent Release Report.

(e) A continuous release is the discharge of liquid wastes of a non-discrete volume; e.g. from a volume or system that has an input flow during the continuous release. Decay corrections will be calculated based on all samples collected during the release.

(f) The frequency notation specified for the performance of sampling and analysis requirements shall correspond to the intervals defined below.

Notation	Frequency
PR, Prior to Release	Within 12 hours to each release
S, Each Shift	At least once per 12 hours
W, Weekly	At least once per 7 days
M, Monthly	At least once per 31 days
Q, Quarterly	At least once per 92 days

B. Liquid Effluents Release Points

There are three normal release points for liquid radioactive effluents from the plant that empty into the discharge canal. These are the Radwaste Treatment Discharge, Retention Tank discharge and the All Volatile Treatment Discharge. Each of these is a monitored release line that can be isolated before the release reaches the discharge canal. There is also a release point for the service water lines used for cooling the heat exchangers that is a monitored release line but is not isolatable. If there is an alarm on the service water monitor, it is necessary to sample each heat exchanger separately to determine which has a leak and then isolate the affected heat exchanger. The pressure of the service water system flow would normally force water from the clean service water side into the contaminated side of the heat exchanger. Dilution of liquid effluent is provided by the discharge canal . The discharge canal flow is 1.7 E+05 gpm for each circulating water pump. During operating periods, two circulating water pumps are in operation. During shutdown periods, one circulating water pump is operated. If neither circulating water pump is operable, dilution is provided by operation of one to three service water pumps which provide 7500 gpm each.

C. Liquid Effluents Monitor Setpoints

Alarm and/or trip setpoints for radiation monitors on each liquid effluent line are required. Precautions, limitations and setpoints applicable to the operation of Ginna Station liquid effluent monitors are provided in plant procedures P-9 and CH-RETS-RMS. Setpoint values are calculated to assure that alarm and trip actions occur prior to exceeding ten times the effluent concentration of Appendix B, Table 2, Column 2 of 10 CFR 20.1001 - 20.2402 at the release point to the unrestricted area. For added conservatism, liquid effluent release rates are administratively set so that only small fractions of the applicable maximum effluent concentrations can be reached in the discharge canal.

The Calculated alarm and trip action setpoints for each radioactive liquid effluent line monitor and flow determination must satisfy the following equation:

$$\text{Equation (1):} \quad \frac{cf}{F+f} \leq C$$

Where:	C -	the effluent concentration which implements ten times 10 CFR 20 limit for unrestricted areas, in uCi/ml.
	c -	the setpoint of the radioactivity monitor measuring the radioactivity concentration in the discharge line prior to dilution and subsequent release, in uCi/ml.
	F -	the dilution water flow as determined prior to the release point, in volume per unit time.
	f -	the flow as measured at the discharge point, in volume per unit time, in the same units as F.

Liquid effluent batch releases from Ginna Station are discharged through a liquid waste disposal monitor. The liquid waste stream (f) is diluted by (F) in the plant discharge canal before it enters Lake Ontario.

The limiting batch release concentration (c) corresponding to the liquid waste monitor setpoint is calculated from the above expression. Since the value of (f) is very small in comparison to (F), the expression becomes:

$$\text{Equation (2):} \quad c \leq \frac{CF}{f}$$

Where:	C -	1/10th the allowable concentration of Cs-137 as given in Appendix B, Table 2, Column 2 of 10 CFR 20, 1 E-07. This value is normally more restrictive than the calculated mixed isotopic release concentration.
	F -	the dilution flow assuming operation of only 1 circulating water pump (170,000 gpm).
	f -	the maximum waste effluent discharge rate through the designated pathway.

The limiting release concentration (c) is then converted to a set-point count rate by the use of the monitor calibration factor determined per procedure CH-RETS-RMS. The expression becomes:

$$\text{Equation (3):} \quad Setpoint'\,(cpm) = \frac{c\ (uCi/ml)}{Cal\ Factor\ (uCi/ml/cpm)}$$

Example (Liquid Radwaste Monitor R-18):

If one assumes, for example, that the maximum pump effluent discharge rate (f) is 30 gpm, then the limiting batch release concentration (c) would be determined as follows:

$$c\ (uCi/ml) \le \frac{1\ E\text{-}07\ (uCi/ml)\ x\ 170{,}000\ (gpm)}{30\ gpm}$$

$$c \le 5.7\ E\text{-}04\ (uCi/ml)$$

The monitor R-18 alarm and trip setpoint (in cpm) is then determined utilizing the monitor calibration factor calculated in plant procedure CH-RETS-RMS. Assuming a calibration factor of

$$9.5\ E\text{-}09\ \frac{(uCi/ml)}{cpm}$$

and a limiting batch release concentration determined above, the alarm and trip setpoint for monitor R-18 would be:

$$\frac{5.7\ E\text{-}04\ (uCi/ml)}{9.5\ E\text{-}09\ \frac{(uCi/ml)}{cpm}} = 6.0\ E\text{+}04\ cpm$$

The setpoint values for the containment Fan Cooler monitor (R-16), Spent Fuel Pit Heat Exchanger Service Water Monitors (R-20A and R-20B), Steam Generator Blowdown Monitor (R-19), the Retention Tank Monitor (R-21, and the All volatile Treatment Waste Discharge Monitor (R-22) are calculated in a similar manner using equation (2), substituting appropriate values of (f) and the corresponding calibration factor.

D. Liquid Effluent Release Concentrations

Liquid batch releases are controlled individually and each batch release is authorized based upon sample analysis and the existing dilution flow in the discharge canal. Plant procedures CH-RETS-LIQ-RELEASE and CH-RETS-LIQ-COMP establish the methods for sampling and analysis of each batch prior to release. A release rate limit is calculated for each batch based upon analysis, dilution flow and all procedural conditions being met before it is authorized for release. The waste effluent stream entering the discharge canal is continuously monitored and the release will be automatically terminated if the preselected monitor setpoint is exceeded.

If gross beta analysis is performed for each batch release in lieu of gamma isotopic analysis, then a weekly composite for principal gamma emitters and I-131 is performed. Additional monthly and quarterly composite analyses are performed as specified in Table I-1.

The equations used to calculate activity are:

Gamma Spectroscopy
Equation (4):

$$uCi/gm\ Act. = \frac{peak\ area\ counts - bkgd\ counts}{(C\ Time)\ (Eff)\ (Vol)\ (Decay)\ (3.7\ E{+}04)\ (BF)}$$

Gross Beta/Gamma
Equation (5):

$$uCi/gm\ Act. = \frac{Total\ counts - bkgd\ counts}{(C\ Time)\ (Eff)\ (Vol)\ (Decay)\ (3.7\ E{+}04)}$$

Where:	C Time	-	seconds of count time
	Eff sec	-	counting efficiency in $\frac{\text{count per sec}}{\text{disintegrations per sec}}$
	vol	-	volume in milliliters
	decay	-	decay correction factor, $e^{-\lambda t}$
	3.7 E+04	-	conversion constant, in $\frac{\text{disintegration per sec}}{\text{uCi}}$
	BF	-	the fraction disintegrating at a specific energy

E. Liquid Effluent Dose

The dose contribution received by the maximally exposed individual from the ingestion of Lake Ontario fish and drinking water is determined using the following methodology. These calculations will assume a near field dilution factor of 1.0 in evaluating the fish pathway dose, and a dilution factor of 20 between the plant discharge and the Ontario Water District drinking water intake located 1.1 miles away (Figure V-2). The dilution factor of 20 was derived from drift and dispersion studies documented in reference 4.

Dose contributions from shoreline recreation, boating and swimming have been shown to be negligible in the Appendix I dose analysis, reference 5, and do not need to be routinely evaluated. Also, there is no known human consumption of shellfish from Lake Ontario.

The dose contribution to an individual will be determined to ensure that it complies with the specification of I.A.2.a(i) and I.A.2 a(ii). Offsite receptor doses will be determined for the limiting age group and organ, unless census data show that actual offsite individuals are the limiting age group.

The following expression in used to calculate ingestion pathway dose contributions for the total release period from all radionuclides identified in liquid effluents released to unrestricted areas:

$$\textit{Equation (6)}: D_\tau = \sum_i [A_{i\tau} \sum_j \Delta t_j C_{ij} F_j]$$

Where:	D_τ	-	the cumulative dose commitment to the total body or any organ, τ, from the liquid effluents for the summation of the total time period in mrem. $\sum_j$ *is for total number of hours of release.*
	Δt_j	-	the length of the jth time period over which C_{ij} and F_j are averaged for all liquid releases in hours.
	C_{ij}	-	the average concentration of radionuclide i in undiluted liquid effluent during time period Δt_j from any liquid release in uCi/ml.
	$A_{i\tau}$	-	the site-related ingestion dose commitment factor to the total body or any organ, τ, for each identified principal gamma and beta emitter in mrem/hr per uCi/ml. See equation (7).
	F_j	-	the discharge canal dilution factor for C_{ij} during any liquid effluent release. Defined as the ratio of the maximum undiluted liquid waste flow during release to unrestricted receiving waters. The dilution factor will depend on the number of circulation pumps operating and, during icing conditions, the percentage opening of the recirculating gate. Reference curves are presented in plant procedure CH-RETS-LIQ-RELEASE.

$$Equation\ (7):\quad A_{i\tau} = k_o\ (U_w/D_w + U_F\ BF_i)\ DF_i$$

Where:	$A_{i\tau}$	-	The site-related ingestion dose commitment factor to the total body or to any organ, τ, for each identified principal gamma and beta emitter in mrem/hr per uCi/ml.
	k_o	-	units conversion factor, 1.14 E+05 - 1 E+06 pCi/uCi x 1 E+03 ml/kg + 8760 hr/yr
	U_w	-	a receptor person's water consumption by age group from table E-5 of Regulatory guide 1.109
	D_w	-	dilution factor from the near field area of the release point to potable water intake. The site specific dilution factor is 20. This factor is assumed to be 1.0 for the fish ingestion pathway
	U_F	-	a receptor person's fish consumption by age group from table E-5 of Regulatory Guide 1.109
	BF_i	-	bioaccumulation factor for nuclide, i, in fish in pCi/kg per pCi/L, from table A-1 of Regulatory Guide 1.109
	DF_i	-	dose conversion factor for the ingestion of nuclide, i, for a receptor person in pre-selected organ, τ, in mrem/pCi, from Tables E-11, E-12, E-13, E-14 of Regulatory guide 1.109

The monthly dose contribution from releases for which radionuclide concentrations are determined by periodic composite sample analysis may be approximated by assuming an average monthly concentration based on the previous monthly or quarterly composite analyses. However, in the Annual Radioactive Effluent Release Report the calculated dose contributions from these radionuclides shall be based on the actual composite analyses.

Example:

Computing the dose to the whole body via the fish and drinking water pathways, assuming an initial Cs-137 discharge concentration of 3.0 E-04 uCi/ml:

Given the following discharge factors, where:

Δt_i = 1 hour

C_{ij} = 3.0 E-04 uCi/ml

$F_j = \frac{20\ gpm}{170{,}000\ gpm} = 1.2\ E\text{-}04$

D_W = 20

and, taking the following values from Regulatory Guide 1.109 which concern the receptor of interest, which we assume is the child in this case:

U_W = 510 l/year
U_F = 6.9 kg/year
BF_i = 2000 pCi/kg per pCi/l
DF_i = 4.62 E-05 mrem/pCi

Then, the site-related ingestion dose commitment factor, A_{iT}, is calculated as follows:

$$A_{iT}\ \frac{mrem/hr}{uCi/ml} = k_o\ (U_W / D_W + U_F\ BF_i)\ DF_i$$

$$= 1.14\ E{+}05\ \left[\frac{510}{20} + (6.9)(2000)\right]\ 4.62\ E{-}05$$

$$A_{iT} = 7.28\ E{+}04\ mrem/hr\ per\ uCi/ml$$

And, the whole body dose to the child is then:

$$D_T\ mrem = (A_{iT})(\Delta t_j)(C_j)(F_j)$$

$$= (7.28\ E{+}04)(1)(3.0\ E{-}04)(1.2\ E{-}04)$$

D_T = 2.6 E-03 mrem to the whole body from Cs-137

The dose contribution from any other isotopes would then need to be calculated and all the isotopic contributions summed.

II. GASEOUS EFFLUENTS

A. Specification

1. Concentration

a. The release of radioactive gaseous effluents shall be such that the concentration of the release point when averaged over one hour does not exceed the effluent concentration values specified in Appendix B, Table 2, Column 2 to 10CFR Part 20.1001-20.2402. If the concentration when averaged over one hour exceeds twenty times the applicable concentration specified in Appendix B, Table 2, Column 1 in an unrestricted area, submit to the Commision a special report within 30 days.

b. The radioactivity content of each batch release of radioactive gaseous waste to be discharged shall be determined prior to release by sampling and analysis in accordance with Table II-1. The results of pre-release analyses shall be used with the calculation methods in Sections II.D and II.E to assure that the concentration at the point of release is limited to the values in II.A.1.a and the dose commitments from gaseous waste are limited to the values in Specification II.A.2.a.

2. Dose Rate

a. The instantaneous dose rate due to radioactive materials released in gaseous effluents from the site shall be limited to the following values:

(i) the dose rate for noble gases shall be ≤ 500 mrem/yr to the total body and ≤ 3000 mrem/yr to the skin, and

(ii) the dose rate for I-131, I-133, tritium, and for all radioactive materials in particulate form with half-lives greater than 8 days shall be ≤ 1500 mrem/yr to any organ.

b. For unplanned release of gaseous wastes, compliance with II.A.2.a may be determined by averaging over a 24-hour period.

c. If the calculated dose rate of radioactive materials released in gaseous effluents from the site exceeds the limits of II.A.2.a or II.A.2.b, measures shall be initiated to restore releases to within limits as soon as practicable.

d. Compliance with II.A.2.a and II.A.2.b shall be determined by considering the applicable ventilation system flow rates. These flow rates shall be determined at the frequency required by Table III-3.

3. Release Rate

a. The effluent continuous monitors as listed in Table III-1 having provisions for the automatic termination of gas decay tank, shutdown purge or mini-purge releases, shall be used to limit releases within the values established in Specification II.A.2 when monitor setpoint values are exceeded.

b. The dose rate due to radioactive materials, other than noble gases, in gaseous effluents shall be determined by obtaining representative samples and performing analyses in accordance with the sampling and analysis program specified in Table II-1.

4. Dose (10 CFR Part 50, Appendix I)

a. The air dose due to noble gases released in gaseous effluents from the site shall be limited to the following:

(i) During any calendar quarter to ≤ 5 mrad for gamma radiation and to ≤ 10 mrad for beta radiation.

(ii) During any calendar year to ≤ 10 mrad for gamma radiation and to ≤ 20 mrad for beta radiation.

b. The dose to an individual from I-131, I-133, tritium, and for all radioactive materials in particulate form with half-lives greater than eight days released with gaseous effluents from the site shall be limited to the following:

(i) during any calendar quarter to ≤ 7.5 mrem to any organ.

(ii) during any calendar year to ≤ 15 mrem to any organ.

c. Whenever the calculated dose to an individual resulting from noble gases or from radionuclides other than noble gases exceeds the quarterly limits of II.A.4.a(i) or II.A.4.b(i), a Special Report shall be submitted to the Commission within thirty days which includes the following information:

   (i) Identification of the cause for exceeding the dose limit.

   (ii) Corrective actions taken and/or to be taken to reduce releases of radioactive material in gaseous effluents to assure that subsequent releases will be within the above limits.

d. Cumulative dose contributions from gaseous effluents shall be determined at least once every 31 days.

e. During any month when the calculated dose to an individual exceeds 1/48th the annual limit (0.2 mrad), projected cumulative dose contributions from gaseous effluents shall be determined for that month and at least once every 31 days for the next 3 months.

5. Dose (40 CFR Part 190)

a. If the calculated dose from the release of radioactive materials from the plant in gaseous effluents exceeds twice the limits of Specification II.A.4.a or II.A.4.b, a Special Report shall be submitted to the Commission within thirty days and subsequent releases shall be limited so that the dose or dose commitment to a real individual is limited to ≤ 25 mrem to the total body or any organ (except thyroid, which is limited to ≤ 75 mrem) for the calendar year that includes the release(s) covered by this report.

This report shall include an analysis which demonstrates that radiation exposures to all real individuals from the plant are less than the 40 CFR Part 190 limits. Otherwise, the report shall request a variance from the commission to permit releases to exceed 40 CFR Part 190. Submittal of the report is considered a timely request by the NRC, and a variance is granted until staff action on the request is complete.

Table II-1

Radioactive Gaseous Waste Sampling and Analysis Program

Gaseous Release Type	Sampling (i) Frequency	Minimum Analysis Frequency	Type of Activity Analysis	Lower Limit of Detection (LLD)(uCi/cc)(a)
Containment Purge	PR Each Purge (b,c) Grab Sample	PR	Principal Gamma Emitters (e) H-3	1 E-04 1 E-06
Auxiliary Building Ventilation	M (b) Grab Sample	M (b)	Principal Gamma Emitters (e) H-3	1 E-04 1 E-06
All Release Types as listed above	Continuous (d)	W (b) Charcoal Sample	I-131 I-133	1 E-12 1 E-10
	Continuous (d)	W (b) Particulate Sample	Principal Gamma Emitters (e)	1 E-11
	Continuous (d)	M Composite Particulate Sample	Gross Alpha	1 E-11
	Continuous (d)	Q Composite Particulate Sample	Sr-89, Sr-90	1 E-11
Air Ejector	M (b,f) Grab Sample	M (b)	Principal Gamma Emitters (e) I-131 (h) H-3 (g)	1 E-04 1 E-06
All Release Types listed above	Continuous (d)	Noble Gas Monitor	Beta or Gamma	1 E-06
Gas Decay Tank	PR Each Tank Grab Sample	PR Each Tank	Principal Gamma Emitters (e)	1 E-04

(a) The lower limit of detection (LLD) is defined in Table Notation a of Table I-1.

(b) Analyses shall also be performed when the monitor on the continuous sampler reaches its setpoint.

(c) Tritium grab samples shall be taken at least three times per week when the reactor cavity is flooded.

(d) The ratio of the sample flow rate to the sampled stream flow rate shall be known for the time period covered by each dose or dose rate calculation made in accordance with specification II.A.1.a, II.A.3.a and II.A.3.b.

(e) The principal gamma emitters for which the LLD specification will apply are exclusively the following radionuclides:

Kr-85m, Xe-133, Xe-133m and Xe-135 for gaseous emissions

Mn-54, Fe-59, Co-58, Co-60, Zn-65, Mo-99, Cs-134, Cs-137, Ce-141 and Ce-144 for particulate emissions.

This list does not mean that only these nuclides are to be detected and reported. Other nuclides which are measurable and identifiable, together with the above nuclides, shall also be identified and reported. Nuclides which are below the LLD for the analyses should not be reported as being present at the LLD level for that nuclide. When unusual circumstances result in LLDs higher than required, the reasons shall be documented in the Annual Radioactive Effluent Release Report.

(f) Air ejector samples are not required during cold or refueling shutdowns.

(g) Air ejector tritium sample is not required if the secondary coolant activity is less than 1 E-04 uCi/gm.

(h) Air ejector iodine samples shall be taken and analyzed weekly if the secondary coolant activity exceeds 1 E-04 uCi/gm.

(i) Sampling and analysis frequency is defined in Table Notation (f) of Table I-1

B. Gaseous Effluent Release Points

There are three release points continuously monitored for noble gases, containment vent, plant vent and air ejector. The containment vent and plant vent are also continuously monitored for radioiodines and particulates. Since the
9 air ejector is a steam release point, continuous radioiodine and particulate monitoring is not required when the secondary coolant activity is less than 1 E-04 uCi/gm. Flow rates through the vents are measured periodically. During shutdown, temporary trailers may be brought on site that also require monitoring and characterization of their releases, such as the CO_2 decon trailer.

Quarterly plant measurements of one week duration for the particulate and iodine released in the steam by the air ejector demonstrate that sampling this pathway for particulate and iodine is not necessary since these releases are less than 0.1% of
9 the Plant Vent. The releases are correlated to blowdown activity for determining activity in steam releases. During shutdown and startup, special systems are in use that may release small amounts of radioactivity in steam releases. This is accounted for by using operational data and activity in the source of the steam. Grab samples are obtained when possible.

If an unmonitored release point is discovered, a calculation is performed to determine the potential radioactivity that is released. If the release is continuous, it is included in the monthly report that accounts for releases from the site for calculating doses to the general public.

C. Gaseous Effluent Monitor Setpoints

Alarm and/or trip setpoints for specified radiation monitors are required on each noble gas effluent line from the plant. Precautions, limitations and setpoints applicable to the operation of Ginna Station gaseous effluent monitors are provided in plant procedures P-9 and CH-RETS-RMS. Setpoints are conservatively established for each ventilation noble gas monitor so that dose rates in unrestricted areas corresponding to 10 CFR Part 50 Appendix I limits will not be exceeded. Setpoints shall be determined so that dose rates from releases of noble gases will comply with Specification II.A.1.a(i).

The calculated alarm and trip action setpoints for each radioactive gaseous effluent monitor must satisfy the following equation:

$$\text{Equation (8):} \quad c \leq \frac{Q_{iv}}{(f)(k)(K)}$$

Where:	c	-	setpoint in cpm
	Q_{iv}	-	release rate limit by specific nuclide (i) in uCi/sec from vent (v)
	f	-	discharge flow rate in cfm
	k	-	units conversion factor in cc/sec/cfm
	K	-	calibration factor in uCi/cc/cpm

The general methodology for establishing plant ventilation monitor setpoints is based upon a vent concentration limit in uCi/cc derived from site specific meteorology and vent release characteristics.

Additional radiation monitor alarm and/or trip setpoints are calculated for radiation monitors measuring radioiodines, radioactive materials in particulate form and to radionuclides other than noble gases. Setpoints are determined to assure that dose rates from the release of these effluents shall comply with Specification II.A.1.a(ii).

The release rate limit for noble gases shall be calculated by the following equation for total body dose:

$$\text{Equation (9):} \quad Q_{iv}\ uCi/sec \leq \frac{500\ mrem/yr}{(K_i\ mrem/yr\ per\ uCi/m^3)\,(X/Q)_v\ sec/m^3}$$

and by the following equation for skin doses:

Equation (10):

$$Q_{iv}\ uCi/sec \leq \frac{3000\ mrem/yr}{(L_i + 1.1M_i)\ mrem/yr\ per\ uCi/m^3\ (X/Q)_v\ sec/m^3}$$

where:	Q_{iv}	=	the release rate of radionuclide (i) from vent (v) which results in a dose rate of 500 mrem/yr to the whole body or 3000 mrem/yr to the skin of the critical receptor in uCi/sec.
	K_i	=	the total body dose factor due to gamma emissions for each identified noble gas radionuclide in mrem/yr per uCi/m^3 from table II-2.
	L_i	=	the skin dose factor due to beta emissions for each identified noble gas radionuclide in mrem/yr per uCi/m^3 from table II-2.
9	M_i	=	the air dose factor due to gamma emissions for each identified noble gas radionuclide in mrad/yr per uCi/m^3 from Table II-2. Unit conversion constant of 1.1 mrem/mrad converts air dose to skin dose.
	$(X/Q)_v$	=	the highest calculated annual average dispersion parameter for estimating the dose to the critical offsite receptor from vent release point (v) in sec/m^3. The $(X/Q)_v$ is calculated by the method described in Regulatory Guide 1.111.

Noble gas monitor setpoints are conservatively set according to procedure P-9 to correspond to fractions of the applicable 10 CFR Part 20 dose limits for unrestricted areas. Fractions are small enough to assure the timely detection of any simultaneous discharges from multiple release points before the combined downwind site boundary concentration could exceed allowable limits. Additional conservatism is provided by basing these setpoints upon instantaneous downwind concentrations. Release rates during the remainder of a given year, combined with any infrequent releases at setpoint levels, would result in only a very small fraction of the 10 CFR Part 20 annual limits.

Historically, xenon-133 is the principal noble gas released from all vents and is appropriate for use as the reference isotope for establishing monitor setpoints. The whole body dose will be limiting, and the Xe-133 release rate limit is calculated by substituting the appropriate values into equation (9). After the release rate limit for Xe-133 is determined for each vent, the corresponding vent concentration limits are calculated based on applicable vent flow rates. Annually-derived monitor calibration factors in uCi/cc per cpm are used to convert limiting vent concentrations to count rates.

Example: Plant Vent Monitor, R-14

Using Xe-133 as the controlling isotope for the setpoint and assuming a measured activity of 2.66 E-04 uCi/cc and a ratemeter reading of 4750 cpm above background, the efficiency can be calculated, using a measured vent
9 flow of 7.45 E+04 cfm, K_i from Table II-2 of 2.94E+02 and a $(X/Q)_v$ for the site boundary of 2.7 E-06, the Release Rate Limit is calculated and then the setpoint determined.

$$Xe\text{-}133\ efficiency = \frac{Activity}{Net\ ratemeter\ reading}$$

$$Xe\text{-}133\ efficiency = \frac{2.66\ E\text{-}04}{4750} = 5.67\ E\text{-}08\ \frac{uCi/cc}{cpm}$$

Using Equation 9:

$$Release\ Rate\ Limit\ Q_{iv} \leq \frac{500\ mrem/yr}{(K_i)\ (X/Q)_v}$$

9 $$Q_{iv} \leq \frac{500}{(2.94\ E{+}02)\ (2.7\ E\text{-}06)} \leq 6.3\ E{+}05\ uCi/sec$$

Using Equation 8:

$$Setpoint\ c \leq \frac{Q_{iv}}{(f)\ (k)\ (K)}$$

$$c \leq \frac{6.3\ E{+}05\ uCi/sec}{(7.45\ E{+}04\ cfm)\left(472\ \frac{cc/sec}{cfm}\right)\left(5.67\ E\text{-}08\ \frac{uCi/cc}{cpm}\right)}$$

$$c \leq 3.2\ E{+}05\ cpm$$

Per procedure P-9, R-14 is set at 1/20th of this value or 1.6 E+04 cpm for normal operation

D. Gaseous Effluent Dose Rate

Gaseous effluent monitor setpoints as described in Section II.C of this manual are established at concentrations which permit some margin for corrective action to be taken before exceeding offsite dose rates corresponding to 10 CFR Part 20 limitations. Plant procedures CH-RETS-SAMP-CV, CH-RETS-RMS-CV-ALT, CH-RETS-CV-PURGE, CH-RETS-SAMP-PV, CH-RETS-SAMP-PV-ALT, CH-RETS-PV-PURGE, CH-SAMP-AIR-H3 and CH-RETS-MINIPURGE establish the methods for sampling and analysis for continuous ventilation releases and for containment purge releases. Plant procedure CH-RETS-GDT-RELEASE establishes the methods for sampling and analysis prior to gas decay tank releases. The instantaneous dose rate in unrestricted areas due to unplanned releases of airborne radioactive materials may be averaged over a 24-hour period. Dose rates shall be determined using the following expressions:

For noble gases:

Equation (11): $D = \sum_i [K_i \, (X/Q)_v \, Q_{iv}] \leq 500$ mrem/yr to total body

Equation (12): $D = \sum_i [(L_i + 1.1\, M_i)\, (X/Q)_v \, Q_{iv}] \leq 3000$ mrem/yr

total gamma and beta dose to the skin

For I-131, I-133, tritium and all radioactive materials in particulate form with half-lives greater than 8 days:

$$\text{Equation (13)}: \; D = \sum_i [P_i \, W_v \, Q_{iv}] \leq 1500 \text{ mrem/yr to critical organ}$$

where:	K_i	=	the total body dose factor due to gamma emissions for each identified noble gas radionuclide (i) in mrem/yr per uCi/m^3 from Table II-2.
	L_i	=	the skin dose factor due to beta emissions for each identified noble gas radionuclide (i) in mrem/yr per uCi/m^3 from Table II-2.
	M_i	=	the air dose factor due to gamma emissions for each identified noble gas radionuclide (i) in mrad/yr per uCi/m^3 from Table II-2. Unit conversion constant of 1.1 mrem/mrad converts air dose to skin dose.
	P_i	=	the dose parameter for radionuclide (i) other than noble gases for the inhalation pathway, in mrem/yr per uCi/m^3 and for food and ground plane pathways, in m^{-2} mrem/yr per uCi/sec from Table II-3. The dose factors are based on the critical individual organ and most restrictive age group.
	$(X/Q)_v$	=	the highest calculated annual average relative concentration for any area at or beyond the unrestricted area boundary in sec/m^3.
	W_v	=	the highest annual average dispersion parameter for estimating the dose to the critical receptor in sec/m^3 for the inhalation pathway and in m^{-2} for the food and ground pathways.
	Q_{iv}	=	the release rate of radionuclide (i) from vent (v) in uCi/sec.

E. Gaseous Effluent Doses

The air dose in unrestricted areas due to noble gases released in gaseous effluents from the site shall be determined using the following expressions:

During any calendar year, for gamma radiation:

$$\text{Equation (14)}: D\gamma = 3.17\ E\text{-}08 \sum_{i} [M_i (X/Q)_v\ Q_{iv}] \leq 10\ mrad$$

And, during any calendar year for beta radiation:

$$\text{Equation (15)}: D_\beta = 3.17\ E\text{-}08 \cdot \sum_{i} [N_i (X/Q)_v\ Q_{iv}] \leq 20\ mrad$$

where: M_i	=	the air dose factor due to gamma emissions for each identified noble gas radionuclide in mrad/yr per uCi/m^3 from Table II-2
N_i	=	the air dose factor due to beta emissions for each identified noble gas radionuclide in mrad/yr per uCi/m^3 from Table II-2
$(X/Q)_v$	=	for vent releases. The highest calculated annual average relative concentration for any area at or beyond the unrestricted area boundary in sec/m^3.
D_γ	=	the total gamma air dose from gaseous effluents in mrad.
D_β	=	the total beta air dose from gaseous effluents in mrad.
Q_{iv}	=	the release of noble gas radionuclides, i, in gaseous effluents from vents in uCi. Releases shall be cumulative over the time period.
3.17 E-08	=	the inverse of the number of seconds in a year

[illegible]

The dose to an individual from I-131, I-133, tritium and all radioactive materials in particulate form with half-lives greater than 8 days in gaseous effluents released from the site to unrestricted areas shall be determined using the following expression:

<u>during any calendar year</u>:

$$\text{Equation (16)}: \; D_I = 3.17\ E\text{-}08 \sum_i [R_i\ W_v\ Q_{iv}] \leq 15\ mrad$$

<u>Where</u>:	D_I	-	the total dose from I-131, I-133, tritium and all radioactive materials in particulate form with half-lives greater than 8 days in gaseous effluents in mrem.
	R_i	-	the dose factor for each identified radionuclide (i) in m^{-2} mrem/yr per uCi/sec or mrem/yr per uCi/m^3 from Table II-4.
	W_v	-	the annual average dispersion parameter for estimating the dose to an individual at the critical location in sec/m^3 for the inhalation pathway and in m^{-2} for the food and ground pathways.
	Q_{iv}	-	the release of I-131, I-133, tritium and all radioactive materials in particulate form in gaseous effluents with half-lives greater than 8 days in uCi. Releases shall be cumulative over the desired time period as appropriate.

Table II-2

Dose Factors For Noble Gases and Daughters *

Radionuclides	Total Body Dose Factor K_i (mrem/yr per uCi/m^3)	Skin Dose Factor L_i (mrem/yr per uCi/m^3)	Gamma Air Dose Factor M_i (mrad/yr per uCi/m^3)	Beta Air Dose Factor N_i (mrad/yr per uCi/m^3)
Kr-83m	7.56E-02**	—	1.93E+01	2.88E+02
Kr-85m	1.17E+03	1.46E+03	1.23E+03	1.97E+03
Kr-85	1.61E+01	1.34E+03	1.72E+01	1.95E+03
Kr-87	5.92E+03	9.73E+03	6.17E+03	1.03E+04
Kr-88	1.47E+04	2.37E+03	1.52E+04	2.93E+03
Kr-89	1.66E+04	1.01E+04	1.73E+04	1.06E+04
Kr-90	1.56E+04	7.29E+03	1.63E+04	7.83E+03
Xe-131m	9.15E+01	4.76E+02	1.56E+02	1.11E+03
Xe-133	2.94E+02	3.06E+02	3.53E+02	1.05E+03
Xe-133m	2.51E+02	9.94E+02	3.27E+02	1.48E+03
Xe-135m	3.12E+03	7.11E+02	3.36E+03	7.39E+02
Xe-135	1.81E+03	1.86E+03	1.92E+03	2.46E+03
Xe-137	1.42E+03	1.22E+04	1.51E+03	1.27E+04
Xe-138	8.83E+03	4.13E+03	9.21E+03	4.75E+03
Ar-41	8.84E+03	2.69E+03	9.30E+03	3.28E+03

* The listed dose factors are for radionuclides that may be detected in gaseous effluents. These dose factors for noble gases and daughter nuclides are taken from Table B-1 of Regulatory Guide 1.109 (reference 3). A semi-infinite cloud is assumed.

** 7.56E-02 = 7.56 x 10^{-2}

Table II-3

Dose Parameters for Radionuclides and Radioactive Particulate, Gaseous Effluents *

Radionuclides	P_i Inhalation Pathways (mrem/yr per uCi/m^3)	P_i Food & Ground Pathways (m^2 • mrem/yr per uCi/sec)	Radionuclides	P_i Inhalation Pathways (mrem/yr per uCi/m^3)	P_i Food & Ground Pathways (m^2 • mrem/yr per uCi/sec)
H-3	6.5E+02	2.4E+03	Cd-115m	7.0E+04	4.8E+07
C-14	8.9E+03	1.3E+09	Sn-126	1.2E+06	1.1E+09
Cr-51	3.6E+02	1.1E+07	Sb-125	1.5E+04	1.1E+09
Mn-54	2.5E+04	1.1E+09	Te-127m	3.8E+04	7.4E+10
Fe–59	2.4E+04	7.0E+08	Te-129m	3.2E+04	1.3E+09
Co-58	1.1E+04	5.7E+08	Te-132	1.0E+03	7.2E+07
Co-60	3.2E+04	4.6E+09	Cs-134	7.0E+05	5.3E+10
Zn-65	6.3E+04	1.7E+10	Cs-136	1.3E+05	5.4E+09
Rb-86	1.9E+05	1.6E+10	Cs-137	6.1E+05	4.7E+10
Sr-89	4.0E+05	1.0E+10	Ba-140	5.6E+04	2.4E+08
Sr-90	4.1E+07	9.5E+10	Ce-141	2.2E+04	8.7E+07
Y-91	7.0E+04	1.9E+09	Ce-144	1.5E+05	6.5E+08
Zr-95	2.2E+04	3.5E+08	Np-239	2.5E+04	2.5E+06
Nb-95	1.3E+04	3.6E+08	I-131	1.5E+07	1.1E+12
Mo-99	2.6E+02	3.3E+08	I-133	3.6E+06	9.6E+09
Ru-103	1.6E+04	3.4E+10	Unidentified	4.1E+07	9.5E+10
Ru-106	1.6E+05	4.4E+11			
Ag-110m	3.3E+04	1.5E+10			

* The listed dose parameters are for radionuclides that may be detected in gaseous effluents. These and additional dose parameters for isotopes not included in Table II-3 may be calculated using the methodology described in NUREG-0133, Section 5.2.1 (reference 2).

Table II-4

Pathway Dose Factors Due to Radionuclides Other Than Noble Gases *

Radionuclides	Inhalation Pathway R_i (mrem/yr per uCi/m^3)	Meat Pathway R_i (m^2•mrem/yr per uCi/sec)	Ground Plane Pathway R_i (m^2•mrem/yr per uCi/sec)	Cow-Milk-Infant Pathway R_i (m^2•mrem/yr per uCi/sec)	Leafy Vegetables Pathway R_i (m^2•mrem/yr per uCi/sec)
H-3	1.12E+03	2.33E+02	0.	2.38E+03	2.47E+02
Cr-51	1.70E+04	4.98E+05	5.31E+06	5.75E+06	1.63E+06
Mn-54	1.57E+06	7.60E+06	1.56E+09	3.70E+07	5.38E+07
Fe-59	1.27E+06	6.49E+08	3.09E+08	4.01E+08	1.10E+08
Co-58	1.10E+06	9.49E+07	4.27E+08	7.01E+07	4.55E+07
Co-60	7.06E+06	3.61E+08	2.44E+10	2.25E+08	1.54E+08
Zn-65	9.94E+05	1.05E+09	8.28E+08	1.99E+10	2.24E+08
Sr-89	2.15E+06	4.89E+08	2.42E+04	1.28E+10	5.39E+09
Sr-90	1.01E+08	1.01E+10	0	1.19E+10	9.85E+10
Zr-95	2.23E+06	6.09E+08	2.73E+08	8.76E+05	1.13E+08
I-131	1.62E+07	2.60E+09	1.01E+07	4.95E+11	2.08E+10
I-133	3.84E+06	6.45E+01	1.43E+06	4.62E+09	3.88E+08
Cs-134	1.01E+06	1.42E+09	7.70E+09	6.37E+10	1.96E+09
Cs-136	1.71E+05	5.06E+07	1.64E+08	6.61E+09	1.60E+08
Cs-137	9.05E+05	1.27E+09	1.15E+10	5.75E+10	1.80E+09
Ba-140	1.74E+06	5.00E+07	2.26E+07	2.75E+08	2.03E+08
Ce-141	5.43E+05	1.45E+07	1.48E+07	1.43E+07	8.99E+07

* Additional dose factors for isotopes not included in Table II-4 may be calculated using the methodology described in NUREG-0133, Section 5.3.1 (reference 2).

III. RADIOACTIVE EFFLUENT MONITORING INSTRUMENTATION

A. Specification

1. Radioactive Effluent Monitoring Instrumentation

9 a. The Gross Activity Monitors for liquid radioactive effluent monitoring shown in Table III-1 shall be operable at all times with alarm and/or trip setpoints set to ensure that the limit of Specification I.A.2 is not exceeded.

b. The Plant Ventilation radioactive effluent monitoring instrumentation shown in Table III-1 shall be operable at all times, with alarm and/or trip setpoints set to ensure that the limit of Specification II.A.2 is not exceeded.

c. The Containment Purge radioactive effluent monitoring instrumentation shown in Table III-1 shall be operable in Modes 5 and 6 when the purge flange is removed with alarm and/or trip setpoints set to ensure that the limit of Specification II.A.2 is not exceeded.

d. The Air Ejector Monitor radioactive effluent monitoring instrumentation shown in Table III-1 shall be operable when the air ejector is operating with alarm and/or trip setpoints set to ensure that the limit of Specification II.A.2 is not exceeded.

e. Alarm and/or trip setpoints shall be established in accordance with calculational methods set forth in Section I.C and II.C.

f. If the setpoint for a radioactive effluent monitor alarm and/or trip is found to be higher than required, one of the following three measures shall be taken immediately:

(i) the setpoint shall be immediately corrected without declaring the channel inoperable; or

(ii) immediately suspend the release of effluents monitored by the affected channel; or

(iii) declare the channel inoperable.

If the number of channels which are operable is found to be less than required, take action shown in Table III-1. Exert best efforts to return the instruments to OPERABLE status within 31 days and, if unsuccessful, explain in the next Annual Radioactive Effluent Release Report why the inoperability was not corrected in a timely manner.

g. Each radioactive effluent monitoring instrumentation channel shall be demonstrated operable by performing the channel check, source check, channel functional test and channel calibration at the frequency shown in Table III-3.

9 h. The radioactive effluent monitoring instrumentation may be removed from service for short periods of time without the instrumentation being considered inoperable for weekly grab filter or cartridge changes, or quarterly valve stroke testing with the exception of R-10A, R-11, R-12 skid. Preventative maintenance, calibrations and moving filter replacements require instrumentation to be declared inoperable.

2. <u>Radiation Accident Monitoring Instrumentation</u>

9 a. The radiation accident monitoring instrumentation channels shown in Table III-2 shall be operable under the following schedule:

   (i) Containment Area Monitors (R-29, R-30) - Modes 1, 2, and 3

   (ii) Containment Purge (R-12A) - Modes 5 and 6 when the purge flanges are removed.

   (iii) Plant vent (R-14A) - All modes

   (iv) Air Ejector (R-15A) - When air ejector is operating

   (v) A Main Steam Line (R-31) - Modes 1, 2, and 3

   (vi) B Main Steam Line (R-32) - Modes 1, 2, and 3

b. With one or more of the radiation monitoring channels inoperable,take the action shown in Table III-2. Startup may commence or continue consistent with the action statement.

c. Each accident monitoring instrumentation channel shall be demonstrated operable by performance of the channel check and channel calibration operations at the frequencies shown in Table III-3.

3. <u>Area Radiation Monitors</u>

a. Channel calibration, channel check, and a functional test of the area radiation monitors shall be performed as specified in Table III-4.

Table III-1

Radioactive Effluent Monitoring Instrumentation

Gross Activity Monitors (Liquid)	Minimum Channels Operable	Action
a. Containment Fan Coolers (R-16)	1	1
b. Liquid Radwaste (R-18)	1	2
c. Steam Generator Blowdown (R-19)	1(a)	3
d. Spent Fuel Pool Heat Exchanger (R-20A, R-20B)	1	1
e. Turbine Building Floor Drains (R-21)	1	1
f. High Conductivity Waste (R-22)	1	2
Plant Ventilation (b)	**Minimum Channels Operable**	**Action**
a. Iodine sampler (R-10B or R-14A3)	1	4
b. Particulate Sampler (R-13 or R-14A1)	1	4
c. Noble Gas Activity (R-14 or R-14A5)	1	5
d. Containment Noble Gas Activity (R-12) or Containment Particulate Sampler (R-11)	1 (c) (f) (e)	6
Containment Purge (d)	**Minimum Channels Operable**	**Action**
a. Iodine Sampler (R-10A or R-12A3)	1	4
9 b. Particulate Sampler (R-11 or R-12A1)	1 (g)	8
c. Noble Gas Activity (R-12 or R-12A5)	1 (g)	8
Air Ejector Monitor	**Minimum Channels Operable**	**Action**
Noble Gas Activity (R15 or R15A5)	1	7

(a) Not required when Steam Generator Blowdown is being recycled (i.e. not released).

(b) Only radiation monitors R-13 and R-14 have isolation signals. If R-14A is being used to monitor releases, no gas decay tanks may be released.

(c) Required during mini-purge operation to provide isolation capability.

(d) Only when the shutdown purge flanges are removed. Radiation monitors R-11 and R-12 are used during normal operation as one method required by Technical Specifications 3.4.15 for leak detection.

(e) The mini-purge system allows the release of Containment atmosphere through the plant vent. 10 CFR Part 100 type releases via mini-purge are limited by an isolation signal generated from Safety Injection. 10 CFR Part 20 releases through the mini-purge are considered to be similar to other plant ventilation releases and are monitored by R-14, R-13 and R-10B. R-14A may be used as a substitute since automatic isolation is available from the R-12 and R-11 monitors if the activity in Containment increases. Therefore, either R-12 or R-11 is required to sample Containment during a mini-purge release. Automatic isolation of mini-purge for 10 CFR part 20 type releases is considered unnecessary due to the low flow associated with mini-purge, the continuous monitoring from R-12 or R-11 and the original measurements before the purge begins. To ensure the Containment sample monitored by R-11 or R-12 is representative of the containment atmosphere, at least one recirculation fan is required to be in operation during mini-purge operation. Should R-11 and R-12 become inoperable, a 1 hour limit is chosen to be consistent with the generally accepted time for prompt action.

(f) If the R-10A, R-11, R-12 skid is not operable, it is possible to substitute the R-10B, R-13, R-14 skid when the R-14A skid is operable. The setpoints for the R-10A, R-11, R-12 skid would be used. There would be no automatic containment isolation capability using R-10B, R-13, R-14 skid for containment leakage measurements.

9 (g) If containment ventilation isolation instrumentation is required by LCO 3.3.5 for core alteration or movement of irradiated fuel in containment, R-12A skid cannot be used in place of the R-10A, R-11, R-12 skid. Terminate the purge immediately.

Table III-1 (continued)
Radioactive Effluent Monitoring Instrumentation

Action 1 - If the number of operable channels is less than required by the Minimum Channels Operable requirement, effluent releases via this pathway may continue provided that at least once per 24 hours grab samples are analyzed for isotopic concentration or gross radioactivity (beta or Gamma) at a lower limit of detection (LLD) of at most 1 E-07 uCi/gm.

Action 2 - If the number of operable channels is less than required by the minimum Channels Operable requirement, effluent releases from the tank may continue for up to 14 days, provided that prior to initiating a release:

1. At least two independent samples of the tank's contents are analyzed and agree within 10% of total activity, and
2. At least two technically qualified members of the Facility Staff independently verify the discharge line valving, otherwise, suspend release of radioactive effluents via this pathway.

Action 3 - When Steam Generator Blowdown is being released (not recycled) and the number of channels operable is less than required by the Minimum Channels Operable requirement, effluent releases via this pathway may continue provided grab samples are analyzed for isotopic concentration or gross radioactivity (beta or gamma) at a lower limit of detection (LLD) of at most 1 E-07 uCi/gram:

1. At least once per 8 hours when the concentration of the secondary coolant is > 0.01 uCi/gram dose equivalent I-131.

2. At least once per 24 hours when the concentration of the secondary coolant is ≤ 0.01 uCi/gram dose equivalent I-131.

Action 4 - If the number of operable channels is less than required by the Minimum Channels Operable requirement, effluent releases via this pathway may continue provided iodine and particulate samples are continuously collected with alternate sampling equipment.

Action 5 - If the number of operable channels is less than required by the Minimum Channels Operable requirement, effluent releases via this pathway may continue provided grab samples are taken and analyzed for isotopic activity at least once per 8 hours.

Action 6 - If the number of operable channels is less than required by the Minimum Channels Operable requirement, or at least one containment fan cooler is not in operation, within 1 hour terminate any mini-purge in process.

Action 7 - If the number of Operable Channels is less than required by the Minimum Channels Operable requirement and the Secondary Activity is ≤ 1 E-04 uCi/gm, effluent releases may continue via this pathway provided grab samples are analyzed for isotopic concentration or gross radioactivity (beta or gamma) at least once per 24 hours. If the secondary activity is > 1 E-04 uCi/gm, effluent releases via this pathway may continue for up to 31 days provided grab samples are taken every 8 hours and analyzed within 24 hours.

9

Action 8 - If the number of operable channels is less than required by the Minimum Channels Operable requirement, terminate the purge within 1 hour.

Table III-2
Radiation Accident Monitoring Instrumentation

Instrument	Minimum Channels Operable	Action
Containment Area Monitors (R-29 and R-30) See Tech Spec 3.3.3	2	2
Noble Gas Effluent Monitors a. Containment Purge (R-12A)	1*	1
b. Plant Vent (R-14A)	1	1
c. Air Ejector (R-15A)	1**	1
d. A Main Steam Line (R-31)	1	1
e. B Main Steam Line (R-32)	1	1

* Only when the shutdown purge flanges are removed; otherwise, instrumentation kept in STANDBY mode.

** R-15A has a low activity alarm to ensure equipment is not accidently removed from service when the plant is operating. During shutdown, the channel is removed from scan on the PPCS to keep from receiving unnecessary alarms.

Action 1 - With the number of operable channels less than required by the Minimum Channels Operable requirements, either restore the inoperable channel(s) to operable status within 7 days of the event, or prepare and submit a Special Report to the Commission within 30 days following the event outlining the action taken, the cause of the inoperability and the plans and schedule for restoring the system to operable status.

Action 2 - Take action in accordance with Tech Spec Table 3.3.3-1 item 10.

Table III-3

Radioactive Effluent Monitoring Surveillance Requirements (7)

Gross Activity Monitor (Liquid)	Channel Check	Source Check	Functional Test	Channel Calibration
a. Containment Fan Coolers (R-16)	D(6)	M(3)	Q(2)	R(4)
b. Liquid Rad waste (R-18)	D(6)	M(3)	Q(1)	R(4)
c. Steam Generator Blowdown (R-19)	D(6)	M(3)	Q(1)	R(4)
d. Spent Fuel Pool Heat Exchanger (R-20A, R-20B)	D(6)	M(3)	Q(2)	R(4)
e. Turbine Building Floor Drains (R-21)	D(6)	M(3)	Q(1)	R(4)
f. High Conductivity Waste (R-22)	D(6)	M(3)	Q(1)	R(4)
Plant Ventilation	**Channel Check**	**Source Check**	**Functional Test**	**Channel Calibration**
a. Iodine Sampler (R-10B)	W(6)	N.A.	M	R(4)
b. Particulate Sampler (R-13)	W(6)	N.A.	N.A	R(4)
c. Noble Gas Activity (R-14)	D(6)	M	Q(1)	R(4)
d. Flow Rate Determination	N.A.	N.A.	N.A.	R(5)
Containment Purge	**Channel Check**	**Source Check**	**Functional Test**	**Channel Calibration**
a. Iodine Sampler (R-10A)	W(6)	N.A.	M	R(4)
b. Particulate Sampler (R-11)	W(6)	N.A.	Q(1)	R(4)
c. Noble Gas Activity (R-12)	D(6)	PR	Q(1)	R(4)
d. Flow Rate Determination	N.A.	N.A.	N.A.	R(5)
Air Ejector Monitor	**Channel Check**	**Source Check**	**Functional Test**	**Channel Calibration**
Noble Gas Activity (R-15)	D(6)	M	M(2)	R(4)
Radiation Accident Monitoring Instrumentation	**Channel Check**	**Source Check**	**Functional Test**	**Channel Calibration**
a. Containment Purge (R-12A)	W(6)	M	M(2)	R(4)
b. Plant Vent (R-14A)	D(6)	M	M(2)	R(4)
c. Air Ejector (R-15A)	D(6)	M	M(2)	R(4)
d. A Main Steam Line (R-31)	M	N.A	Q	R
e. B Main Steam Line (R-32)	M	N.A.	Q	R

Table Notation

(1) The Channel Functional Test shall also demonstrate that automatic isolation of this pathway and control room alarm occur if any of the following conditions exist:

1. Instrument indicates measured levels above the alarm and/or trip setpoint.
2. Power failure.

(2) The Channel Functional Test shall also demonstrate that control room alarm occurs if any of the following conditions exist.

1. Instrument indicates measured levels above the alarm setpoint.
2. Power failure.

(3) This check may require the use of an external source due to high background in the sample chamber.

(4) Source used for the Channel Calibration shall be traceable to the National Institute for Standards and Technology (NIST) or shall be obtained from suppliers (e.g. Amersham) that provide sources traceable to other officially designated standards agencies.

(5) Flow rate for main plant ventilation exhaust and containment purge exhaust are calculated by the flow capacity of ventilation exhaust fans in service and shall be determined at the frequency specified.

(6) Applies only during releases via this pathway.

(7) The frequency notation for the performance of surveillance requirements shall correspond to the intervals defined below:

Notation	Frequency
D	At least once per 24 hours
W	7 days
M	31 days
Q	92 days
R	18 months
PR	Prior to a release

Table III-4
Area Radiation Monitor Surveillance Requirements *

Instrument		Channel Check	Functional Test	Channel Calibration
A. Control Room	R-1	D	M	R
B. Containment	R-2	D	M	R
C. Radiochemistry Lab	R-3	D	M	R
D. Charging Pump Room	R-4	D	M	R
E. Spent Fuel Pool	R-5	D	M	R
F. Nuclear Sample Room	R-6	D	M	R
G. Incore Detector Area	R-7	D	M	R
H.. Drumming Station	R-8	D	M	R
I. Letdown Line Monitor	R-9	D	M	R
J. Component Cooling Water Heat Exchanger	R-17	D	M	R
K. AVT A Mixed Bed	R-23	N.A.	Q	N.A.
L. AVT B Mixed Bed	R-24	N.A.	Q	N.A.
M. AVT C Mixed Bed	R-25	N.A.	Q	N.A.
N. AVT D Mixed Bed	R-26	N.A.	Q	N.A.
O. HCWT and LCWT	R-27	N.A.	Q	N.A.
P. Resin Regeneration Tank	R-28	N.A.	Q	N.A.
M. Nuclear Sample Room Wide Range Area Monitor	R-33	N.A.	Q	N.A.
R. Containment Spray Pump Wide Range Area Monitor	R-34	N.A.	Q	N.A.
S. PASS Panel Wide Range Area Monitor	R-35	N.A.	Q	N.A.

* Surveillance frequency notation is defined in table Notation (7) of Table III-3

IV. RADWASTE TREATMENT

A. Specification

1. Liquid Radwaste Treatment

   a. The liquid radwaste treatment system shall be used to reduce the radioactive materials in liquid wastes prior to their discharge, if necessary, to assure that the cumulative dose due to liquid effluent releases when averaged over 31 days does not exceed 0.06 mrem to the total body or 0.2 mrem to any organ.

   b. If the liquid radwaste treatment system is not operable for more than 31 days and if radioactive liquid waste is being discharged without treatment resulting in doses in excess of Specification I.A.3.a, a special Report shall be submitted to the Commission within thirty days which includes the following information:

      (i) identification of equipment or subsystems not operable and the reasons;

      (ii) action(s) taken to restore the inoperable equipment to operable status;

      (iii) summary description of action(s) taken to prevent a recurrence.

2. Gaseous Waste Treatment

   a. The gaseous radwaste treatment system shall be used to reduce radioactive materials in gaseous waste prior to their discharge, if necessary, to assure that the cumulative air dose due to gaseous effluent releases to unrestricted areas when averaged over 31 days does not exceed 0.2 mrad for gamma radiation and 0.4 mrad for beta radiation to the maximally exposed individual.

   b. The appropriate portions of the ventilation exhaust system shall be used to reduce radioactive material in gaseous waste prior to their discharge, if necessary, to assure that the cumulative dose due to gaseous effluent releases from the site when averaged over 31 days does not exceed 0.3 mrem to any organ.

c. If the gaseous radwaste treatment system or ventilation exhaust system is inoperable for more than 31 days and if gaseous waste is being discharged without treatment resulting in doses in excess of Specification II.A.3.a or II.A.3.b, a Special Report shall be submitted to the Commission within thirty days which includes the following information:

   (i) identification of equipment or subsystems not operable and the reasons;

   (ii) action(s) taken to restore the inoperable equipment to operable status;

   (iii) summary description of action(s) taken to prevent a recurrence.

3. <u>Solid Radioactive Waste</u>

   a. The solid radwaste system shall be used as applicable in accordance with the Process Control Program for the solidification and packaging of radioactive waste to ensure meeting the requirements of 10 CFR Part 71 prior to shipment of radioactive wastes from the site.

   b. If the packaging requirements of 10 CFR Part 71 are not satisfied, suspend shipments of deficiently packaged solid radioactive wastes from the site until appropriate corrective measures have been taken.

4. <u>Major Changes to Radioactive Waste Treatment Systems</u>
   (Liquid, Gaseous and Solid)

   a. The radioactive waste treatment systems (liquid, gaseous and solid) are those systems used to minimize the total activity released from the site.

   b. Major changes to radioactive waste systems (liquid, gaseous and solid) shall include the following:

      (i) Changes in process equipment, components and structures from those in use (e.g., deletion of evaporators and installation of demineralizers);

      (ii) Changes in the design of radwaste treatment systems (liquid, gaseous and solid) that could significantly alter the characteristics and/or quantities of effluents released;

(iii) Changes in system design which may invalidate the accident analysis (e.g., changes in tank capacity that would alter the curies released).

c. Changing the filters used, replacement resins or minor modifications (pipe or valve dimensions or manufacturers) due to maintenance activities would not be considered a major change.

d. Major changes to the radioactive waste systems (liquid and gaseous) shall be reported to the Commission by the inclusion of a suitable discussion or by reference to a suitable discussion of each change in the Annual Radioactive Effluent Release Report for the period in which the changes were made. The discussion of each change shall contain:

(i) a summary, in accordance with 10 CFR Part 50.59, of the evaluation that led to the determination that the change could be made;

(ii) sufficient detailed information to support the reason for the change;

(iii) a detailed description of the equipment, components and processes involved and the interfaces with other plant systems;

(iv) an evaluation of the change which shows the predicted releases of radioactive materials in liquid and gaseous effluents from those previously predicted;

(v) an evaluation of the change which shows the expected maximum exposures to individuals in the unrestricted area and to the general population from those previously estimated;

(vi) documentation of the fact that the change was reviewed and found acceptable by the onsite review function.

5. <u>Process Control Program</u>

a. The Process Control Program (PCP) shall be a document outlining the method for processing wet or dry solid wastes and for solidification of liquid wastes. It shall include the process parameters and evaluation methods used to assure meeting the requirements or 10 CFR Part 71 prior to shipment of containers of radioactive waste from the site.

b. Licensee may make changes to the PCP and shall submit to the Commission with the Radioactive Effluent Release Report for the period in which any change(s) is made a copy of the new PCP and a summary containing:

   (i) sufficiently detailed information to support the rationale for the change;

   (ii) a determination that the change will not reduce the overall conformance of the solidified waste product to existing criteria for solid wastes; and

   (iii) documentation of the fact that the change has been reviewed and found acceptable by the onsite review function.

c. Licensee initiated changes shall become effective after review and acceptance by the onsite review function on a date specified by the licensee.

B. Liquid and Gaseous Radwaste Treatment and Operability

The objective which implements the overall requirements of 10 CFR Part 50, Appendix I, is to ensure that the plant radwaste treatment equipment is used and maintained. This equipment is to be utilized to reduce radioactive discharges from nuclear plants to levels "as low as reasonably achievable" or ALARA. ALARA levels warranting equipment operability have been defined by the NRC in the form of monthly dose "trigger"values. The trigger values correspond to approximately 1/48 of the annual design objective doses given by 10 CFR Part 50, Appendix I. If continued at this rate, these monthly doses would correspond to just under 1/4 of the Appendix I annual design objectives.

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31-day Trigger Values	Liquid Radwaste System	Gaseous Radwaste System	Ventilation Exhaust
	0.06 mrem (W. Body)	0.2 mrad (gamma air)	0.3 mrem (any organ)
	0.2 mrem (any organ)	0.4 mrad (beta air)	

Figures IV-1 and IV-2 show the components of the R. E. Ginna liquid and gaseous waste/ventilation exhaust systems. These systems are normally in routine use at the plant. Because discharges are being treated, the trigger values in specification IV.A.1.a, IV.A.2.a and IV.A.2.b may be exceeded but compliance with the stated quarterly and annual dose limits is required.

If the liquid or gaseous radwaste/ventilation exhaust systems is inoperable in excess of 31 days, then effluents are considered "untreated" waste. Should, over a 31-day period, the plant discharges exceed the dose trigger values in conjunction with extended inoperablility of a waste treatment system, then sections IV.A.1.b and IV.A.2.c apply. In this case, a 30-day report must be submitted to the Commission which identifies the inoperable equipment and describes appropriate corrective actions.

The following method would be used to determine the need for a 30-day report for a liquid release. A gaseous release would follow the same procedure.

1. Using existing plant procedures, sample the concentration contained in the tank to be released (C_{ij}). Decide a sample frequency (e.g. 1/day) since the tank concentration could change.

2. Determine the permissible release rate to maintain the concentration in the discharge canal well within 10 times the applicable effluent release concentration of 10 CFR Part 20, Table 2 Column 2. For gaseous releases, use the site boundary and Table 2, Column 1.

3. Calculate the incremental dose from all identified isotopes via the drinking water and fish ingestion pathways for the child. Assume the release will be continuous and that doses will be evaluated each day, corresponding to the waste tank sampling frequency selected. We thus compute D_T using Equations 6 and 7, taking Δt_j as the duration of each release, in this case, 24 hr/day. For gaseous releases use direct radiation from the plume and inhalation pathways.

4. The offsite receptor dose due to a controlled discharge of the waste tank contents is thus determined and cumulated over each daily release time interval. If the isotopic mixture and the discharge canal dilution factor, F_j , are relatively constant, then each day's dose increment should be approximately the same. One can then estimate the number of release days it will take to reach the applicable dose trigger value.

5. The 30-day reporting requirement applies if a radwaste treatment system is inoperable and dose trigger values are exceeded within 31 days. If the liquid pathway dose does not exceed the trigger values in 31 days or less, then a 30-day report is not required.

6. It would be prudent to avoid a situation requiring the 30-day report using other treatment options available at the plant. A trigger level dose, when added to the calculated doses resulting from all other liquid release sources, may significantly impact upon the plant's "dose budget" for the calendar quarter or the calendar year.

Figure IV-1

Ginna Station Liquid Waste Treatment System

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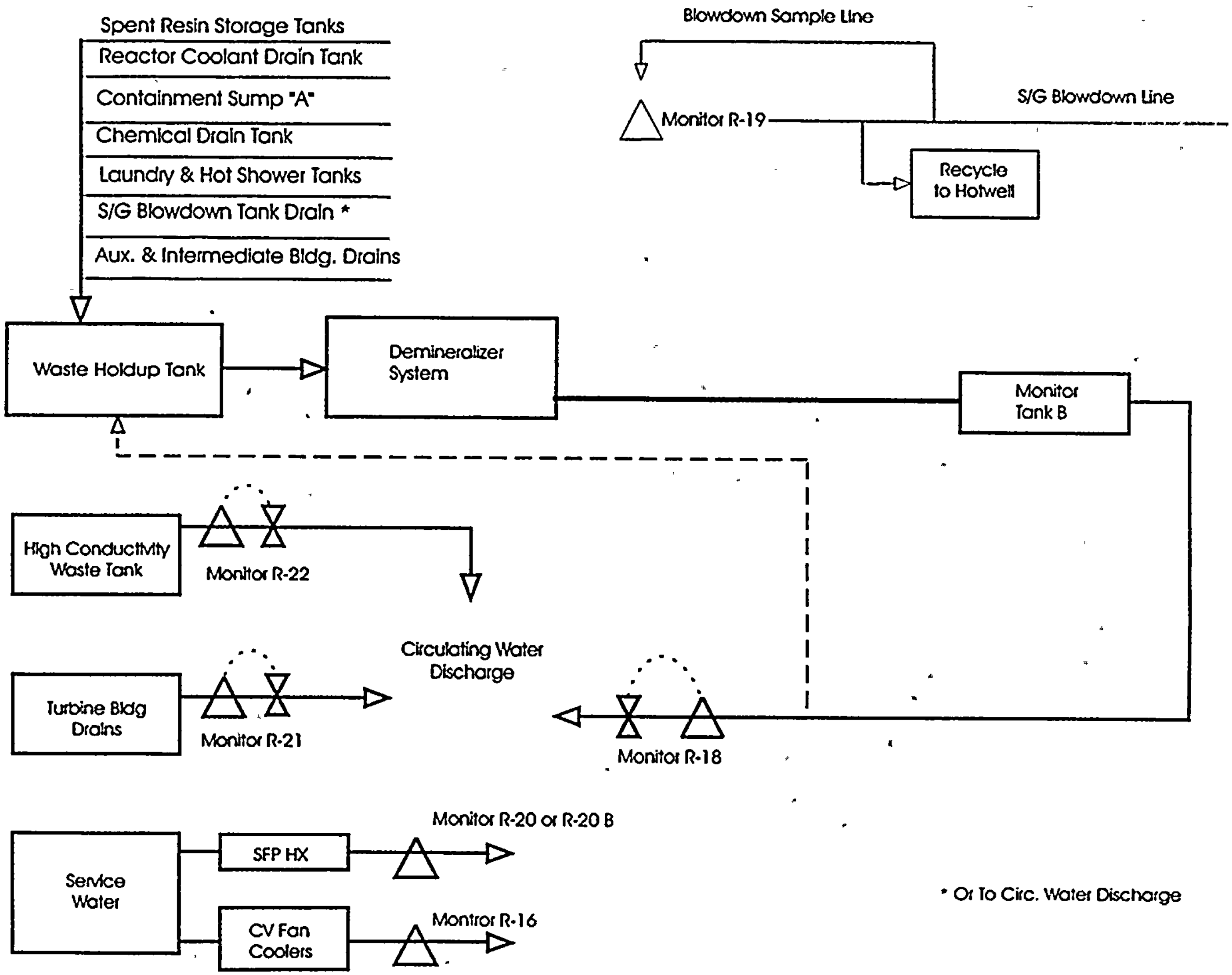
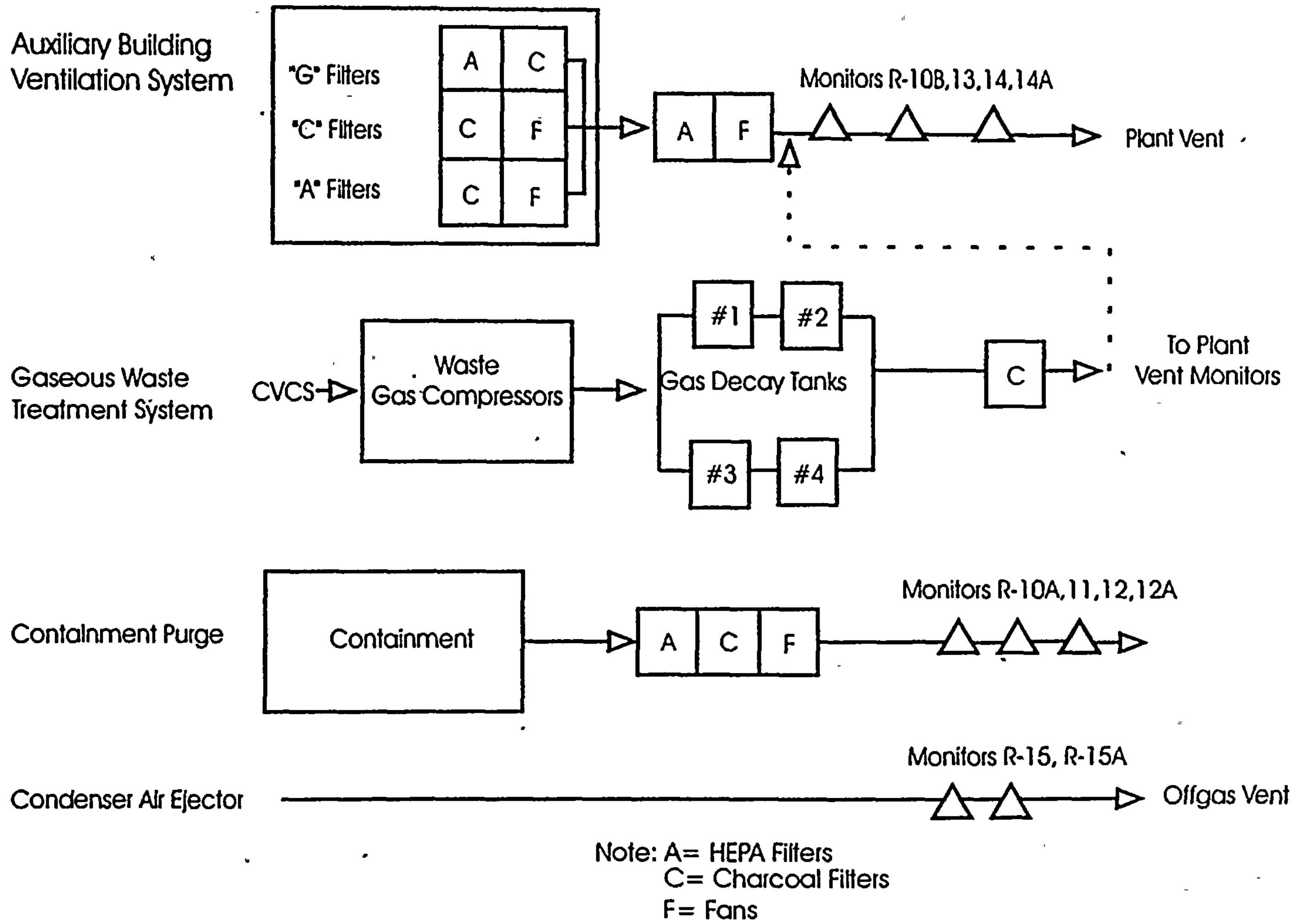


Figure IV-2
Ginna Station Gaseous Waste Treatment System and Ventilation Exhaust Systems



V. RADIOLOGICAL ENVIRONMENTAL MONITORING

A. Specification

1. Monitoring Program

a. The radiological environmental monitoring program shall be conducted as specified in Table V-1 at the locations given in Figures V-1, V-2, V-3 and V-4.

b. If the radiological environmental monitoring program is not conducted as specified in Table V-1, prepare and submit to the Commission, in the Annual Radiological Environmental Operating Report, a description of the reasons for not conducting the program as required and the plans for preventing a recurrence. Deviations are permitted from the required sampling schedule if specimens are unobtainable due to hazardous conditions, seasonal availability, or to malfunction of automatic sampling equipment. If the latter, efforts shall be made to complete corrective action prior to the end of the next sampling period. Sampling periods for this specification are usually of one week duration. If continuous sampling equipment is out of service, the 120 minute aliquot sampling period does not mean that grab samples must be taken every 120 minutes, but one grab sample once each week is sufficient until the automatic sampling equipment is restored to service.

c. If the level of radioactivity in an environmental sampling medium at one or more of the locations specified exceeds the reporting levels of Table V-4 when averaged over any calendar quarter, a Special Report shall be submitted to the Commission within thirty days which includes an evaluation of any release conditions, environmental factors or other aspects which caused the reporting levels of Table V-4 to be exceeded.

When more than one of the radionuclides in Table V-4 are detected in the sampling medium, this report shall be submitted if:

$$\frac{\text{concentration (1)}}{\text{limit level (1)}} + \frac{\text{concentration (2)}}{\text{limit level (2)}} + \bullet\bullet\bullet > 1.0$$

When radionuclides other than those in Table V-4 are detected and are the result of plant effluents, this report shall be submitted if the potential annual dose to an individual is greater than the calendar year limit of Specifications I.A.2.a or II.A.3.b. This report is not required if the measured level of radioactivity was not the result of plant effluents; however, in such an event, the condition shall be reported and described in the Annual Radiological Environmental Operating Report.

d. If milk or fresh leafy vegetable samples are unavailable for more than one sample period from one or more of the sampling locations indicated on Figure V-2, a discussion shall be included in the Annual Radiological Environmental Operating Report which identifies the cause for the unavailability of samples and identifies locations for obtaining replacement samples. If a milk or leafy vegetable sample location becomes unavailable, the location from which samples were unavailable may then be deleted provided that a comparable location is added to the environmental monitoring program.

2. Land Use Census

a. A land use census shall be conducted annually, between June 1 and October 1, and shall identify the location of the nearest milk animal, the nearest garden exceeding 500 square feet and the nearest residence within a distance of five miles in each of the 16 meteorological sectors.

The Land Use Census shall identify changes in the use of the land, particularly the addition of new facilities, i.e. large buidlings, factories, private airports or landing fields, shopping center changes, etc., that may change population densities near the R.E. Ginna Plant.

b. In lieu of a garden census, an onsite garden located either in the meteorological sector having the highest historical D/Q or in another location with a higher D/Q than the location of the maximally exposed individual may be used for broad leaf vegetation sampling.

c. If a land use census identifies a location(s) which yields a calculated dose or dose commitment greater than that to the maximally exposed individual currently being calculated, the new identified location(s) shall be reported in the Annual Radiological Environmental Operating Report.

d. If a land use census identifies a milk location(s) which yields a calculated dose or dose commitment greater than that at a location from which samples are currently being obtained, the new identified location(s) shall be reported in the Annual Radiological Environmental Operating Report. The new location shall be added to the radiological environmental monitoring program within thirty days, if possible. The milk location having the lowest calculated dose or dose commitment may be deleted from this monitoring program after October 31 of the year in which this land use census was conducted.

3. <u>Interlaboratory Comparison Program</u>

a. Analyses shall be performed on applicable radioactive environmental samples supplied as part of an interlaboratóry comparison program which has been approved by the NRC, if such a program exists.

b. If analyses are not performed as required above, report the corrective actions taken to prevent a recurrence in the Annual Radiological Environmental Operating Report.

c. A summary of the results obtained from the interlaboratory comparison program shall be included in the Annual Radiological Operating Report.

Table V-1

Radiological Environmental Monitoring Program

EXPOSURE PATHWAY AND/OR SAMPLE	NUMBER OF SAMPLES & SAMPLE LOCATIONS	SAMPLING AND COLLECTION FREQUENCY	TYPE AND FREQUENCY OF ANALYSIS
1. AIRBORNE a. Radioiodine	2 indicator 2 control	Continuous operation of sampler with sample collection at least once per 10 days	Radionuclide canister. Analyze within 7 days of collection for I-131.
b. Particulate	7 indicator 5 control	Same as above	Particulate sampler. Analyze for gross beta radioactivity ≥ 24 hours following filter change. Perform gamma isotopic analysis on each sample for which gross beta activity is > 10 times the mean of offsite samples. Perform gamma isotopic analysis on composite (by location) sample at least once per 92 days.
2. DIRECT RADIATION	18 indicator 10 control 11 placed greater than 5 miles from plant site.	TLDs at least quarterly	Gamma dose quarterly.
3. WATERBORNE a. Surface	1 control (Russell Station) 1 indicator (Condenser Water Discharge)	Composite* sample collected over a period of ≤ 31 days.	Gross beta and gamma isotopic analysis of each composite sample. Tritium analysis of one composite sample at least once per 92 days.
b. Drinking	1 indicator (Ontario Water District Intake)	Same as above	Same as above.

* Composite sample to be collected by collecting an aliquot at intervals not exceeding 2 hours.

Table V-1 (continued)
Radiological Environmental Monitoring Program

EXPOSURE PATHWAY AND/OR SAMPLE	NUMBER OF SAMPLES & SAMPLE LOCATIONS	SAMPLING AND COLLECTION FREQUENCY	TYPE AND FREQUENCY OF ANALYSIS
4. INGESTION a. Milk	1 control 3 indicator June thru October each of 3 farms	At least once per 15 days	Gamma isotopic and I-131 analysis of each sample.
	1 control 1 indicator November thru May one of the farms	At least once per 31 days	Gamma isotopic and I-131 analysis of each sample.
b. Fish	4 control 4 indicator (Off shore at Ginna)	Twice during fishing season including at least four species.	Gamma isotopic analysis on edible portions of each sample.
c. Food Products	1 control 2 indicator (On site)	Annual at time of harvest. Sample from two of the following: 1. apples 2. cherries 3. grapes	Gamma isotopic analysis on edible portion of each sample.
	1 control 1 indicator (Nearest offsite garden within 5 miles in the highest D/Q meteorological sector or onsite garden)	At time of harvest. One sample of: 1. broad leaf vegetation 2. other vegetable	Gamma isotopic analysis on edible portion of each sample.

B. Environmental Monitor Sample Locations

All sample locations are specified on Table V-2, a list of direction and distance to sample points. Indicator and control samples required by the environmental program are noted by an I or a C.

Figure V-1 shows the onsite* indicator sample locations for airborne particulates, radioiodine and direct radiation. Also indicated on Figure V-1 is the onsite vegetable garden, as well as the placement of post accident TLDs, locations 2 - 7 and 13 - 24. TLD locations 2 - 7 are co-located with the air monitor samplers. The onsite garden is located in the SE sector near the closest resident who is the maximally exposed individual, rather than in the ESE sector which has the highest D/Q.

Figure V-2 gives the location of the only milk herds within 5 miles of the plant. On this map is also included the Ontario Water District intake pumping station where lake water is sampled prior to treatment.

Figure V-3 shows the offsite control sample locations for airborne particulates, radioiodine and direct radiation. Sample stations 9 and 11 are situated near population centers, Webster and Williamson, located approximately 7 miles from the Ginna Site. TLD locations 8 - 12 are co-located with air monitor samplers.

* Onsite refers to the area surrounding the Ginna Plant bounded by RG&E property lines. Offsite refers to the area beyond the immediate RG&E property.

Table V-2

Direction and Distance to Sample Points

All directions given in degrees and all distances given in meters

Air Sample Stations	Direction	Distance
# 2 I	87	320
# 3 I	110	420
# 4 I	140	250
# 5 I	185	160
# 6 I	232	225
# 7 I	257	220
# 8 C	258	19200
# 9 C	235	11400
# 10 C	185	13100
# 11 C	123	11500
# 12 C	93	25100
# 13 I	194	690

Water Sample Locations	Direction	Distance
Russell Station C	270	25600
Ontario Water Dist Intake I	70	2200
Circ Water Intake	0	420
Circ Water Discharge I	15	130
Deer Creek I	105	260
Tap I	Onsite	Sink
Rainfall #3	110	420
Rainfall #5	185	160
Rainfall #8	258	19200
Rainfall #10	185	13100
Rainfall #12	93	25100

Milk Sample Locations	Direction	Distance
Farm A I	113	9500
Farm B I	242	5450
Farm C I	156	4950
Farm D C	132	21000

Fish Samples	
Indicator Samples	Lake Ontario Discharge Plume
Background Samples	Russell Station

Produce Samples	
Indicator Samples	Grown on property surrounding Plant
Background Samples	Purchased from farms > 10 miles

I = Indicator Samples
C = Control or Background Samples

TLD Locations	Direction	Distance
# 2 I	87	320
# 3 I	110	420
# 4 I	140	250
# 5 I	185	160
# 6 I	232	225
# 7 I	257	220
# 8 C	258	19200
# 9 C	235	11400
# 10 C	185	13100
# 11 C	123	11500
# 12 C	93	25100
# 13 I	292	230
# 14 I	292	770
# 15 I	272	850
# 16 I	242	900
# 17 I	208	500
# 18 I	193	650
# 19 I	177	400
# 20 I	165	680
# 21 I	145	600
# 22 I	128	810
# 23 I	107	680
# 24 I	90	630
# 25 C	247	14350
# 26 C	223	14800
# 27 C	202	14700
# 28 C	145	17700
# 29 C	104	13800
# 30 C	103	20500
# 31 I	263	7280
# 32 I	246	6850
# 33 I	220	7950
# 34 I	205	6850
# 35 I	193	7600
# 36 I	174	5650
# 37 I	158	6000
# 38 I	137	7070
# 39 I	115	6630
# 40 I	87	6630

Figure V-1
Location of Onsite Air Monitors and Post Accident TLDs

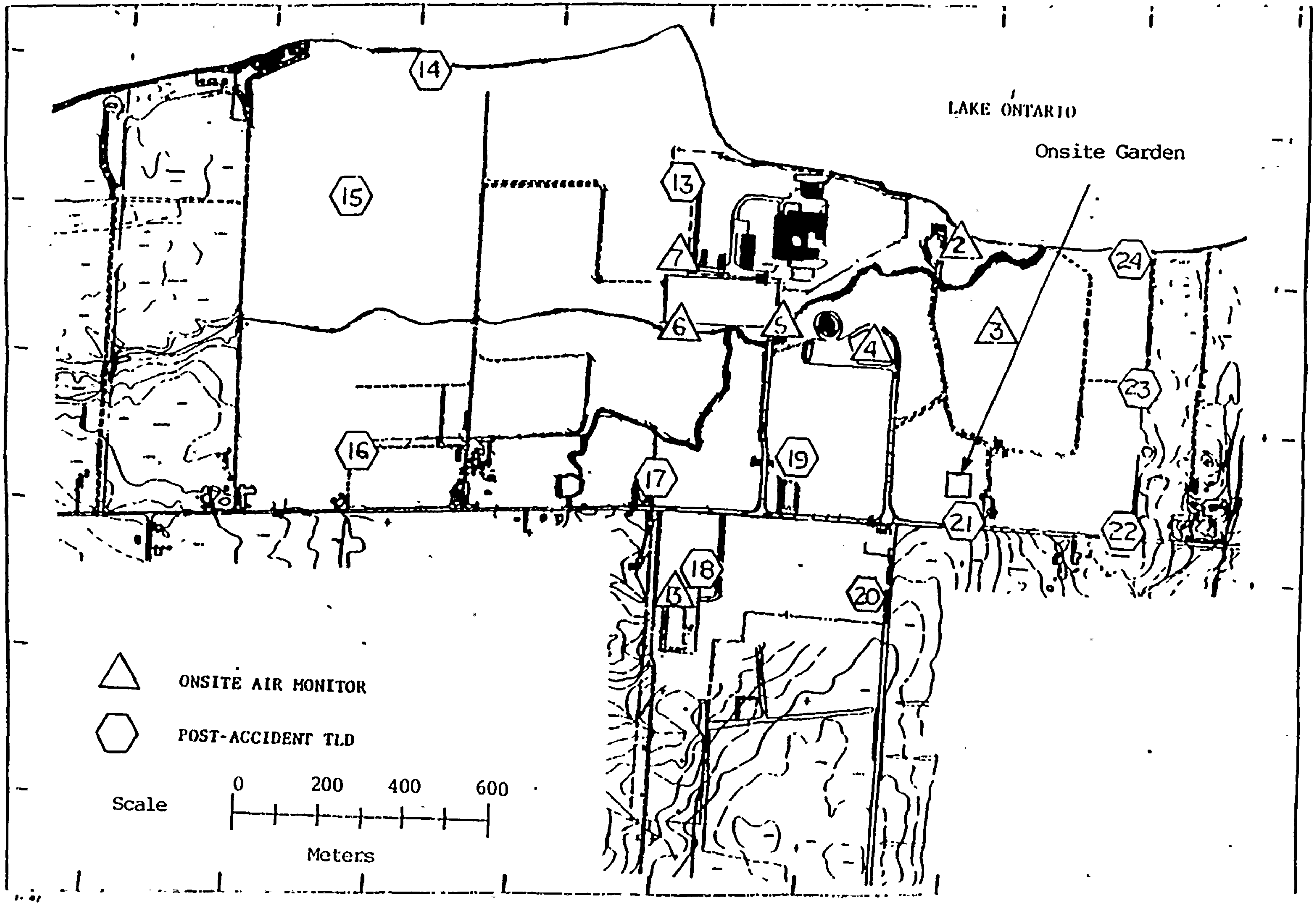
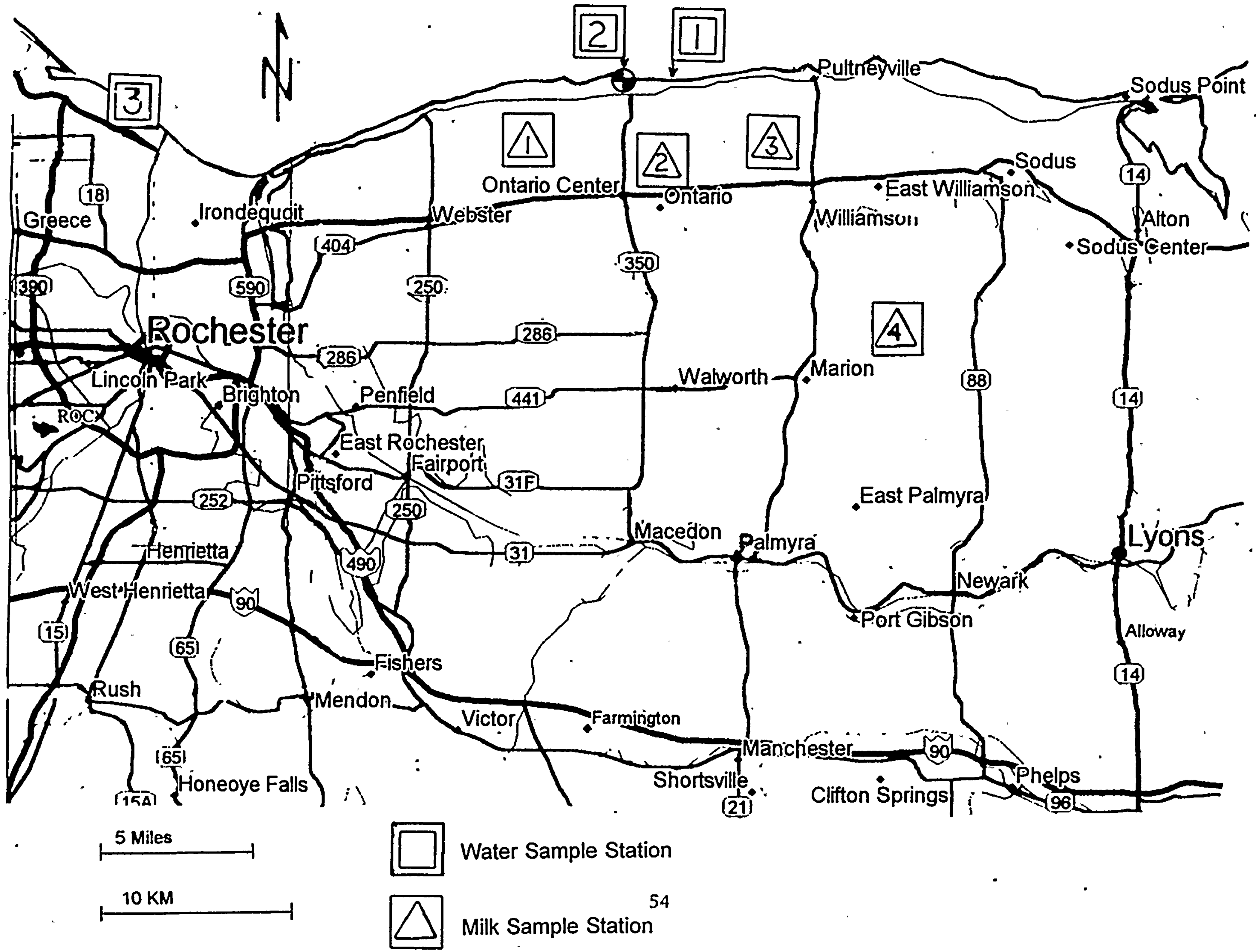


Figure V-2
Location of Farms for Milk Samples and Ontario Water District Intake



re V-3
Location of Offsite TLDs

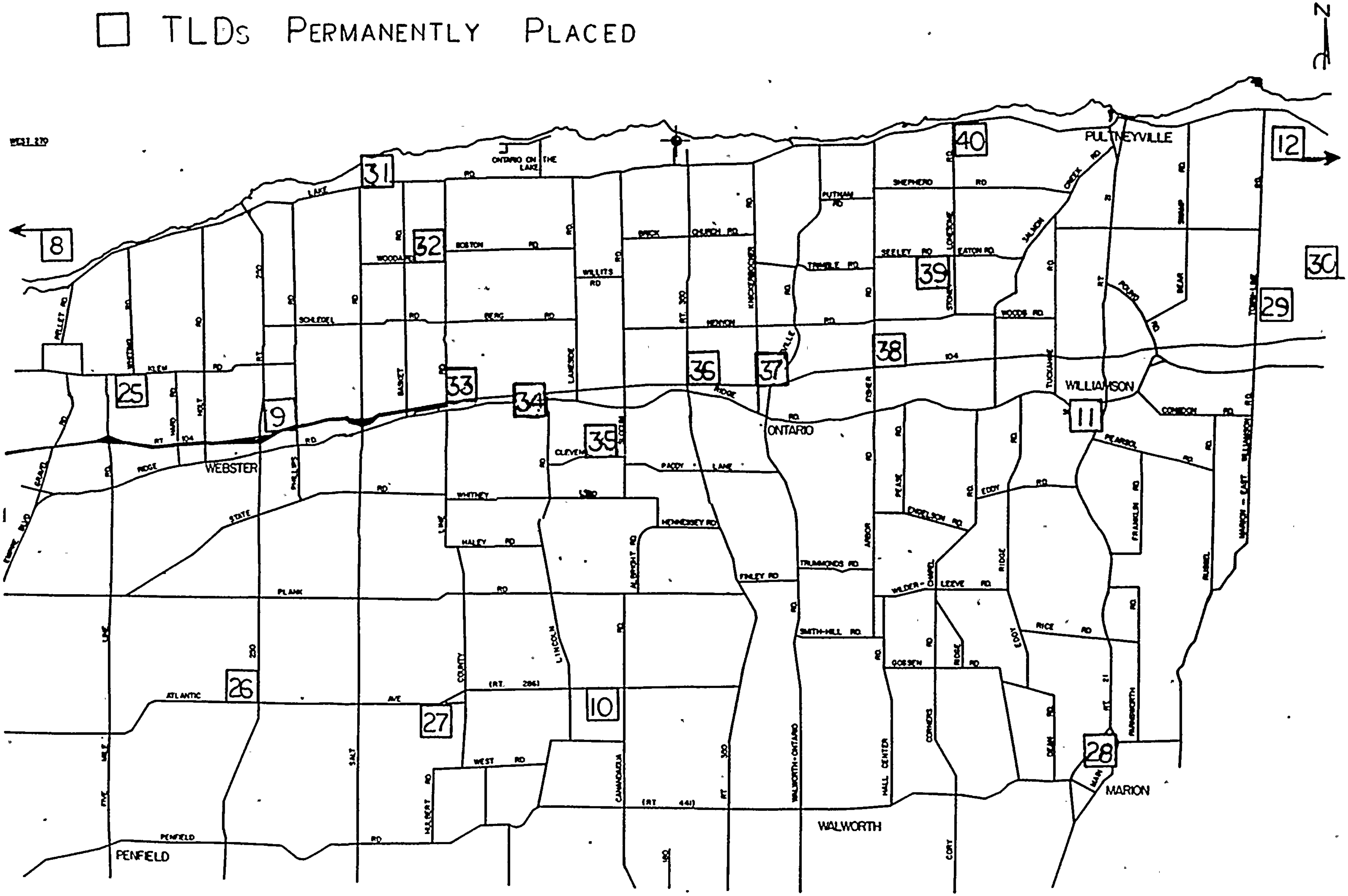
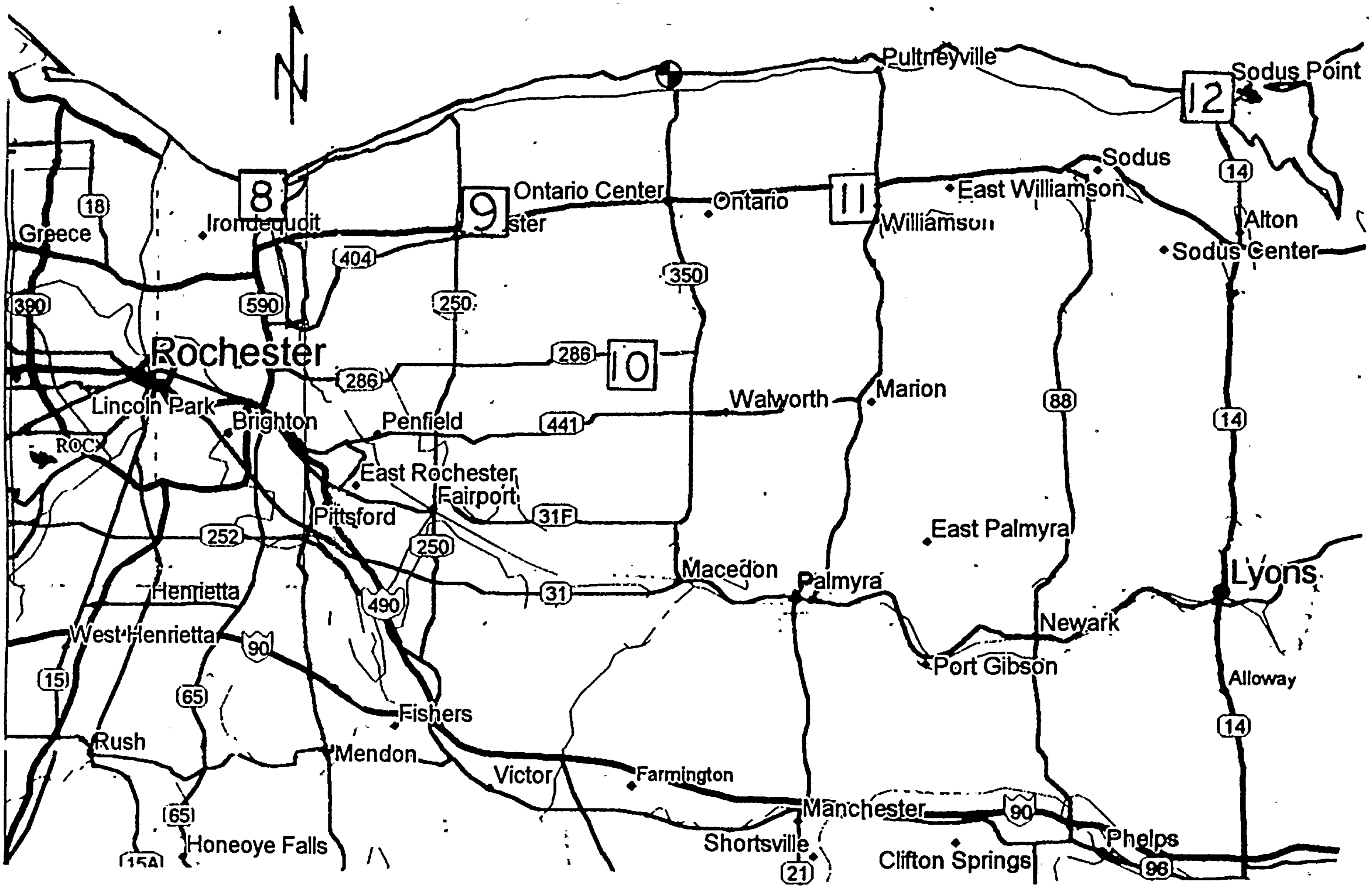


Figure V-4
Location of Offsite Air Monitors

□ OFFSITE AIR MONITOR



5 Miles

10 KM

Table V-3
Maximum LLD Values for Environmental Monitoring Instrumentation

Analysis	Water (pCi/l)	Airbourne Particulate or Gas (pCi/m^3)	Fish (pCi/kg, wet)	Milk (pCi/l)	Food Particulate (pCi/kg, wet)
gross beta	4(a)	1 E-02			
3-H	2000 (1000)(a)				
54-Mn	15		130		
59-Fe	30		260		
58, 60-Co	15		130		
65-Zn	30		260		
95-Zr-Nb	15(b)				
131-I	1	7 E-02		1	60
134, 137-Cs	15(10)(a), 18	1 E-02	130	15	60
140-Ba-La	15(b)			15(b)	

a. LLD for drinking water

b. Total for parent and daughter

The LLD shall be calculated as described in Notation (a) to Table 1-1.

Table V-4

Reporting Levels for Radioactivity Concentrations in Environmental Samples

Reporting Levels

Analysis	Water (pCi/l)	Airbourne Particulate or Gas (pCi/m^3)	Fish (pCi/kg, wet)	Milk (pCi/l)	Broad Leaf Vegetables (pCi/kg, wet)
H-3	2 E+04				
Mn-54	1000		3 E+04		
Fe-59	400		1 E+04		
Co-58	1000		3 E+04		
Co-60	300		1 E+04		
Zn-65	300		2 E+04		
Zr-Nb-95	400(a)				
I-131	2	0.9		3	1 E+02
Cs-134	30	10	1 E+03	60	1 E+03
Cs-137	50	20	2 E+03	70	2 E+03
Ba-La-140	200(a)			300	

a. Total for parent and daughter

Decay correction in analysis of environmental samples is taken from the end of the sampling time not from the midpoint of the sample period.

Table V-5
Dispersion Parameter (X/Q) For Long Term Releases > 500 hr/yr or > 125 hr/qtr
Plant Vent

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	4.0-4.5	4.5-5.0
N	8.8 E-6	2.1 E-6	1.0 E-6	4.7 E-7	2.5 E-7	1.8 E-7	1.3 E-7	1.1 E-7	9.4 E-8	8.2 E-8
NNE	7.4 E-6	1.7 E-6	9.2 E-7	4.5 E-7	2.5 E-7	1.8 E-7	1.4 E-7	1.2 E-7	9.9 E-8	9.0 E-8
NE	9.7 E-6	2.3 E-6	1.2 E-6	5.9 E-7	3.2 E-7	2.3 E-7	1.8 E-7	1.5 E-7	1.2 E-7	1.1 E-7
ENE	9.2 E-6	2.2 E-6	1.1 E-6	5.0 E-7	2.6 E-7	1.8 E-7	1.4 E-7	1.2 E-7	9.8 E-8	8.7 E-8
E	1.1 E-5	2.7 E-6	1.3 E-6	5.4 E-7	2.7 E-7	1.9 E-7	1.4 E-7	1.2 E-7	9.6 E-8	8.5 E-8
ESE	8.5 E-6	2.1 E-6	1.1 E-6	4.4 E-7	2.2 E-7	1.5 E-7	1.1 E-7	9.4 E-8	7.9 E-8	6.9 E-8
SE	6.5 E-6	1.4 E-6	6.9 E-7	3.0 E-7	1.5 E-7	1.1 E-7	8.5 E-8	6.9 E-8	5.6 E-8	4.8 E-8
SSE	3.6 E-6	1.1 E-6	5.0 E-7	2.3 E-7	1.2 E-7	8.4 E-8	6.3 E-8	5.2 E-8	4.2 E-8	3.5 E-8
S	2.1 E-6	8.8 E-7	4.5 E-7	1.9 E-7	1.0 E-7	7.6 E-8	5.9 E-8	4.8 E-8	4.0 E-8	3.3 E-8
SSW	2.0 E-6	5.8 E-7	3.4 E-7	1.8 E-7	9.6 E-8	6.8 E-8	5.3 E-8	4.5 E-8	3.8 E-8	3.2 E-8
SW	2.3 E-6	5.6 E-7	3.0 E-7	1.4 E-7	7.6 E-8	5.4 E-8	4.2 E-8	3.5 E-8	2.9 E-8	2.4 E-8
WSW	2.9 E-6	7.1 E-7	5.3 E-7	1.6 E-7	9.0 E-8	6.4 E-8	4.8 E-8	3.9 E-8	3.3 E-8	2.9 E-8
W	3.3 E-6	1.0 E-6	5.1 E-7	2.4 E-7	1.3 E-7	9.6 E-8	7.2 E-8	5.9 E-8	4.9 E-8	4.3 E-8
WNW	2.7 E-6	8.9 E-7	4.7 E-7	2.3 E-7	1.2 E-7	9.0 E-8	6.9 E-8	5.8 E-8	4.8 E-8	4.2 E-8
NW	2.0 E-6	6.4 E-7	3.6 E-7	1.8 E-7	9.8 E-8	7.4 E-8	5.7 E-8	4.6 E-8	3.9 E-8	3.4 E-8
NNW	4.3 E-6	1.2 E-6	5.7 E-7	2.7 E-7	1.4 E-7	1.0 E-7	8.0 E-8	6.7 E-8	5.6 E-8	4.9 E-8

* Direction wind blows into

Table V-6
Dispersion Parameter (D/Q) For Long Term Releases > 500 hr/yr or > 125 hr/qtr
Plant Vent

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	4.0-4.5	4.5-5.0
N	8.3 E-8	1.7 E-8	6.1 E-9	2.5 E-9	1.2 E-9	7.3 E-10	5.1 E-10	4.1 E-10	2.9 E-10	2.5 E-10
NNE	4.5 E-8	1.0 E-8	3.7 E-9	1.5 E-9	7.0 E-10	4.4 E-10	3.1 E-10	2.4 E-10	1.8 E-10	1.5 E-10
NE	6.5 E-8	1.5 E-8	5.4 E-9	2.2 E-9	1.0 E-9	6.5 E-10	4.5 E-10	3.6 E-10	2.6 E-10	2.2 E-10
ENE	8.3 E-8	1.8 E-8	6.4 E-9	2.6 E-9	1.2 E-9	7.5 E-10	5.3 E-10	4.1 E-10	3.1 E-10	2.6 E-10
E	1.4 E-7	2.9 E-8	1.0 E-8	4.2 E-9	1.9 E-9	1.2 E-9	8.6 E-10	6.7 E-10	4.8 E-10	4.1 E-10
ESE	1.4 E-7	3.0 E-8	1.1 E-8	4.3 E-9	1.9 E-9	1.2 E-9	8.7 E-10	6.7 E-10	5.2 E-10	4.5 E-10
SE	1.3 E-7	2.7 E-8	9.3 E-9	3.7 E-9	1.7 E-9	1.0 E-9	7.7 E-10	6.1 E-10	4.6 E-10	4.0 E-10
SSE	5.8 E-8	1.4 E-8	4.7 E-9	1.9 E-9	8.9 E-10	5.6 E-10	4.1 E-10	3.5 E-10	2.7 E-10	2.3 E-10
S	2.8 E-8	8.6 E-9	3.1 E-9	1.3 E-9	5.8 E-10	3.8 E-10	2.9 E-10	2.4 E-10	1.8 E-10	1.6 E-10
SSW	3.1 E-8	7.8 E-9	3.1 E-9	1.3 E-9	5.9 E-10	3.7 E-10	2.7 E-10	2.2 E-10	1.8 E-10	1.5 E-10
SW	4.5 E-8	1.0 E-8	3.6 E-9	1.5 E-9	6.8 E-10	4.4 E-10	3.1 E-10	2.5 E-10	1.9 E-10	1.6 E-10
WSW	5.6 E-8	1.3 E-8	4.6 E-9	1.8 E-9	8.4 E-10	5.3 E-10	3.7 E-10	2.9 E-10	2.1 E-10	1.8 E-10
W	4.2 E-8	1.0 E-8	3.9 E-9	1.6 E-9	7.4 E-10	4.7 E-10	3.3 E-10	2.6 E-10	1.9 E-10	1.6 E-10
WNW	2.2 E-8	5.9 E-9	2.4 E-9	1.0 E-9	4.7 E-10	3.0 E-10	2.1 E-10	1.7 E-10	1.3 E-10	1.0 E-10
NW	1.5 E-8	4.1 E-9	1.7 E-9	7.0 E-10	3.3 E-10	2.1 E-10	1.5 E-10	1.2 E-10	8.8 E-11	7.4 E-11
NNW	4.0 E-8	9.2 E-9	3.5 E-9	1.4 E-9	6.6 E-10	4.2 E-10	2.9 E-10	2.3 E-10	1.7 E-10	1.4 E-10

* Direction wind blows into

Table V-7
Dispersion Parameter $(X/Q)_{cp}$ For Long Term Releases > 500 hr/yr or > 125 hr/qtr
Containment Purge

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	4.0-4.5	4.5-5.0
N	3.7 E-6	1.2 E-6	7.2 E-7	3.6 E-7	2.0 E-7	1.4 E-7	1.1 E-7	9.6 E-8	8.1 E-8	7.1 E-8
NNE	3.1 E-6	1.0 E-6	6.6 E-7	3.5 E-7	2.0 E-7	1.5 E-7	1.2 E-7	1.0 E-7	8.9 E-8	7.9 E-8
NE	4.1 E-6	1.4 E-6	9.0 E-7	4.7 E-7	2.7 E-7	2.0 E-7	1.6 E-7	1.3 E-7	1.1 E-7	1.0 E-7
ENE	3.9 E-6	1.3 E-6	7.7 E-7	3.9 E-7	2.1 E-7	1.5 E-7	1.2 E-7	1.0 E-7	8.5 E-8	7.5 E-8
E	4.9 E-6	1.6 E-6	8.8 E-7	4.1 E-7	2.2 E-7	1.5 E-7	1.2 E-7	1.0 E-7	8.3 E-8	7.3 E-8
ESE	4.3 E-6	1.5 E-6	9.1 E-7	3.9 E-7	2.0 E-7	1.4 E-7	1.1 E-7	8.6 E-8	7.4 E-8	6.4 E-8
SE	4.2 E-6	1.2 E-6	6.1 E-7	2.8 E-7	1.4 E-7	9.9 E-8	8.0 E-8	6.5 E-8	5.4 E-8	4.6 E-8
SSE	2.3 E-6	9.7 E-7	4.6 E-7	2.2 E-7	1.2 E-7	8.1 E-8	6.1 E-8	5.0 E-8	4.0 E-8	3.4 E-8
S	1.3 E-6	7.7 E-7	4.1 E-7	1.9 E-7	1.0 E-7	7.4 E-8	5.8 E-8	4.7 E-8	3.8 E-8	3.2 E-8
SSW	1.2 E-6	4.5 E-7	3.3 E-7	1.7 E-7	9.5 E-8	6.7 E-8	5.3 E-8	4.5 E-8	3.7 E-8	3.2 E-8
SW	1.3 E-6	4.1 E-7	2.7 E-7	1.3 E-7	7.3 E-8	5.2 E-8	4.1 E-8	3.4 E-8	2.7 E-8	2.3 E-8
WSW	1.7 E-6	5.3 E-7	3.2 E-7	1.5 E-7	8.6 E-8	6.0 E-8	4.5 E-8	3.8 E-8	3.2 E-8	2.8 E-8
W	1.7 E-6	7.2 E-7	4.4 E-7	2.1 E-7	1.2 E-7	8.6 E-8	6.6 E-8	5.5 E-8	4.6 E-8	4.0 E-8
WNW	1.2 E-6	6.0 E-7	3.9 E-7	2.0 E-7	1.1 E-7	8.2 E-8	6.3 E-8	5.3 E-8	4.5 E-8	3.9 E-8
NW	8.5 E-7	4.4 E-7	3.0 E-7	1.6 E-7	8.9 E-8	6.5 E-8	5.1 E-8	4.3 E-8	3.5 E-8	3.2 E-8
NNW	1.8 E-6	7.0 E-7	4.4 E-7	2.2 E-7	1.2 E-7	9.0 E-8	7.1 E-8	6.0 E-8	5.0 E-8	4.4 E-8

* Direction wind blows into

Table V-8
Dispersion Parameter (D/Q) For Long Term Releases > 500 hr/yr or > 125 hr/qtr
Containment Purge

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	4.0-4.5	4.5-5.0
N	4.2 E-8	1.0 E-8	4.0 E-9	1.6 E-9	7.6 E-10	4.6 E-10	3.4 E-10	2.7 E-10	1.9 E-10	1.6 E-10
NNE	2.3 E-8	6.2 E-9	2.5 E-9	1.0 E-9	4.8 E-10	2.9 E-10	2.2 E-10	1.7 E-10	1.2 E-10	1.0 E-10
NE	3.4 E-8	9.3 E-9	3.7 E-9	1.5 E-9	7.1 E-10	4.5 E-10	3.2 E-10	2.5 E-10	1.8 E-10	1.6 E-10
ENE	4.2 E-8	1.1 E-8	4.3 E-9	1.8 E-9	8.3 E-10	5.3 E-10	3.8 E-10	2.9 E-10	2.1 E-10	1.8 E-10
E	7.3 E-8	1.9 E-8	7.4 E-9	3.0 E-9	1.4 E-9	9.0 E-10	6.4 E-10	5.0 E-10	3.6 E-10	3.1 E-10
ESE	9.1 E-8	2.4 E-8	9.1 E-9	3.6 E-9	1.6 E-9	9.9 E-10	7.5 E-10	5.9 E-10	4.8 E-10	4.2 E-10
SE	1.0 E-7	2.4 E-8	8.4 E-9	3.4 E-9	1.6 E-9	9.6 E-10	7.4 E-10	5.9 E-10	4.6 E-10	4.1 E-10
SSE	4.3 E-8	1.3 E-8	4.3 E-9	1.8 E-9	8.3 E-10	5.4 E-10	4.0 E-10	3.6 E-10	2.7 E-10	2.3 E-10
S	2.1 E-8	8.1 E-9	2.9 E-9	1.7 E-9	5.5 E-10	3.7 E-10	3.0 E-10	2.5 E-10	1.9 E-10	1.6 E-10
SSW	2.1 E-8	6.9 E-9	2.9 E-9	1.2 E-9	5.7 E-10	3.6 E-10	2.7 E-10	2.2 E-10	1.8 E-10	1.5 E-10
SW	3.4 E-8	8.9 E-9	3.3 E-9	1.4 E-9	6.3 E-10	4.1 E-10	3.0 E-10	2.5 E-10	1.9 E-10	1.6 E-10
WSW	4.3 E-8	1.1 E-8	4.2 E-9	1.7 E-9	7.8 E-10	4.9 E-10	3.4 E-10	2.7 E-10	2.0 E-10	1.7 E-10
W	3.0 E-8	8.8 E-9	3.4 E-9	1.4 E-9	6.5 E-10	4.2 E-10	2.9 E-10	2.3 E-10	1.7 E-10	1.4 E-10
WNW	1.2 E-8	4.5 E-9	2.0 E-9	8.4 E-10	4.0 E-10	2.6 E-10	1.8 E-10	1.4 E-10	1.1 E-10	9.1 E-11
NW	8.8 E-9	3.2 E-9	1.4 E-9	5.9 E-10	2.8 E-10	1.8 E-10	1.3 E-10	1.0 E-10	7.6 E-11	6.5 E-11
NNW	2.2 E-8	6.4 E-9	2.6 E-9	1.1 E-9	5.0 E-10	3.3 E-10	2.3 E-10	1.8 E-10	1.4 E-10	1.1 E-10

* Direction wind blows into

Table V-9
Dispersion Parameter (X/Q) For Long Term Releases > 500 hr/yr or > 125 hr/qtr
Ground Vent

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	4.0-4.5	4.5-5.0
N	4.4 E-5	8.2 E-6	3.4 E-6	1.4 E-6	6.9 E-7	4.7 E-7	3.4 E-7	2.7 E-7	2.2 E-7	1.9 E-7
NNE	5.5 E-5	1.0 E-5	4.2 E-6	1.8 E-6	8.7 E-7	5.9 E-7	4.3 E-7	3.5 E-7	2.9 E-7	2.4 E-7
NE	6.5 E-5	1.2 E-5	5.1 E-6	2.1 E-6	1.0 E-6	6.9 E-7	5.1 E-7	4.1 E-7	3.4 E-7	2.8 E-7
ENE	4.4 E-5	8.3 E-6	3.5 E-6	1.4 E-6	6.9 E-7	4.8 E-7	3.4 E-7	2.8 E-7	2.2 E-7	1.9 E-7
E	3.7 E-5	7.1 E-6	2.9 E-6	1.2 E-6	5.7 E-7	3.7 E-7	2.8 E-7	2.2 E-7	1.8 E-7	1.5 E-7
ESE	2.6 E-5	4.8 E-6	2.0 E-6	7.8 E-7	3.8 E-7	2.5 E-7	1.8 E-7	1.5 E-7	1.1 E-7	9.9 E-8
SE	1.7 E-5	3.1 E-6	1.3 E-6	5.0 E-7	2.4 E-7	1.6 E-7	1.1 E-7	9.3 E-8	7.6 E-8	6.3 E-8
SSE	1.3 E-5	2.4 E-6	9.5 E-7	3.7 E-7	1.8 E-7	1.2 E-7	8.6 E-8	7.0 E-8	5.7 E-8	4.6 E-8
S	1.2 E-5	2.2 E-6	9.0 E-7	3.5 E-7	1.7 E-7	1.1 E-7	8.4 E-8	6.7 E-8	5.4 E-8	4.5 E-8
SSW	1.2 E-5	2.1 E-6	8.7 E-7	3.5 E-7	1.7 E-7	1.1 E-7	8.3 E-8	6.6 E-8	5.4 E-8	4.5 E-8
SW	9.7 E-6	1.7 E-6	6.8 E-7	2.7 E-7	1.3 E-7	8.7 E-8	6.3 E-8	5.1 E-8	4.1 E-8	3.4 E-8
WSW	1.4 E-5	2.4 E-6	9.9 E-7	4.0 E-7	1.9 E-7	1.3 E-7	9.3 E-8	7.6 E-8	6.3 E-8	5.2 E-8
W	2.5 E-5	4.5 E-6	1.8 E-6	7.5 E-7	3.6 E-7	2.4 E-7	1.8 E-7	1.4 E-7	1.1 E-7	9.8 E-8
WNW	2.4 E-5	4.6 E-6	1.9 E-6	7.7 E-7	3.7 E-7	2.5 E-7	1.8 E-7	1.5 E-7	1.2 E-7	9.7 E-8
NW	2.1 E-5	4.0 E-6	1.6 E-6	6.7 E-7	3.3 E-7	2.2 E-7	1.6 E-7	1.3 E-7	1.1 E-7	8.8 E-8
NNW	2.9 E-5	5.4 E-6	2.2 E-6	9.2 E-7	4.5 E-7	3.0 E-7	2.2 E-7	1.8 E-7	1.5 E-7	1.2 E-7

* Direction wind blows into

Table V-10
Dispersion Parameter (D/Q) For Long Term Releases > 500 hr/yr or > 125 hr/qtr
Ground Vent

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	4.0-4.5	4.5-5.0
N	2.0 E-7	3.7 E-8	1.2 E-8	5.0 E-9	2.3 E-9	1.4 E-9	9.7 E-10	7.6 E-10	5.5 E-10	4.7 E-10
NNE	1.8 E-7	3.4 E-8	1.1 E-8	4.5 E-9	2.1 E-9	1.3 E-9	9.0 E-10	6.9 E-10	5.0 E-10	4.3 E-10
NE	2.5 E-7	4.5 E-8	1.5 E-8	6.1 E-9	2.8 E-9	1.7 E-9	1.1 E-9	9.2 E-10	6.9 E-10	5.8 E-10
ENE	2.1 E-7	3.9 E-8	1.3 E-8	5.3 E-9	2.4 E-9	1.5 E-9	1.0 E-9	8.0 E-10	6.0 E-10	5.0 E-10
E	2.5 E-7	4.6 E-8	1.5 E-8	6.2 E-9	2.8 E-9	1.7 E-9	1.2 E-9	9.4 E-10	7.0 E-10	5.8 E-10
ESE	2.2 E-7	4.1 E-8	1.3 E-8	5.5 E-9	2.5 E-9	1.6 E-9	1.1 E-9	8.4 E-10	6.3 E-10	5.2 E-10
SE	1.8 E-7	3.7 E-8	1.1 E-8	4.5 E-9	2.1 E-9	1.3 E-9	9.0 E-10	6.9 E-10	5.1 E-10	4.3 E-10
SSE	9.8 E-8	1.8 E-8	6.0 E-9	2.4 E-9	1.1 E-9	6.8 E-10	4.8 E-10	3.7 E-10	2.7 E-10	2.3 E-10
S	6.8 E-8	1.3 E-8	4.2 E-9	1.7 E-9	7.7 E-10	4.8 E-10	3.3 E-10	2.6 E-10	1.9 E-10	1.6 E-10
SSW	6.7 E-8	1.2 E-8	4.1 E-9	1.7 E-9	7.6 E-10	4.7 E-10	3.3 E-10	2.5 E-10	1.8 E-10	1.5 E-10
SW	7.6 E-8	1.4 E-8	4.7 E-9	1.9 E-9	8.6 E-10	5.5 E-10	3.8 E-10	2.9 E-10	2.1 E-10	1.7 E-10
WSW	9.9 E-8	1.8 E-8	6.1 E-9	1.5 E-9	1.1 E-9	6.9 E-10	4.9 E-10	3.7 E-10	2.8 E-10	2.3 E-10
W	1.1 E-7	2.0 E-8	6.7 E-9	2.7 E-9	1.2 E-9	7.5 E-10	5.4 E-10	4.1 E-10	3.0 E-10	2.5 E-10
WNW	8.9 E-8	1.6 E-8	5.4 E-9	2.2 E-9	1.0 E-9	6.3 E-10	4.3 E-10	3.3 E-10	2.5 E-10	2.1 E-10
NW	7.0 E-8	1.3 E-8	4.3 E-9	1.7 E-9	7.9 E-10	4.9 E-10	3.4 E-10	2.6 E-10	2.0 E-10	1.6 E-10
NNW	1.2 E-7	1.2 E-8	7.1 E-9	1.9 E-9	1.3 E-9	8.1 E-10	5.7 E-10	4.4 E-10	3.2 E-10	2.7 E-10

* Direction wind blows into

VI. REPORTING REQUIREMENTS

A. Specification

The following reports will be prepared and submitted to the U.S. Nuclear Regulatory Commission, Document Control Desk, Washington, D.C. 20555 and a copy to the Regional Administrator of the USNRC, Region I.

1. Annual Radiological Environmental Operating Report

An Annual Radiological Environmental Operating Report covering the operation of the unit during the previous calendar year shall be submitted
9 prior to May 15 of each year. The Annual Radiological Environmental Operating Report shall include summaries, interpretations, and analysis of trends of the results of the radiological environmental surveillance activities for the report period, including a comparison with background (control) samples and previous environmental surveillance reports and an assessment of the observed impacts of the plant operation on the environment. The report shall also include the results of the Land Use Census as required.

This report shall include any new location(s) identified by the Land Use Census which yield a calculated dose or dose commitment greater than those forming the basis of Specification II.A or IV.A. The report shall also contain a discussion which identifies the causes of the unavailability of milk or leafy vegetable samples and identifies locations for obtaining replacement samples in accordance with Specification V.A.1.d.

The Annual Radiological Environmental Operating Report shall include summarized and tabulated results in the format of table VI-1 of all radiological environmental samples taken during the report period. In the event that some results are not available for inclusion with the report, the report shall be submitted noting and explaining the reasons for the missing results. The missing data shall be submitted as soon as possible in a supplementary report. In addition, the annual report shall include a discussion which identifies the circumstances which prevent any required detection limits for environmental sample analyses from being met, and a discussion of all deviations from the sample schedule of Table V-1. The report shall also include the following:

a. a summary description of the radiological environmental monitoring program including a map of all sampling locations keyed to a table giving distances and directions from the reactor; and

b. the results of the participation in an interlaboratory comparison program.

2. Radioactive Effluent Release Report

The Radioactive Effluent Release Report covering the operation of the unit during the previous twelve months of operation shall be submitted prior to May 15 each year. This report shall include a summary, on a quarterly basis, of the quantities of radioactive liquid and gaseous effluents and solid waste released as outlined in Regulatory Guide 1.21, Revision 1.

The Radioactive Effluent Release Report shall include an assessment of radiation doses from the radioactive liquid and gaseous effluents released from the unit during each of the previous four calendar quarters as outlined in Regulatory Guide 1.21, Revision 1. In addition, the site boundary maximum noble gas gamma air and beta air doses shall be evaluated. The assessment of radiation doses shall be performed in accordance with Specification I.A.2 and II.A.4. This same report shall include an annual summary of hourly meteorological data collected over the previous calendar year. Alternatively, the licensee has the option of retaining this summary on site in a file that shall be provided to the NRC upon request. The Radioactive Effluent Release Report shall include a discussion which identifies the circumstances which prevented any required detection limits for effluent sample analyses being met.

This report shall include any changes made during the reporting period to the Offsite Dose Calculation Manual (ODCM). Licensee may make changes to this ODCM and shall submit to the Commission, with the Radioactive Effluent Release Report for the period in which any change(s) is made, a copy of the new ODCM and a summary containing:

a. sufficiently detailed information to support the rationale for the change;

b. a determination that the change will not reduce the accuracy or reliability of dose calculations or setpoint determinations; and

c. documentation of the fact that the change has been reviewed and found acceptable by the onsite review function.

Licensee initiated changes shall become effective after review and acceptance by the onsite review function on a date specified by the licensee.

This report shall include any changes made during the reporting period to the Process Control Program (PCP). This report shall include a discussion of any major changes to the radioactive waste treatment systems.

3. Preparation of Special Report to Demonstrate Compliance with Environmental Radiation Protection Standards

Thirty day reports are required to be prepared and sent to the Commission when certain conditions exist as defined in the following sections of this ODCM:

- I.A.2.a, Liquid effluents exceeding twenty times the concentration specified in Appendix B, Table 2, Column 2 to 10CFR20 at the receiving waters
- I.A.2.b, Liquid effluents exceeding the Specification for dose, 10 CFR 50 Appendix I;
- I.A.3.a, Liquid effluents exceeding the Specification for dose, 10 CFR Part 190;
- II.A.1.a, Gaseous effluents exceeding twenty times the concentrations specified in Appendix B, Table 2, Column 1 to 10CFR20 in an unrestricted area
- II.A.4.c. Gaseous effluents exceeding the Specification for dose, 10 CFR Part 50 Appendix I;
- II.A.5.a. Gaseous effluents exceeding the Specification for dose, 10 CFR Part 190;
- IV.A.1.b, Inoperability of liquid waste treatment equipment resulting in doses in excess of 10CFR50 Appendix I
- IV.A.2.c, Inoperability of gaseous waste treatment equipment resulting in doses in excess of 10CFR50 Appendix I
- V.A.1.c, Level of radioactivity in environmental sampling medium at one or more locations exceeds the reporting level
- Table III-2, Inoperability of accident radiation monitoring instrumentation greater than 7 days

Guidance is given for each of these reports in the applicable location. The following general guidelines are presented for calculating dose to an exposed individual or the general population for preparation of Special Reports:

a. The maximally exposed real member of the public will generally be the same individual considered in the ODCM.

b. Dose contributions to the maximally exposed individual need only be considered to be those resulting from the Ginna plant itself. All other uranium fuel cycle facilities or operations are of sufficient distance to contribute a negligible portion of the individual's dose.

c. For determining the total dose to the maximally exposed individual from the major gaseous and liquid effluent pathways and from direct radiation, dose evaluation techniques used in preparing the Special Report may be those described in this manual or other applicable methods where appropriate.

d. The contribution from direct radiation may be estimated by effluent dispersion modelling or calculated from the results of the environmental monitoring program for direct radiation.

Table VI-1

Environmental Radiological Monitoring Program Summary

ROCHESTER GAS AND ELECTRIC CORPORATION
R.E. GINNA NUCLEAR POWER PLANT - DOCKET NO. 50-244
WAYNE, NEW YORK

PATHWAY SAMPLED UNIT OF MEASUREMENT	TYPE AND TOTAL NUMER OF ANALYSES	LLD	INDICATOR LOCATIONS MEAN (1) RANGE	LOCATION WITH HIGHEST ANNUAL MEAN: NAME, DISTANCE AND DIRECTION	LOCATION WITH HIGHEST ANNUAL MEAN: MEAN (1) RANGE	CONTROL LOCATIONS MEAN (1) RANGE
AIR: Particulate	Gross Beta					
(pCi/Cu.M.)	Gamma Scan					
Iodine	Gamma Scan					
DIRECT RADIATION: TLD (mrem/QUARTER)	Gamma					
WATER: Drinking (pCi/Liter)	Gross Beta					
	Gamma Scan					
	Iodine					
Surface (pCi/liter)	Gross Beta					
	Gamma Scan					
	Iodine					
Rainfall ($pCi/m^2/day$)	Gross Beta					
MILK: (pCi/Liter)	Iodine					
	Gamma Scan					
FISH: (pCi/Kg)	Gamma Scan					
VEGETATION: (pCi/Kg)	Gamma Scan					

(1) Mean and range based on detectable measurements only. Fraction of detectable measurements at specified locations in parentheses.

VII. REFERENCES

1. R. E. Ginna Nuclear Power Plant Unit No. 1, Appendix A to Operating License No. DPR-18, Technical Specifications, Rochester Gas and Electric Corporation, Docket 50-244

2. USNRC, Preparation of Radiological Effluent Technical Specifications for Nuclear Power Plants, NUREG-0133 (October, 1978).

3. USNRC, Calculation of Annual Doses to Man from Routine Releases of Reactor Effluents for the Purpose of Evaluating Compliance with 10 CFR Part 50, Appendix I, Regulatory Guide 1.109, Revision 1 (October 1977).

4. R. E. Ginna Nuclear Power Plant, Updated Final Safety Analysis Report.

5. R. E. Ginna Nuclear Power Plant, Calculations to Demonstrate Compliance with the Design Objectives of 10 CFR Part 50, Appendix I, Rochester Gas and Electric Corporation, (June, 1977).

6. USNRC, Methods for Estimating Atmospheric Transport and dispersion of Gaseous Effluents in Routine Releases from Light-Water-Cooled Reactors, Regulatory Guide 1.111, Revision 1 (July, 1977).

7. R. E. Ginna Nuclear Power Plant, Incident Evaluation, Ginna Steam Generator Tube Failure Incident January 25, 1982, Rochester Gas and Electric Corporation, (April 12, 1982).

8. Pelletier, C. A., et .al., Sources of Radioiodine at Pressurized Water Reactors, EPRI NP-939 (November 1978).