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Washington, D.C. 20555

Subject: Clinton Power Station  
Annual Radioactive Effluent Release Report

Dear Sir:

Attached is the Annual Radioactive Effluent Release Report for Clinton Power Station (CPS) for the period of January 1, 1995 through December 31, 1995. This submittal is provided in accordance with the requirements of section 5.6.3 of the CPS Technical Specifications.

Sincerely yours,

Michael W. Lyon  
Director-Licensing

WSI/csm

Attachment

cc: NRC Clinton Licensing Project Manager  
NRC Resident Office, V-690  
Regional Administrator, Region III, USNRC  
Illinois Department of Nuclear Safety

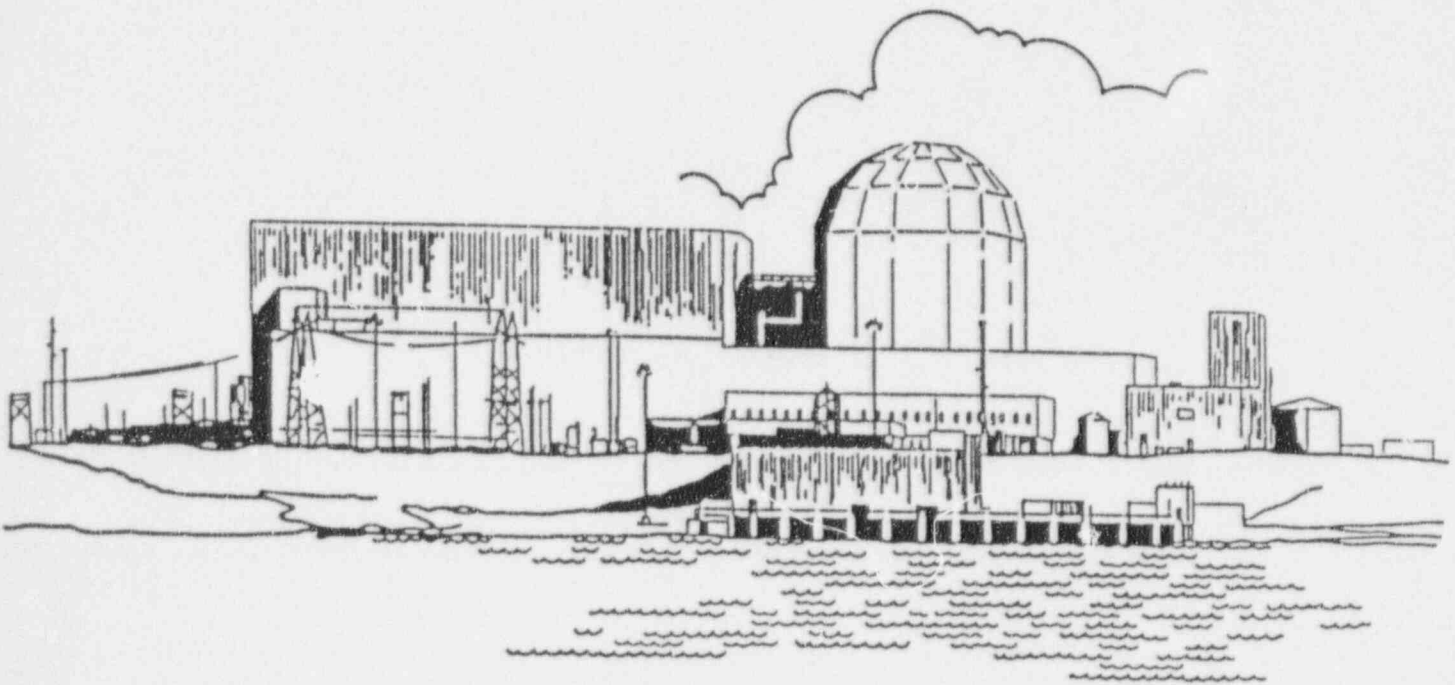
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# CLINTON POWER STATION

## ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT

January 1, 1995 through December 31, 1995



January 1, 1995 - December 31, 1995  
ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT  
FOR THE  
CLINTON POWER STATION

Prepared by  
Plant Radiation Protection and Chemistry Department

April 30, 1996

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SECTION 1  
EXECUTIVE SUMMARY

The Annual Radioactive Effluent Release Report is a detailed description of all radioactive releases (both gaseous and liquid) from the Clinton Power Station (CPS) and the resulting radiation doses for the period from January 1, 1995 through December 31, 1995. This report includes a detailed meteorological section which provides the weather history of the area during this period. This information is used to calculate the dose to the public.

The report also includes a summary of the amounts of radioactive material contained in solid waste that is packaged and shipped for offsite disposal at federally-approved burial facilities. In addition, this report notifies the U.S. Nuclear Regulatory Commission (NRC) staff of changes to CPS's Offsite Dose Calculation Manual (ODCM) and exceptions to the CPS effluent monitoring program which must be reported per ODCM Operation Requirements 2.7.1.b and 3.9.2.b.

The NRC requires that nuclear power stations be designed, constructed, and operated in such a way that the amount of radioactive material in effluent releases to unrestricted areas is kept As Low As Reasonably Achievable (ALARA). To assure these criteria are met, the NRC has established limits governing the release of radioactivity in effluents.

CPS was operated in compliance with established limits during this report period. The maximum radiation dose delivered to the inhabitants of the area surrounding CPS, due to radioactivity released from the station, was very small. The radiation dose to people in the vicinity of CPS was calculated for a continuous gaseous release by using the concentration of radioactive material and the weather conditions at the time of the release. This dose was only a small fraction of the limit for the most exposed member of the public. CPS did not have any liquid radioactive releases in 1995.



SECTION 2  
INTRODUCTION

Clinton Power Station is located in Harp Township, DeWitt County approximately six miles east of the city of Clinton in east-central Illinois. Clinton Power Station is a 985 megawatt gross electrical power output boiling water reactor. The reactor and generating units were supplied by General Electric, Sargent and Lundy Engineers served as architect-engineer, and Baldwin Associates was the constructor.

Construction of CPS began in the mid 1970's. Fuel load began in September of 1986 with initial criticality achieved on February 27, 1987. Commercial operation commenced in April 1987 and the reactor reached 100% power for the first time on September 15, 1987.

Airborne effluents are released from CPS via two gaseous effluent release points to the environment: the Common Station Heating, Ventilating, and Air Conditioning (HVAC) Stack and the Standby Gas Treatment System (SGTS) Vent (see Figure 1). Each release point is continuously monitored and a program of periodic sampling and analysis is conducted as specified in the ODCM.

Liquid effluents from CPS are released in batch mode and are sampled and analyzed prior to release. Liquid effluents, (variable from 10-60 gallons per minute (GPM) or 50-300 GPM), combine with Plant Service Water flow (minimum of approximately 5000 GPM) and Plant Circulating Water flow (0-567,000 GPM) in the seal well prior to entering the 3.4 mile discharge flume to Lake Clinton (see Figure 2).

## Regulatory Limits

The NRC requires nuclear power plants to be designed, constructed and operated in such a way that the radioactivity in effluent releases to unrestricted areas is kept ALARA. To assure these criteria are met, each license authorizing nuclear reactor operation includes Radiological Effluent Technical Specifications (RETS) governing the release of radioactive effluents (Code of Federal Regulations, Title 10, Part 50, Appendix I). The RETS designate the limits for release of effluents, as well as the limits for doses to the general public from the release of radioactive liquids and gases. Keeping releases within these operating limits demonstrates that the ALARA principle is being met.

The dose to a member of the general public from radioactive material in liquid effluents released to unrestricted areas is limited to:

- Less than or equal to 3 mrem per year to the total body.

-and-

- Less than or equal to 10 mrem per year to any organ.

The dose to a member of the general public from the release of noble gases in gaseous effluents is limited to:

- Less than or equal to 10 mrad per year for gamma radiation.

-and-

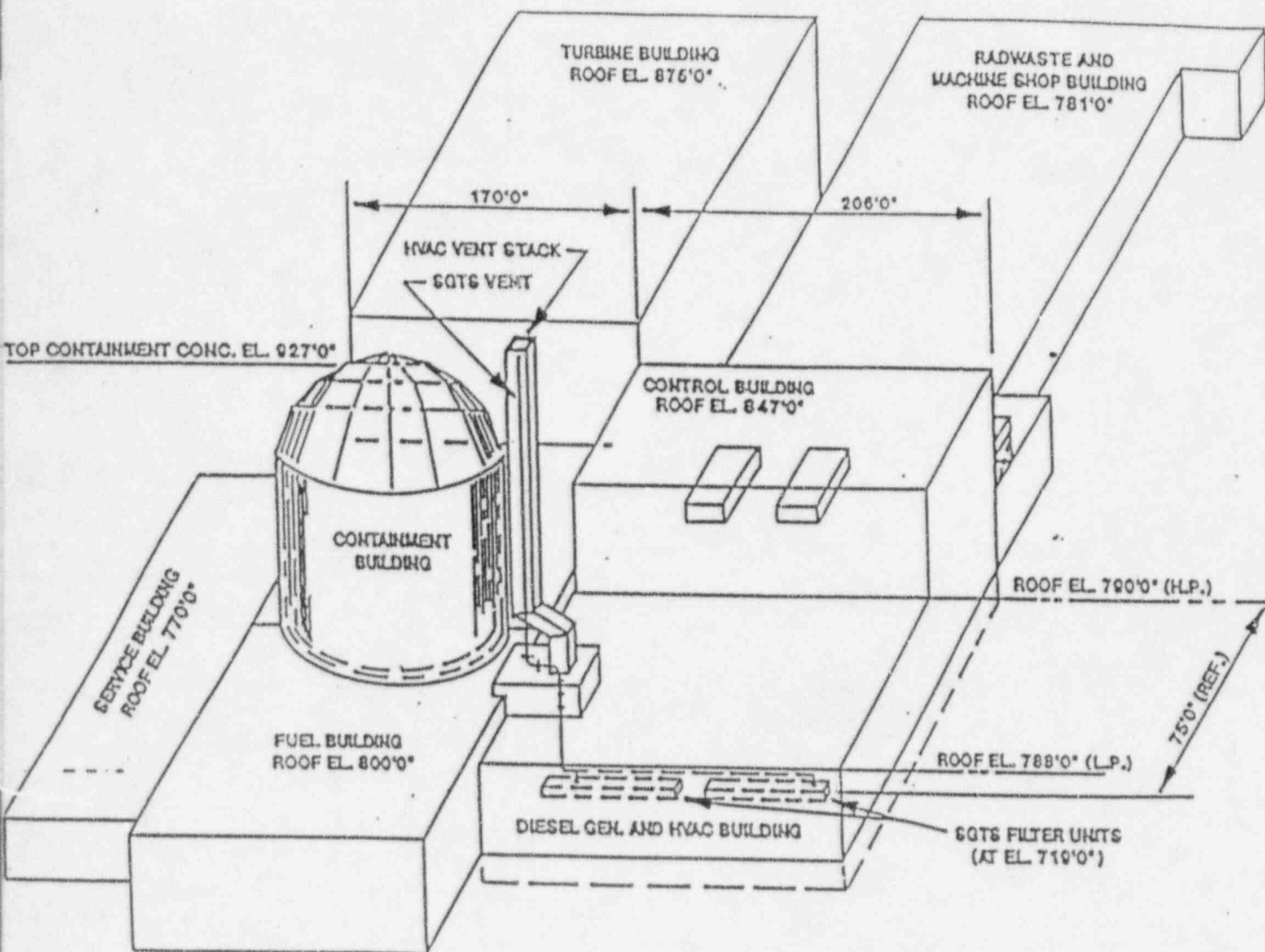
- Less than or equal to 20 mrad per year for beta radiation.

The dose to a member of the general public from iodine-131, tritium and all particulate radionuclides with a half-life greater than eight days in gaseous effluents is limited to:

- Less than or equal to 15 mrem per year to any organ.

# CPS AIRBORNE EFFLUENT RELEASE POINTS

Figure 1

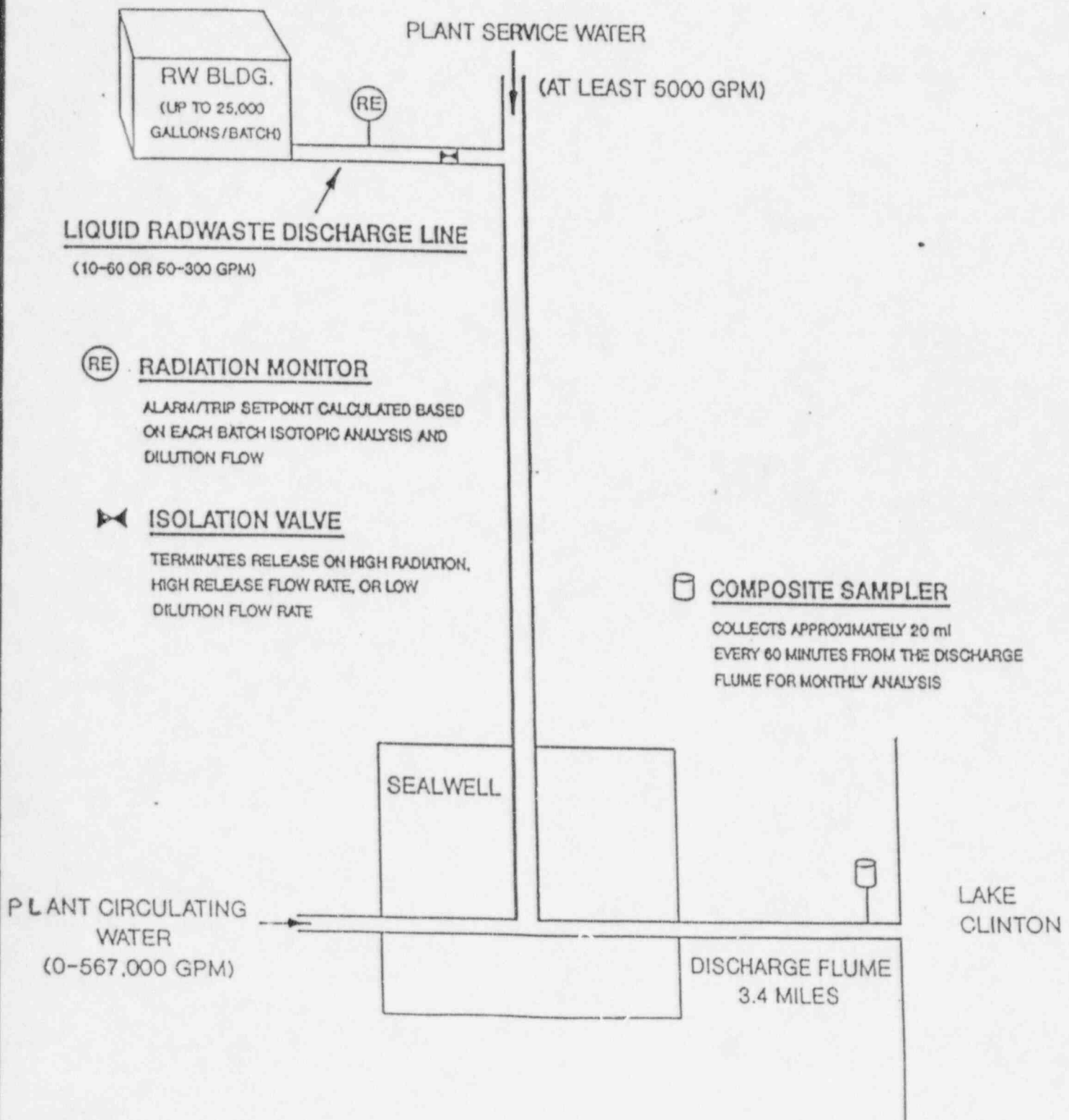


## GASEOUS EFFLUENT RELEASE POINT CHARACTERISTICS

	<u>HVAC EXHAUST STACK</u>	<u>SGTS EXHAUST STACK</u>
RELEASE POINT HEIGHT (m)	61	61
BUILDING HEIGHT(m)	58	58
RELEASE POINT GEOMETRY	DUCT	PIPE
RELEASE POINT AREA (m <sup>2</sup> )	11.15	0.15
RELEASE POINT DIAMETER (m)	3.77'	0.44
ANNUAL AVERAGE FLOW RATE (ft <sup>3</sup> /min)	237,000	4000
VERTICAL EXIT VELOCITY (m/sec)	10.02	12.49

# CPS WATERBORNE EFFLUENTS RELEASE PATHWAY

Figure 2



These ALARA limits are a fraction of the dose limits established by the Environmental Protection Agency (EPA). In its Environmental Dose Standard of 40CFR190, the EPA established dose limits for members of the public in the vicinity of a nuclear power plant. These dose limits are:

- Less than or equal to 25 mrem per year to the total body.
- Less than or equal to 75 mrem per year to the thyroid.

-and-

- Less than or equal to 25 mrem per year to any other organ.

See Section 3 for more information on regulatory limits.

## Processing and Monitoring

Effluents are strictly controlled at CPS to ensure radioactivity released to the environment is minimal and does not exceed release limits. Effluent controls include the operation of radiation monitoring systems in the plant and offsite environmental sampling and analysis programs. In-plant radiation monitoring systems are used to provide a continuous indication of radioactivity and are also used to collect particulate and radioiodine samples. These samples are analyzed in a laboratory to identify the specific concentration of radionuclides being released. Sampling and analysis provide a more sensitive and precise method of determining effluent composition to complement the information provided by real-time monitoring instruments.

Beyond the plant itself, a radiological environmental monitoring program is maintained in accordance with Federal Regulations. The basic purpose of the program is to assess the radiological impact on the environment due to the operation of the Clinton Power Station. Implicit in this purpose is the regulatory requirement to trend and assess radiation exposure rates and radioactivity concentrations that may contribute to human radiation exposure. The program consists of two phases, preoperational and operational. During the preoperational phase of the program, the baseline for the local radiation environment was established. The operational phase of the program includes the objective of making confirmatory measurements to verify that the in-plant controls for the release of radioactive material are functioning as designed. Assessment of the operational impact of CPS on the environment is based on data collected since initial reactor criticality.

## Exposure Pathways

Radiological exposure pathways are the means by which people may become exposed to radioactivity released from nuclear facilities. The major pathways of concern are those which could cause the highest calculated radiation dose. These pathways are determined from the type and amount of radioactivity released, the environmental transport mechanism and use of the environment. The environmental transport mechanism includes the meteorological characteristics of the area which will be defined by wind speed and wind direction at the time of the release. This information is used to evaluate how the radionuclides will be distributed in the area. The most important factor in evaluating the exposure pathway is the use of the environment by the people living around CPS. Factors such as location of homes in the area, use of cattle for milk and meat, and the growing of gardens for vegetable consumption are very important considerations

in evaluating exposure pathways. Figure 3 illustrates the various effluent exposure pathways considered.

The radioactive gaseous effluent exposure pathways include direct radiation, deposition on plants and soil, and inhalation by animals and humans. The radioactive liquid effluent exposure pathways include fish consumption and direct exposure from the lake.

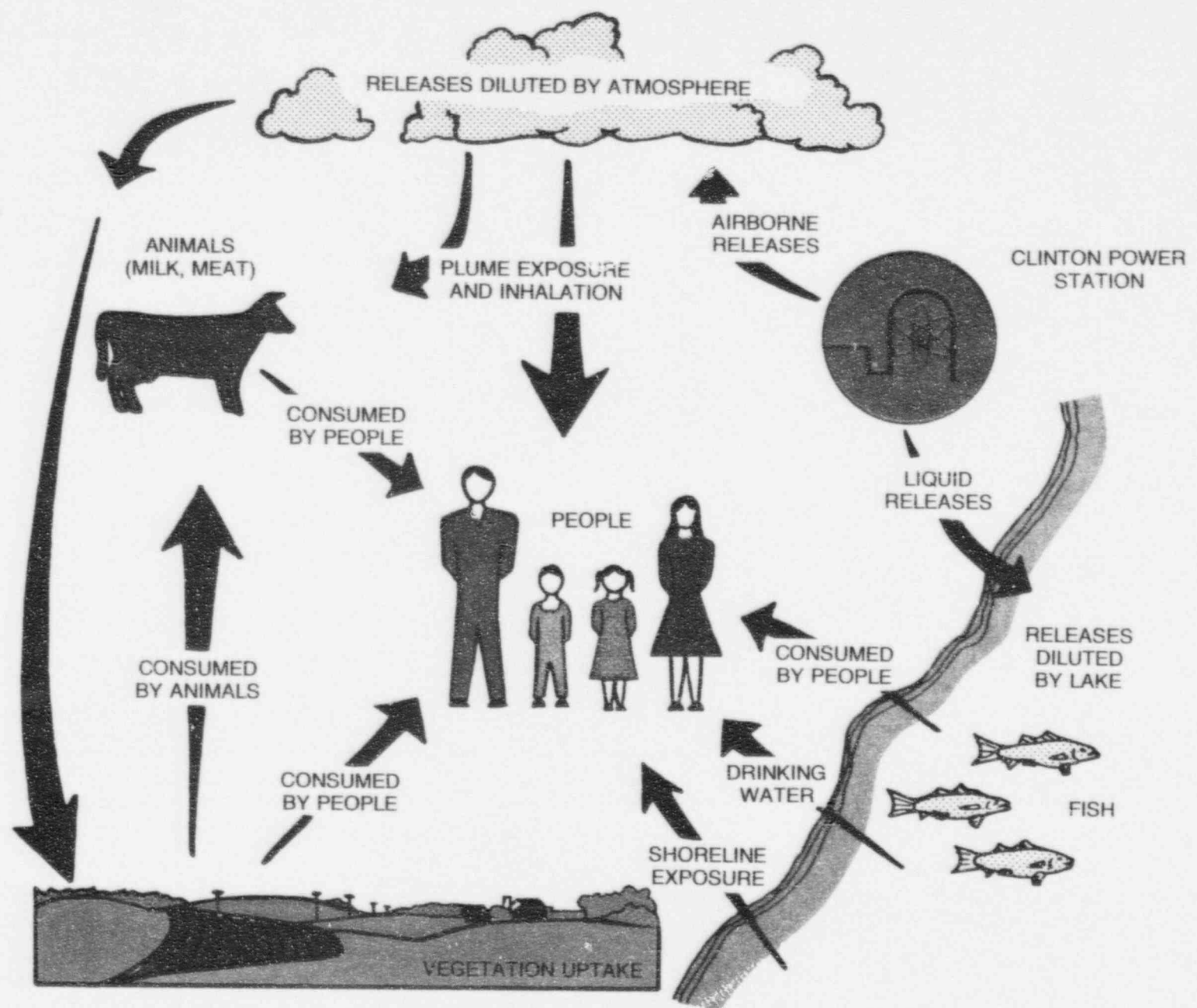
#### Dose Assessment

Whole body radiation involves the exposure of all organs in the human body to ionizing radiation. Most background radiation exposures consist of whole body exposure although specific organs can receive radiation exposure from distinct radionuclides. These radionuclides enter the body through inhalation and ingestion and seek different organs depending on the nuclide. For example, radioactive iodine selectively concentrates in the thyroid, radioactive cesium collects in muscle and liver tissue, and radioactive strontium in mineralized bone.

The total dose to organs from a given radionuclide also depends on the amount of activity in the organ and the amount of time that the radionuclide remains in the body. Some radionuclides remain for very short periods of time due to their rapid radioactive decay and/or elimination rate from the body, while others may remain longer.

The radiation dose to people in the area surrounding CPS is calculated for each release using the concentrations of radioactive material and the weather conditions present at the time of the release. The dose is calculated in all sixteen geographical sectors surrounding CPS and takes into account the location of the nearest residents, vegetable gardens producing broad leaf vegetables, dairy and meat animals in all sectors. The calculated dose also uses the concept of a "maximum exposed individual" and "standard man", and the maximum use factors for the environment, such as how much milk an average person drinks and how much air that person breathes in a year.

See Tables 11-18 of Section 6 for more detailed information on dose to the public.





### Gaseous Effluents

Gaseous effluent radioactivity released from CPS is classified into two categories, 1) noble gases, and 2)  $^{131}\text{I}$ ,  $^{133}\text{I}$ ,  $^3\text{H}$  and all radionuclides in particulate form with half-lives greater than eight days. Noble gases, such as xenon and krypton, are biologically and chemically nonreactive; these radionuclides cause external radiation exposure.  $^{131}\text{I}$ ,  $^{133}\text{I}$ ,  $^3\text{H}$  and radionuclides in particulate form with half-lives greater than eight days are the major contributors to internal dose.

See Tables 1, 2, and 3 of Section 4 for more detailed information on gaseous effluents.

### Liquid Effluents

CPS had no radioactive liquid discharges in 1995.

### Solid Waste Shipments

In order to reduce the radiation exposure to personnel and maintain the ALARA concept, the NRC and the Department of Transportation (DOT) have established limits on the types of radioactive waste and the amount of radioactivity that may be packaged and shipped offsite for burial or disposal. To ensure that CPS is complying with these regulations, the types of waste and the radioactivity present are reported to the NRC.

See Table 7 of Section 4 for more detailed information on solid waste shipments.

SECTION 3  
SUPPLEMENTAL INFORMATION

I. REGULATORY LIMITS

A. Gaseous Effluents

1. In accordance with Title 10 of the Code of Federal Regulations (CFR), Part 20, the maximum permissible concentrations for gaseous effluents shall not exceed the values given in 10CFR20, Appendix B, Table 2, Column 1. To ensure these concentrations are not exceeded, dose rates due to radioactive materials released in gaseous effluents from the site to areas at and beyond the site boundary shall be limited to the following:

a. Noble gases

- Less than or equal to 500 mrem/year to the total body.
- Less than or equal to 3000 mrem/year to the skin.

b.  $^{131}\text{I}$ ,  $^{133}\text{I}$ ,  $^3\text{H}$  and all radionuclides in particulate form with half-lives greater than eight days:

- Less than or equal to 1500 mrem/year to any organ.

2. In accordance with Title 10 of the Code of Federal Regulations, Part 50, Appendix I, air dose due to noble gases released in gaseous effluents to areas at and beyond the site boundary shall be limited to the following:

- a. Less than or equal to 5 mrad for gamma radiation and less than or equal to 10 mrad for beta radiation during any calendar quarter.
- b. Less than or equal to 10 mrad for gamma radiation and less than or equal to 20 mrad for beta radiation during any calendar year.

3. In accordance with 10CFR50, Appendix I, dose to a member of the public (from  $^{131}\text{I}$ ,  $^{133}\text{I}$ ,  $^3\text{H}$  and all radionuclides in particulate form with half-lives greater than eight days) in gaseous effluents released to areas at and beyond the site boundary shall be limited to the following:
  - a. Less than or equal to 7.5 mrem to any organ, during any calendar quarter.
  - b. Less than or equal to 15 mrem to any organ, during any calendar year.

#### B. . Liquid Effluents

1. The concentration of radioactive material released in liquid effluents to unrestricted areas shall be limited to the concentrations specified in Title 10 of the Code of Federal Regulations, Part 20, Appendix B, Table 2, Column 2, for radionuclides other than dissolved or entrained noble gases. For dissolved or entrained noble gases, the concentration shall be limited to 2.0E-04 microcuries per milliliter total activity.
2. The dose or dose commitment to a member of the public from radioactive materials in liquid effluents released to unrestricted areas shall be limited to:
  - a. Less than or equal to 1.5 mrem to the total body and less than or equal to 5 mrem to any organ during any calendar quarter.
  - b. Less than or equal to 3 mrem to the total body and less than or equal to 10 mrem to any organ during any calendar year.

## II. AVERAGE ENERGY

The CPS ODCM limits the dose equivalent rates due to the release of fission and activation gases to less than or equal to 500 mrem per year to the total body and less than or equal to 3000 mrem per year to the skin. These limits are based on dose calculations using actual isotopic concentrations in our effluent streams, and are not based upon gross count monitors. Therefore, the average beta and gamma energies (E) for gaseous effluents as described in Regulatory Guide 1.21, "Measuring, Evaluating, and Reporting Radioactivity in Solid Wastes and Releases of Radioactive Materials in Liquid and Gaseous Effluents from Light-Water-Cooled Nuclear Power Plants", are not applicable.

## III. MEASUREMENT AND APPROXIMATIONS OF TOTAL RADIOACTIVITY

### A. Fission and Activation Gases

1. Gas samples are collected weekly and are counted on a high purity germanium detector (HPGe) for principal gamma emitters. The HVAC and SGTS release points are continuously monitored, and the average release flow rates for each release point are used to calculate the total activity released in a given time period.
2. Tritium is collected by passing a known volume of the sample stream through a gas washer containing a known quantity of demineralized water. The collected samples are distilled and analyzed by liquid scintillation. The tritium released was calculated for each release point from the measured tritium concentration, the volume of the sample, the tritium collection efficiency, and the stack exhaust flow rates.

### B. Iodines

Iodine is continuously collected on a charcoal cartridge filter via an isokinetic sampling assembly on each release point. Filters are normally exchanged once per week and analyzed on an HPGe system. The daily average flow rates for each release point are averaged for the duration of the sampling period and these results, along with isotopic concentrations, are used to determine total activity released during the time period in question.

#### C. Particulates

Particulates are continuously collected on a filter paper via an isokinetic sampling assembly on each release point. Filters are normally exchanged once per week and analyzed on an HPGe system. Flow rates and total activity are determined in the same manner as for iodines.

#### D. Liquid Effluents

Each tank of liquid radwaste is sampled and analyzed for principal gamma emitters prior to release. Each sample tank is recirculated for a sufficient amount of time prior to sampling to ensure that a representative sample is obtained. Samples are analyzed on an HPGe system and release permits are generated based on the values obtained from the isotopic analysis and the most recent values for  $^3\text{H}$ , gross alpha,  $^{55}\text{Fe}$ ,  $^{89}\text{Sr}$  and  $^{90}\text{Sr}$ . An aliquot based on release volume is saved and added to composite containers. The concentrations of composited isotopes and the volumes of the releases associated with these composites establish the proportional relationships that are then utilized for calculating the total activity released for these isotopes.

In 1995 there were no liquid batch releases.

#### IV. BATCH RELEASES

A.	Liquid	1995
1.	Number of batch releases:	0
2.	Total time period for batch releases:	N/A
3.	Maximum time period for batch release:	N/A
4.	Average time period for batch release:	N/A
5.	Minimum time period for batch release:	N/A
6.	Average stream flow during periods of release:	N/A
7.	Total waste volume:	N/A
8.	Total dilution volume:	N/A
B.	Gaseous	1995
1.	Number of batch releases:	0
2.	Total time period for batch releases:	N/A
3.	Maximum time period for batch release:	N/A
4.	Average time period for batch release:	N/A
5.	Minimum time period for batch release:	N/A

## V. DESCRIPTION OF ERROR ESTIMATES

### A. Gaseous and Liquid Effluents

Estimates of measurement and analytical error for gaseous and liquid effluents are calculated as follows:

$$E_T = [(E_1)^2 + (E_2)^2 + \dots (E_n)^2]^{1/2}$$

where,  $E_T$  = total percent error

$E_1 \dots E_n$  = percent error due to calibration standards,  
laboratory analysis, instruments, sample flow, etc.

SECTION 4  
EFFLUENT AND WASTE DISPOSAL DATA  
TABLE 1

AIRBORNE EFFLUENTS - SUMMATION OF ALL RELEASES  
Data Period: January 1, 1995 - December 31, 1995  
Continuous Mode

Nuclide Category	Unit	Est. Total <sup>1</sup> Error, %
A. Fission & Activation Gases		
1. Total Release	Ci	1.52E-01      30
2. Average Release Rate for Period	μCi/sec	4.82E-03
3. Percent of Applicable Limit	%	4.26E-07
B. Iodine-131		
1. Total Release	Ci	9.75E-05      31
2. Average Release Rate for Period	μCi/sec	3.09E-06
C. Particulates		
1. Particulates Released released with Half-lives > 8 Days	Ci	4.20E-03      24
2. Average Release Rate for Period	μCi/sec	1.33E-04
3. Gross Alpha Activity Released	Ci	2.19E-04
4. Average Release Rate for Period	μCi/sec	6.94E-06
5. Percent of Applicable Limit for Particulates, and Iodine	%	2.09E-04
D. Tritium		
1. Total Release	Ci	1.54E+01      105
2. Average Release Rate for Period	μCi/sec	4.89E-01
3. Percent of Applicable Limit (DAC)	%	7.15E-04

<sup>1</sup> It should be noted that the lower the actual sample activity is with respect to background activity, the greater the counting error. Large errors are reported for the various components of CPS gaseous effluents because of consistently low sample activity.



TABLE 2

AIRBORNE EFFLUENTS (Curies)<sup>1</sup>  
 Data Period: January 1, 1995 - December 31, 1995  
 Continuous Mode

Nuclide	Value
A. Gases	
<sup>135</sup> Xe	1.52E-01
Total	1.52E-01
B. Iodines	
<sup>131</sup> I	9.75E-05
<sup>133</sup> I	8.24E-04
Total	9.22E-04
C. Particulates w/Half-lives > 8 Days	
<sup>51</sup> Cr	3.48E-03
<sup>54</sup> Mn	2.03E-04
<sup>58</sup> Co	8.44E-05
<sup>59</sup> Fe	5.68E-05
<sup>60</sup> Co	1.20E-04
<sup>89</sup> Sr	5.16E-05
Total	4.00E-03

<sup>1</sup> Absence of a nuclide from the above list does not indicate that it was not present. It simply indicates that its Minimum Detectable Activity (MDA) was below its LLD. See Table 3 for a list of the LLDs of the various nuclides.

TABLE 3

RADIOACTIVE GASEOUS WASTE LLD VALUES

TYPE OF ACTIVITY ANALYSIS	Lower Limit of Detection (LLD) <sup>a</sup> ( $\mu\text{Ci/ml}$ )
Principal Gamma Emitters <sup>b,c</sup>	$1 \times 10^{-4}$
$^3\text{H}^c$	$1 \times 10^{-6}$
$^{131}\text{I}^d$	$1 \times 10^{-12}$
$^{133}\text{I}^d$	$1 \times 10^{-10}$
Principal Gamma Emitters <sup>b,e</sup> ( $^{131}\text{I}$ , others)	$1 \times 10^{-11}$
Gross Alpha <sup>f</sup>	$1 \times 10^{-11}$
$^{89}\text{Sr}$ , $^{90}\text{Sr}^g$	$1 \times 10^{-11}$

Table 3 Notations

<sup>a</sup> The LLD is defined, for purposes of these specifications, as an a priori determination of 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:

$$\text{LLD} = \frac{4.66 \cdot s_b}{E \cdot V \cdot 2.22 \times 10^6 \cdot Y \cdot e^{-\lambda \Delta t}}$$

Table 3 Notations (Cont'd)

Where:

LLD is the "a priori" lower limit of detection as defined above, as microcuries 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 minute,

E is the counting efficiency, as counts per disintegration,

V is the sample size in units of mass or volume,

$2.22 \times 10^6$  is the number of disintegrations per minute per microcurie,

Y is the fractional radiochemical yield, when applicable,

$\lambda$  is the radioactive decay constant for the particular radionuclide ( $\text{sec}^{-1}$ ) and

$\Delta t$  for plant effluents is the elapsed time between the midpoint of sample collection and the time of counting (sec).

Typical values of E, V, Y, and  $\Delta t$  should be used in the calculation.

It should be recognized that the LLD is defined as an a priori (before the fact) limit representing the capability of a measurement system and not as an a posteriori (after the fact) limit for a particular measurement.

<sup>b</sup> The principal gamma emitters for which the LLD specification applies include the following radionuclides: <sup>87</sup>Kr, <sup>88</sup>Kr, <sup>133</sup>Xe, <sup>133m</sup>Xe, <sup>135</sup>Xe, and <sup>138</sup>Xe in noble gas releases and <sup>54</sup>Mn, <sup>59</sup>Fe, <sup>58</sup>Co, <sup>60</sup>Co, <sup>65</sup>Zn, <sup>99</sup>Mo, <sup>131</sup>I, <sup>134</sup>Cs, <sup>137</sup>Cs, <sup>141</sup>Ce and <sup>144</sup>Ce in iodine and particulate releases. This list does not mean that only these nuclides are to be considered. Other gamma peaks that are identifiable, together with those of the above nuclides, shall also be analyzed and reported in the Radioactive Effluent Release Report.

<sup>c</sup> Weekly grab sample and analysis

<sup>d</sup> Continuous charcoal sample analyzed weekly

<sup>e</sup> Continuous particulate sample analyzed weekly

<sup>f</sup> Composite particulate sample analyzed monthly

<sup>g</sup> Composite particulate sample analyzed quarterly

TABLE 4

WATERBORNE EFFLUENTS - SUMMATION OF ALL RELEASES  
 Data Period: January 1, 1995 - December 31, 1995

<u>Nuclide Category</u>	<u>Unit</u>	<u>Value</u>	<u>Est.Total Error, %</u>
A. Fission & Activation Products			
1. Total Release	Ci	0.00E+00	N/A
2. Average Diluted Concentration	μCi/ml	0.00E+00	
3. Percent of Applicable Limit	%	0.00E+00	
B. Tritium			
1. Total Release	Ci	0.00E+00	N/A
2. Average Diluted Concentration	μCi/ml	0.00E+00	
3. Percent of Applicable Limit	%	0.00E+00	
C. Dissolved and Entrained Gases			
1. Total Release <sup>4</sup>	Ci	0.00E+00	N/A
2. Average Diluted Concentration	μCi/ml	0.00E+00	
3. Percent of Applicable Limit	%	0.00E+00	
D. Gross Alpha Radioactivity Released			
	Ci	0.00E+00	N/A
E. Volume of Waste Released			
	gallons	0.00E+00	
	liters	0.00E+00	
F. Volume of Dilution Water Used			
	gallons	0.00E+00	
	liters	0.00E+00	

<sup>4</sup> Notation: An entry of 0.00E+00 does not represent the absence of a radionuclide but indicates that the MDA concentration of the nuclide was below the LLD value listed in Table 6.

TABLE 5

## WATERBORNE EFFLUENTS (Curies)

Data Period: January 1, 1995 - December 31, 1995

Batch Mode

Nuclide Category	Activity
A. Tritium	N/A
B. Fission & Activation Products	
<sup>51</sup> Cr	N/A
<sup>54</sup> Mn	N/A
<sup>58</sup> Co	N/A
<sup>60</sup> Co	N/A
<sup>55</sup> Fe	N/A
<sup>59</sup> Fe	N/A
<sup>65</sup> Zn	N/A
<sup>89</sup> Sr	N/A
<sup>90</sup> Sr	N/A
<sup>99</sup> Mo	N/A
<sup>124</sup> Sb	N/A
<sup>131</sup> I	N/A
<sup>133</sup> I	N/A
<sup>134</sup> Cs	N/A
<sup>137</sup> Cs	N/A
<sup>140</sup> Ba	N/A
<sup>140</sup> La	N/A
<sup>141</sup> Ce	N/A
<sup>110m</sup> Ag	N/A
Total	N/A
C. Dissolved and Entrained Gases	
<sup>85</sup> Kr	N/A
<sup>85m</sup> Kr	N/A
<sup>87</sup> Kr	N/A
<sup>88</sup> Kr	N/A
<sup>133</sup> Xe	N/A
<sup>133m</sup> Xe	N/A
<sup>135</sup> Xe	N/A
<sup>135m</sup> Xe	N/A
<sup>138</sup> Xe	N/A
Total	N/A

TABLE 6

## RADIOACTIVE LIQUID WASTE LLD VALUES

TYPE OF ACTIVITY ANALYSIS	LOWER LIMIT OF DETECTION (LLD) <sup>a</sup> ( $\mu\text{Ci/ml}$ )
Principal Gamma Emitters <sup>b</sup>	$5 \times 10^{-7}$
$^{131}\text{I}$	$1 \times 10^{-6}$
Dissolved and Entrained Gases (Gamma Emitters)	$1 \times 10^{-5}$
$^3\text{H}$	$1 \times 10^{-5}$
Gross Alpha	$1 \times 10^{-7}$
$^{89}\text{Sr}$ , $^{90}\text{Sr}$	$5 \times 10^{-8}$
$^{55}\text{Fe}$	$1 \times 10^{-6}$

Table 6 Notations

<sup>a</sup>The LLD is defined, for purposes of these requirements, as the smallest concentration of radioactive material in a sample that will yield a net count, above system background, that will be detected with 95% probability with only 5% probability of falsely concluding that a blank observation represents a "real" signal.

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

$$\text{LLD} = \frac{4.66 \cdot s_b}{E \cdot V \cdot 2.22 \times 10^6 \cdot Y \cdot e^{-\lambda \Delta t}}$$

Table 6 Notations (Cont'd)

Where:

LLD is the "a priori" lower limit of detection as defined above, as microcuries 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 minute,

E is the counting efficiency, as counts per disintegration,

V is the sample size in units of mass or volume,

$2.22 \times 10^6$  is the number of disintegrations per minute per microcurie,

Y is the fractional radiochemical yield, when applicable,

$\lambda$  is the radioactive decay constant for the particular radionuclide ( $\text{sec}^{-1}$ ) and

$\Delta_t$  for plant effluents is the elapsed time between the midpoint of sample collection and the time of counting (sec).

Typical values of E, V, Y, and  $\lambda t$  should be used in the calculation.

It should be recognized that the LLD is defined as an a priori (before the fact) limit representing the capability of a measurement system and not as an a posteriori (after the fact, MDA) limit for a particular measurement.

<sup>b</sup>The principal gamma emitters for which the LLD requirement applies include the following radionuclides: <sup>54</sup>Mn, <sup>59</sup>Fe, <sup>58</sup>Co, <sup>60</sup>Co, <sup>65</sup>Zn, <sup>99</sup>Mo, <sup>134</sup>Cs, <sup>137</sup>Cs, and <sup>141</sup>Ce. <sup>144</sup>Ce shall also be measured, but with an LLD of  $5 \times 10^{-6}$ . This list does not mean that only these nuclides are to be detected and reported. Other gamma peaks that are measurable, together with those of the above nuclides, shall also be analyzed and reported in the Radioactive Effluent Release Report.



## SOLID WASTE AND IRRADIATED FUEL SHIPMENTS

During this reporting period there were seventeen (17) radioactive waste shipments and no irradiated fuel shipments from CPS as reported in Table 7. In addition, the CPS ODCM requires reporting of the following information for solid waste shipped offsite during the report period:

### Class A:

1. Container volume: 208 ft<sup>3</sup>, 558 ft<sup>3</sup>, 1173 ft<sup>3</sup> \*.
2. Total curie quantity: 147 curies as determined by dose-to-curie and sample concentration methodology estimates.
3. Principal radionuclides: See Table 7, A.2 for listing of measured radionuclides.
4. Source of waste and processing employed: Resins, filter sludges and evaporator bottoms dewatered or solidified in cement, and non-compacted dry active waste.
5. Type of container: Type A and Strong Tight Container.
6. Solidification agent or absorbent: None.

\* These containers were shipped to a waste processor, not a burial site.

TABLE 7  
 SOLID WASTE AND IRRADIATED FUEL SHIPMENTS  
 January 1, 1995 - December 31, 1995

A. SOLID WASTE SHIPPED OFFSITE FOR BURIAL OR DISPOSAL (not irradiated fuel)

1.	TYPE OF WASTE	UNIT	VALUE	EST. TOTAL ERROR, %
a.	Resins, filter sludges, evaporator bottoms, etc.	m <sup>3</sup> Ci	4.64E+01 1.42E+02	25
b.	Dry compactible waste, contaminated equipment, etc.	m <sup>3</sup> Ci	5.09E+02 <sup>1</sup> 4.93E+00	25
c.	Irradiated components, control rods, etc.	m <sup>3</sup> Ci	0.00E+00 0.00E+00	0
d.	Other	m Ci	0.00E+00 0.00E+00	0

2. ESTIMATE OF MAJOR NUCLIDE COMPOSITION<sup>2</sup>

	NUCLIDE NAME	PERCENT ABUNDANCE	CURIES
a.	Co-60	35.22%	5.00E+02
	Mn-54	30.98%	4.40E+02
	Cr-51	17.63%	2.50E+02
	Co-58	5.74%	8.15E+00
	Fe-55	1.95%	2.77E+00
	OTHER	8.48%	1.20E+01
b.	Fe-55	87.59%	4.32E+00
	Co-60	7.30%	3.60E-01
	Mn-54	2.64%	1.30E-01
	Cr-51	1.62%	7.99E-02
	Co-58	0.27%	1.33E-02
	OTHER	0.59%	2.91E-02
c.	NONE	N/A	N/A
d.	NONE	N/A	N/A

<sup>1</sup> Actual volume reduced by waste processor.

<sup>2</sup> The sum of the percent abundance may not equal exactly 100% due to the rounding off of the figures.

TABLE 7 (Cont'd)

SOLID WASTE AND IRRADIATED FUEL SHIPMENTS  
January 1, 1995 - December 31, 1995

3. SOLID WASTE DISPOSITION

NUMBER OF SHIPMENTS	MODE OF TRANSPORTATION	DESTINATION
8	Truck	Barnwell, SC
9	Truck	Oak Ridge, TN

B. IRRADIATED FUEL SHIPMENTS (Disposition)

NUMBER OF SHIPMENTS	MODE OF TRANSPORTATION	DESTINATION
NONE	N/A	N/A

SECTION 5  
METEOROLOGICAL DATA AND DISPERSION ESTIMATES

The meteorological monitoring program began at the Clinton Power Station site on April 13, 1972. The meteorological system consists of a tower 199 feet high with two levels of instrumentation, at the 10-meter and 60-meter levels. Wind directions and speeds at the 10-meter and 60-meter levels are measured by a combined cup and vane sensor. The temperature at these levels is sensed by an aspirated dual temperature sensor. One-half of the dual sensor at each elevation is used for ambient temperature while the other half is used to provide a differential temperature between the 10-meter and 60-meter levels. Dew-point is measured at the 10-meter level with an aspirated dew-point sensor.

Meteorological monitoring instruments have been placed on the Clinton Power Station microwave tower at the 10-meter level to act as a backup to the existing meteorological tower.

Clinton Power Station meteorological data is transmitted to the Main Control Room via a dedicated telephone line. There the signals are received and converted to a 4 to 20 milliamp signal and fed individually to a microprocessor and chart recorders. The microprocessor is part of the Clinton Power Station Radiation Monitoring System. Meteorological data is available via the microprocessors in the Main Control Room, Technical Support Center and Radiation Protection office.

Dispersion modeling for effluents for normal operation of Clinton Power Station is a straight-line, sector-averaged Gaussian plume model designed to estimate average relative concentration at various receptor points. The model was developed in accordance with routine release analysis procedures specified in Regulatory Guide 1.111. For joint frequency input data, periods of calm are distributed in accordance with a directional distribution. For hourly input data, periods of calm are assigned the previous hour's wind direction. Periods of calm are assigned a wind speed value of half the specified instrument threshold value. See Table 10 for more detailed information on meteorology and dispersion data.

TABLE 8

METEOROLOGICAL DATA AVAILABILITY

Data Period: January 1, 1995 - December 31, 1995

<u>Parameter</u>	<u>Percent of Valid Hours During Period</u>
1. Wind Speed	
a. 10-meter Sensor	91%
b. 60-meter Sensor	90%
2. Wind Direction	
a. 10-meter Sensor	91%
b. 60-meter Sensor	90%
3. Temperature	
a. 10-meter	91%
b. Temperature Difference (10m-60m)	91%
4. Percent of hours for which valid 10-meter Wind Speed, Wind Direction, & Delta Temperature were available	91%
5. Percent of hours for which valid 60-meter Wind Speed, Wind Direction, & Delta Temperature were available	90%

TABLE 2

## CLASSIFICATION OF ATMOSPHERIC STABILITY

Stability Classification	Pasquill Categories	Defining Conditions
Extremely unstable	A	$-0.900 < \Delta T \leq -0.019$
Moderately unstable	B	$-0.019 < \Delta T \leq -0.017$
Slightly unstable	C	$-0.017 < \Delta T \leq -0.015$
Neutral	D	$-0.015 < \Delta T \leq -0.005$
Slightly stable	E	$-0.005 < \Delta T \leq 0.015$
Moderately stable	F	$0.015 < \Delta T \leq 0.040$
Extremely stable	G	$0.040 < \Delta T \leq 0.900$
Invalid		$\Delta T \leq -0.900$ or $\Delta T > 0.900$

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$\Delta T$  = temperature difference in Celsius degrees per meter

TABLE 10, Page 1 of 8

JOINT WIND FREQUENCY DISTRIBUTION BY STABILITY CLASS  
For the Period January 1, 1995 - December 31, 1995  
STABILITY CLASS A

60 Meter (All tabled values are Hours)

SECTOR	1-3 mph	4-7 mph	8-12 mph	13-18 mph	19-24 mph	>24 mph	TOTAL
N	0.00E+00	9.00E+00	2.10E+01	1.60E+01	0.00E+00	0.00E+00	4.60E+01
NNE	2.00E+00	1.30E+01	9.00E+00	3.00E+00	1.00E+00	0.00E+00	2.80E+01
NE	0.00E+00	8.00E+00	9.00E+00	9.00E+00	0.00E+00	0.00E+00	2.60E+01
ENE	1.00E+00	6.00E+00	1.60E+01	8.00E+00	1.00E+00	0.00E+00	3.20E+01
E	2.00E+00	1.20E+01	2.10E+01	5.00E+00	0.00E+00	0.00E+00	4.00E+01
ESE	6.00E+00	1.40E+01	1.20E+01	0.00E+00	0.00E+00	0.00E+00	3.20E+01
SE	6.00E+00	1.80E+01	1.00E+01	6.00E+00	0.00E+00	0.00E+00	4.00E+01
SSE	1.00E+01	2.20E+01	1.30E+01	1.10E+01	4.00E+00	4.00E+00	6.40E+01
S	1.00E+00	2.30E+01	1.90E+01	2.20E+01	2.00E+00	3.00E+00	7.00E+01
SSW	5.00E+00	1.70E+01	2.00E+01	1.70E+01	4.00E+00	0.00E+00	6.30E+01
SW	2.00E+00	2.30E+01	2.00E+01	1.80E+01	0.00E+01	2.00E+00	6.50E+01
WSW	1.00E+00	1.10E+01	2.60E+01	2.20E+01	1.40E+01	9.00E+00	8.30E+01
W	1.00E+00	7.00E+00	2.00E+01	2.60E+01	1.50E+01	1.10E+01	8.00E+01
WNW	3.00E+00	7.00E+00	3.00E+01	4.20E+01	1.30E+01	1.50E+01	1.10E+02
NW	3.00E+00	5.00E+00	2.20E+01	1.60E+01	7.00E+00	4.00E+00	5.70E+01
NNW	0.00E+01	2.00E+00	1.40E+01	2.40E+01	0.00E+00	0.00E+00	4.00E+01
Total	4.30E+01	1.97E+02	2.82E+02	2.45E+02	6.10E+01	4.80E+01	8.76E+02

Periods of Calm (Hours): 4.00E+00

Hours of Invalid Data: 2.30E+01

10 Meter (All tabled values are Hours)

SECTOR	1-3 mph	4-7 mph	8-12 mph	13-18 mph	19-24 mph	>24 mph	TOTAL
N	0.00E+00	1.00E+01	3.80E+01	7.00E+00	0.00E+00	0.00E+00	5.50E+01
NNE	2.00E+00	1.20E+01	1.70E+01	1.00E+00	0.00E+00	0.00E+00	3.20E+01
NE	3.00E+00	1.40E+01	9.00E+00	0.00E+00	0.00E+00	0.00E+00	2.60E+01
ENE	0.00E+00	1.00E+01	1.50E+01	0.00E+00	0.00E+00	0.00E+00	2.50E+01
E	2.00E+00	1.80E+01	1.20E+01	0.00E+00	0.00E+00	0.00E+00	3.20E+01
ESE	2.00E+00	1.60E+01	1.20E+01	0.00E+00	0.00E+00	0.00E+00	3.00E+01
SE	3.00E+00	3.00E+01	1.90E+01	0.00E+00	0.00E+00	0.00E+00	5.20E+01
SSE	8.00E+00	1.90E+01	1.50E+01	3.00E+00	0.00E+00	0.00E+00	4.50E+01
S	7.00E+00	3.30E+01	3.20E+01	5.00E+00	1.00E+00	0.00E+00	7.80E+01
SSW	8.00E+00	2.30E+01	1.90E+01	1.70E+01	0.00E+00	1.00E+00	6.80E+01
SW	1.00E+00	2.70E+01	1.70E+01	1.00E+01	0.00E+00	1.00E+00	5.60E+01
WSW	0.00E+00	1.90E+01	2.80E+01	1.10E+01	5.00E+00	0.00E+00	6.30E+01
W	1.00E+00	1.50E+01	3.10E+01	3.00E+01	1.10E+01	0.00E+00	8.80E+01
WNW	0.00E+00	8.00E+00	5.40E+01	4.80E+01	1.60E+01	4.00E+00	1.30E+02
NW	2.00E+00	7.00E+00	3.90E+01	2.10E+01	6.00E+00	0.00E+00	7.50E+01
NNW	1.00E+00	2.00E+00	2.40E+01	2.00E+00	0.00E+00	0.00E+00	2.90E+01
Total	4.00E+01	2.63E+02	3.81E+02	1.55E+02	3.90E+01	6.00E+00	8.88E+02

Periods of Calm (Hours): 1.00E+00

Hours of Invalid Data: 1.80E+01

## JOINT WIND FREQUENCY DISTRIBUTION BY STABILITY CLASS

Data Period: January 1, 1995 - December 31, 1995

## STABILITY CLASS B

60 METER (All tabled values are Hours)

SECTOR	1-3 mph	4-7 mph	8-12 mph	13-18 mph	19-24 mph	>24 mph	TOTAL
N	1.00E+00	5.00E+00	1.40E+01	2.30E+01	0.00E+00	0.00E+00	4.30E+01
NNE	1.00E+00	9.00E+00	7.00E+00	6.00E+00	0.00E+00	0.00E+00	2.30E+01
NE	2.00E+00	4.00E+00	1.00E+01	6.00E+00	1.00E+00	5.00E+00	2.80E+01
ENE	0.00E+00	6.00E+00	4.00E+00	1.00E+01	1.00E+00	1.00E+00	2.20E+01
E	5.00E+00	9.00E+00	7.00E+00	0.00E+00	1.00E+00	1.00E+00	2.30E+01
ESE	4.00E+00	5.00E+00	2.00E+00	1.00E+00	0.00E+00	0.00E+00	1.20E+01
SE	5.00E+00	4.00E+00	3.00E+00	3.00E+00	1.00E+00	0.00E+00	1.60E+01
SSE	5.00E+00	1.40E+01	6.00E+00	1.00E+01	4.00E+00	5.00E+00	4.40E+01
S	6.00E+00	1.20E+01	9.00E+00	1.60E+01	8.00E+00	1.10E+01	6.20E+01
SSW	2.00E+00	1.00E+01	2.50E+01	1.00E+01	1.00E+00	1.00E+00	4.90E+01
SW	1.00E+00	1.20E+01	3.00E+01	7.00E+00	1.00E+00	3.00E+00	5.40E+01
WSW	3.00E+00	1.20E+01	1.30E+01	1.50E+01	1.80E+01	5.00E+00	6.60E+01
W	0.00E+00	3.00E+00	1.90E+01	1.30E+01	2.30E+01	2.00E+00	6.00E+01
WNW	4.00E+00	5.00E+00	1.70E+01	1.70E+01	1.20E+01	5.00E+00	6.00E+01
NW	3.00E+00	9.00E+00	1.90E+01	1.70E+01	1.30E+01	1.00E+00	6.20E+01
NNW	4.00E+00	6.00E+00	1.30E+01	3.00E+00	1.00E+00	0.00E+00	2.70E+01
Total	4.60E+01	1.25E+02	1.98E+02	1.57E+02	8.50E+01	4.00E+01	6.51E+02

Periods of Calm (Hours): 2.00E+00

Hours of Invalid Data: 1.10E+01

10 METER (All tabled values are Hours)

SECTOR	1-3 mph	4-7 mph	8-12 mph	13-18 mph	19-24 mph	>24 mph	TOTAL
N	0.00E+00	8.00E+00	3.10E+01	4.00E+00	0.00E+00	0.00E+00	4.30E+01
NNE	1.00E+00	5.00E+00	1.20E+01	5.00E+00	0.00E+00	0.00E+00	2.30E+01
NE	2.00E+00	1.40E+01	6.00E+00	2.00E+00	3.00E+00	0.00E+00	2.70E+01
ENE	1.00E+00	4.00E+00	1.50E+01	0.00E+00	0.00E+00	0.00E+00	2.00E+01
E	6.00E+00	1.40E+01	5.00E+00	2.00E+00	0.00E+00	0.00E+00	2.70E+01
ESE	3.00E+00	9.00E+00	2.00E+00	1.00E+00	0.00E+00	0.00E+00	1.50E+01
SE	2.00E+00	7.00E+00	4.00E+00	1.00E+00	0.00E+00	0.00E+00	1.40E+01
SSE	6.00E+00	1.00E+01	6.00E+00	3.00E+00	0.00E+00	0.00E+00	2.50E+01
S	6.00E+00	2.10E+01	1.90E+01	1.60E+01	2.00E+00	0.00E+00	6.40E+01
SSW	4.00E+00	1.40E+01	2.50E+01	9.00E+00	0.00E+00	4.00E+00	5.60E+01
SW	3.00E+00	1.70E+01	2.80E+01	1.00E+00	2.00E+00	0.00E+00	5.10E+01
WSW	1.00E+00	1.70E+01	2.80E+01	1.00E+01	3.00E+00	0.00E+00	5.90E+01
W	2.00E+00	1.20E+01	1.70E+01	2.70E+01	5.00E+00	0.00E+00	6.30E+01
WNW	2.00E+00	1.20E+01	3.00E+01	3.60E+01	3.00E+00	2.00E+00	8.50E+01
NW	4.00E+00	1.10E+01	2.50E+01	2.00E+01	0.00E+00	0.00E+00	6.00E+01
NNW	5.00E+00	5.00E+00	1.30E+01	7.00E+00	0.00E+00	0.00E+00	3.00E+01
Total	4.80E+01	1.80E+02	2.66E+02	1.44E+02	1.80E+01	6.00E+00	6.62E+02

Periods of Calm (Hours): 1.00E+00

Hours of Invalid Data: 1.00E+00



TABLE 10, Page 3 of 8

## JOINT WIND FREQUENCY DISTRIBUTION BY STABILITY CLASS

Data Period: January 1, 1995 - December 31, 1995

## STABILITY CLASS C

60 METER (All tabled values are Hours)

SECTOR	1-3 mph	4-7 mph	8-12 mph	13-18 mph	19-24 mph	>24 mph	TOTAL
N	2.00E+00	7.00E+00	2.20E+01	2.80E+01	0.00E+00	0.00E+00	5.90E+01
NNE	2.00E+00	1.80E+01	1.70E+01	9.00E+00	1.00E+00	0.00E+00	4.70E+01
NE	3.00E+00	6.00E+00	7.00E+00	9.00E+00	1.00E+00	2.00E+00	2.80E+01
ENE	1.00E+00	5.00E+00	6.00E+00	8.00E+00	0.00E+00	6.00E+00	2.60E+01
E	4.00E+00	9.00E+00	6.00E+00	1.00E+00	0.00E+00	0.00E+00	2.00E+01
ESE	9.00E+00	9.00E+00	9.00E+00	6.00E+00	0.00E+00	0.00E+00	3.30E+01
SE	4.00E+00	8.00E+00	6.00E+00	6.00E+00	3.00E+00	0.00E+00	2.70E+01
SSE	4.00E+00	6.00E+00	1.30E+01	2.00E+01	3.00E+00	1.00E+00	4.70E+01
S	5.00E+00	9.00E+00	9.00E+00	1.30E+01	1.00E+01	8.00E+00	5.40E+01
SSW	4.00E+00	1.20E+01	1.50E+01	1.00E+01	2.00E+00	3.00E+00	4.60E+01
SW	2.00E+00	1.20E+01	2.00E+01	8.00E+00	2.00E+00	4.00E+00	4.80E+01
WSW	7.00E+00	4.00E+00	1.90E+01	1.10E+01	5.00E+00	5.00E+00	5.10E+01
W	1.00E+00	7.00E+00	2.00E+01	1.90E+01	7.00E+00	1.00E+00	5.50E+01
WNW	2.00E+00	6.00E+00	2.00E+01	2.00E+01	5.00E+00	9.00E+00	6.20E+01
NW	4.00E+00	7.00E+00	2.60E+01	2.40E+01	4.00E+00	2.00E+00	6.70E+01
NNW	3.00E+00	1.50E+01	1.70E+01	2.10E+01	6.00E+00	1.00E+00	6.30E+01
Total	5.70E+01	1.40E+02	2.32E+02	2.13E+02	4.90E+01	4.20E+01	7.33E+02

Periods of Calm (Hours): 4.00E+00

Hours of Invalid Data: 2.50E+01

10 METER (All tabled values are Hours)

SECTOR	1-3 mph	4-7 mph	8-12 mph	13-18 mph	19-24 mph	>24 mph	TOTAL
N	3.00E+00	1.50E+01	4.20E+01	3.00E+00	0.00E+00	0.00E+00	6.30E+01
NNE	3.00E+00	1.00E+01	2.10E+01	2.00E+00	0.00E+00	0.00E+00	3.60E+01
NE	4.00E+00	1.30E+01	2.30E+01	1.00E+00	0.00E+00	0.00E+00	4.10E+01
ENE	1.00E+00	9.00E+00	8.00E+00	5.00E+00	4.00E+00	0.00E+00	2.70E+01
E	3.00E+00	1.40E+01	5.00E+00	0.00E+00	0.00E+00	0.00E+00	2.20E+01
ESE	9.00E+00	7.00E+00	6.00E+00	0.00E+00	0.00E+00	0.00E+00	2.20E+01
SE	7.00E+00	1.50E+01	1.60E+01	1.00E+00	0.00E+00	0.00E+00	3.90E+01
SSE	3.00E+00	1.30E+01	1.50E+01	2.00E+00	0.00E+00	0.00E+00	3.30E+01
S	8.00E+00	1.50E+01	2.30E+01	1.40E+01	4.00E+00	0.00E+00	6.40E+01
SSW	3.00E+00	1.70E+01	1.40E+01	8.00E+00	0.00E+00	0.00E+00	4.20E+01
SW	6.00E+00	2.00E+01	1.50E+01	3.00E+00	2.00E+00	1.00E+00	4.70E+01
WSW	4.00E+00	1.60E+01	1.50E+01	6.00E+00	4.00E+00	2.00E+00	4.70E+01
W	3.00E+00	9.00E+00	2.80E+01	1.50E+01	3.00E+00	0.00E+00	5.80E+01
WNW	3.00E+00	7.00E+00	3.80E+01	1.70E+01	6.00E+00	3.00E+00	7.40E+01
NW	2.00E+00	2.10E+01	2.80E+01	1.70E+01	3.00E+00	0.00E+00	7.10E+01
NNW	2.00E+00	2.20E+01	2.70E+01	1.30E+01	0.00E+00	0.00E+00	6.40E+01
Total	6.40E+01	2.23E+02	3.24E+02	1.07E+02	2.60E+01	6.00E+00	7.50E+02

Periods of Calm (Hours): 7.00E+00

Hours of Invalid Data: 5.00E+00

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## JOINT WIND FREQUENCY DISTRIBUTION BY STABILITY CLASS

Data Period: January 1, 1995 - December 31, 1995

## STABILITY CLASS D

60 METER (All tabled values are Hours)

SECTOR	1-3 mph	4-7 mph	8-12 mph	13-18 mph	19-24 mph	>24 mph	TOTAL
N	8.00E+00	4.20E+01	7.00E+01	4.90E+01	7.00E+00	1.00E+00	1.77E+02
NNE	1.30E+01	3.40E+01	5.40E+01	5.30E+01	2.00E+01	6.00E+00	1.80E+02
NE	6.00E+00	1.50E+01	5.40E+01	7.10E+01	1.10E+01	3.00E+00	1.60E+02
ENE	6.00E+00	2.20E+01	2.10E+01	4.90E+01	1.60E+01	1.00E+00	1.15E+02
E	1.40E+01	2.10E+01	2.70E+01	3.50E+01	9.00E+00	0.00E+00	1.06E+02
ESE	1.40E+01	3.90E+01	2.70E+01	1.10E+01	3.00E+00	0.00E+00	9.40E+01
SE	6.00E+00	1.50E+01	2.50E+01	2.60E+01	4.00E+00	1.40E+01	9.00E+01
SSE	1.10E+01	3.20E+01	3.60E+01	7.10E+01	5.00E+01	1.60E+01	2.16E+02
S	9.00E+00	2.10E+01	5.90E+01	7.20E+01	6.10E+01	3.20E+01	2.54E+02
SSW	9.00E+00	2.40E+01	6.00E+01	4.00E+01	2.30E+01	1.00E+01	1.66E+02
SW	6.00E+00	2.90E+01	6.80E+01	4.50E+01	1.90E+01	1.10E+01	1.78E+02
WSW	1.20E+01	2.20E+01	6.00E+01	5.90E+01	4.10E+01	2.30E+01	2.17E+02
W	6.00E+00	2.00E+01	7.10E+01	7.70E+01	4.50E+01	1.10E+01	2.30E+02
WNW	1.00E+01	1.70E+01	5.60E+01	5.90E+01	3.40E+01	1.80E+01	1.94E+02
NW	1.10E+01	2.30E+01	6.50E+01	4.80E+01	2.70E+01	1.60E+01	1.90E+02
NNW	1.00E+00	3.60E+01	5.10E+01	4.90E+01	7.00E+00	5.00E+00	1.49E+02
Total	1.42E+02	4.12E+02	8.04E+02	8.14E+02	3.77E+02	1.67E+02	2.72E+03

Periods of Calm (Hours): 4.00E+00

Hours of Invalid Data: 7.30E+01

10 METER (All tabled values are Hours)

SECTOR	1-3 mph	4-7 mph	8-12 mph	13-18	19-24 mph	>24 mph	TOTAL
N	6.00E+00	4.90E+01	7.60E+01	1.50E+01	3.00E+00	0.00E+00	1.49E+02
NNE	1.50E+01	6.30E+01	5.10E+01	3.70E+01	1.00E+00	0.00E+00	1.67E+02
NE	1.50E+01	6.10E+01	9.40E+01	1.60E+01	6.00E+00	1.00E+00	1.93E+02
ENE	9.00E+00	3.70E+01	6.20E+01	1.10E+01	0.00E+00	0.00E+00	1.19E+02
E	1.30E+01	4.00E+01	3.70E+01	0.00E+00	0.00E+00	0.00E+00	9.00E+01
ESE	1.60E+01	6.80E+01	2.30E+01	0.00E+00	0.00E+00	0.00E+00	1.07E+02
SE	1.20E+01	3.00E+01	3.20E+01	1.50E+01	0.00E+00	0.00E+00	8.90E+01
SSE	1.70E+01	5.40E+01	7.10E+01	2.30E+01	0.00E+00	0.00E+00	1.65E+02
S	1.30E+01	5.40E+01	1.04E+02	5.40E+01	1.20E+01	0.00E+00	2.37E+02
SSW	9.00E+00	5.90E+01	9.30E+01	5.20E+01	1.00E+01	5.00E+00	2.28E+02
SW	1.70E+01	6.30E+01	5.00E+01	1.50E+01	3.00E+00	1.00E+00	1.49E+02
WSW	1.50E+01	6.90E+01	7.00E+01	5.00E+01	1.40E+01	6.00E+00	2.24E+02
W	4.00E+00	4.90E+01	1.06E+02	8.10E+01	1.10E+01	1.00E+00	2.52E+02
WNW	1.70E+01	4.90E+01	1.05E+02	5.90E+01	1.40E+01	2.00E+00	2.46E+02
NW	1.20E+01	4.80E+01	8.80E+01	4.40E+01	1.10E+01	2.00E+00	2.05E+02
NNW	1.00E+00	5.10E+01	7.20E+01	1.10E+01	4.00E+00	1.00E+00	1.40E+02
Total	1.91E+02	8.44E+02	1.13E+03	4.83E+02	8.90E+01	1.90E+01	2.76E+03

Periods of Calm (Hours): 4.00E+00

Hours of Invalid Data: 2.90E+01

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## JOINT WIND FREQUENCY DISTRIBUTION BY STABILITY CLASS

Data Period: January 1, 1995 - December 31, 1995

## STABILITY CLASS E

60 METER (All tabled values are Hours)

SECTOR	1-3 mph	4-7 mph	8-12 mph	13-18 mph	19-24 mph	>24 mph	TOTAL
N	2.00E+00	1.00E+01	4.20E+01	2.60E+01	2.00E+00	0.00E+00	8.20E+01
NNE	2.00E+00	1.30E+01	2.80E+01	1.30E+01	1.00E+00	0.00E+00	5.70E+01
NE	3.00E+00	1.70E+01	2.60E+01	1.00E+01	1.00E+00	0.00E+00	5.70E+01
ENE	3.00E+00	1.10E+01	2.20E+01	2.30E+01	3.00E+00	0.00E+00	6.20E+01
E	3.00E+00	2.70E+01	2.60E+01	2.10E+01	4.00E+00	0.00E+00	8.10E+01
ESE	1.00E+01	4.40E+01	2.00E+01	5.00E+00	1.00E+00	0.00E+00	8.00E+01
SE	6.00E+00	3.00E+01	5.40E+01	2.90E+01	8.00E+00	2.00E+00	1.29E+02
SSE	8.00E+00	3.30E+01	6.80E+01	8.10E+01	2.10E+01	7.00E+00	2.18E+02
S	3.00E+00	2.80E+01	7.60E+01	1.07E+02	3.70E+01	1.80E+01	2.69E+02
SSW	3.00E+00	2.40E+01	6.70E+01	4.30E+01	1.60E+01	1.10E+01	1.64E+02
SW	2.00E+00	2.50E+01	5.30E+01	3.90E+01	6.00E+00	2.00E+00	1.27E+02
WSW	4.00E+00	2.00E+01	4.70E+01	2.20E+01	1.00E+00	0.00E+00	9.40E+01
W	8.00E+00	1.50E+01	2.80E+01	3.70E+01	1.00E+01	1.00E+00	9.90E+01
WNW	4.00E+00	1.20E+01	3.40E+01	2.60E+01	4.00E+00	1.00E+00	8.10E+01
NW	0.00E+00	1.30E+01	4.10E+01	2.10E+01	0.00E+00	0.00E+00	7.50E+01
NNW	8.00E+00	1.60E+01	3.70E+01	9.00E+00	0.00E+00	0.00E+00	7.00E+01
Total	6.90E+01	3.38E+02	6.69E+02	5.12E+02	1.15E+02	4.20E+01	1.75E+03

Periods of Calm (Hours): 8.00E+00

Hours of Invalid Data: 2.50E+01

10 METER (All tabled values are Hours)

SECTOR	1-3 mph	4-7 mph	8-12 mph	13-18 mph	19-24 mph	>24 mph	TOTAL
N	8.00E+00	3.50E+01	1.60E+01	3.00E+00	0.00E+00	0.00E+00	6.20E+01
NNE	1.70E+01	3.40E+01	1.00E+01	1.00E+00	0.00E+00	0.00E+00	6.20E+01
NE	1.70E+01	3.40E+01	3.00E+00	0.00E+00	0.00E+00	0.00E+00	5.40E+01
ENE	2.80E+01	3.20E+01	7.00E+00	0.00E+00	0.00E+00	0.00E+00	6.70E+01
E	3.40E+01	3.70E+01	3.00E+00	0.00E+00	0.00E+00	0.00E+00	7.40E+01
ESE	4.10E+01	3.90E+01	1.40E+01	0.00E+00	0.00E+00	0.00E+00	9.40E+01
SE	2.40E+01	6.10E+01	1.40E+01	1.00E+00	0.00E+00	0.00E+00	1.00E+02
SSE	3.20E+01	1.12E+02	4.30E+01	5.00E+00	0.00E+00	0.00E+00	1.92E+02
S	2.40E+01	1.09E+02	9.30E+01	2.30E+01	1.00E+00	0.00E+00	2.50E+02
SSW	3.20E+01	9.70E+01	5.50E+01	2.40E+01	3.00E+00	0.00E+00	2.11E+01
SW	3.40E+01	8.50E+01	2.40E+01	8.00E+00	1.00E+00	0.00E+00	1.52E+01
WSW	1.90E+01	5.30E+01	1.80E+01	0.00E+00	1.00E+00	0.00E+00	9.10E+01
W	1.50E+01	5.00E+01	4.10E+01	1.00E+01	0.00E+00	0.00E+00	1.16E+01
WNW	8.00E+00	5.40E+01	3.90E+01	4.00E+00	0.00E+00	0.00E+00	1.05E+02
NW	1.10E+01	5.70E+01	1.30E+01	0.00E+00	0.00E+00	0.00E+00	8.10E+01
NNW	4.00E+00	4.40E+01	7.00E+00	0.00E+00	0.00E+00	0.00E+00	5.50E+01
Total	3.48E+02	9.33E+02	4.00E+02	7.90E+01	6.00E+00	0.00E+00	1.77E+03

Periods of Calm (Hours): 1.00E+01

Hours of Invalid Data: 2.00E+00

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JOINT WIND FREQUENCY DISTRIBUTION BY STABILITY CLASS  
 Data Period: January 1, 1995 - December 31, 1995  
 STABILITY CLASS F

60 METER (All tabled values are Hours)

SECTOR	1-3 mph	4-7 mph	8-12 mph	13-18 mph	19-24 mph	>24 mph	TOTAL
N	2.00E+00	7.00E+00	2.30E+01	1.10E+01	0.00E+00	2.00E+00	4.50E+01
NNE	2.00E+00	3.00E+00	1.20E+01	1.80E+01	1.00E+00	0.00E+00	3.60E+01
NE	3.00E+00	9.00E+00	1.70E+01	1.00E+01	0.00E+00	0.00E+00	3.90E+01
ENE	2.00E+00	1.30E+01	2.20E+01	8.00E+00	0.00E+00	0.00E+00	4.50E+01
E	4.00E+00	1.40E+01	1.60E+01	1.30E+01	1.00E+00	0.00E+00	4.80E+01
ESE	7.00E+00	1.80E+01	7.00E+00	2.00E+00	0.00E+00	0.00E+00	3.40E+01
SE	9.00E+00	1.10E+01	8.00E+00	1.40E+01	4.00E+00	0.00E+00	4.60E+01
SSE	6.00E+00	1.40E+01	1.30E+01	2.20E+01	2.00E+00	0.00E+00	5.70E+01
S	2.00E+00	1.50E+01	2.70E+01	3.30E+01	4.00E+00	0.00E+00	8.10E+01
SSW	0.00E+00	5.00E+00	2.30E+01	1.70E+01	0.00E+00	0.00E+00	4.50E+01
SW	1.00E+00	6.00E+00	2.40E+01	9.00E+00	2.00E+00	0.00E+00	4.20E+01
WSW	1.00E+00	9.00E+00	1.40E+01	3.90E+01	2.00E+00	0.00E+00	6.50E+01
W	2.00E+00	7.00E+00	1.70E+01	1.10E+01	0.00E+00	0.00E+00	3.70E+01
WNW	4.00E+00	4.00E+00	2.00E+01	6.00E+00	0.00E+00	0.00E+00	3.40E+01
NW	1.00E+00	3.00E+00	1.50E+01	8.00E+00	0.00E+00	0.00E+00	2.70E+01
NNW	7.00E+00	6.00E+00	2.30E+01	8.00E+00	0.00E+00	0.00E+00	4.40E+01
Total	5.30E+01	1.44E+02	2.81E+02	2.29E+02	1.60E+01	2.00E+00	7.25E+02

Periods of Calm (Hours): 2.00E+00

Hours of Invalid Data: 3.00E+00

10 METER (All tabled values are hours)

SECTOR	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	1.10E+01	2.20E+01	3.00E+00	1.00E+00	0.00E+00	0.00E+00	3.70E+01
NNE	1.40E+01	2.60E+01	1.00E+00	1.00E+00	0.00E+00	0.00E+00	4.20E+01
NE	3.10E+01	2.30E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.40E+01
ENE	2.60E+01	1.40E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.00E+01
E	2.40E+01	2.20E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.60E+01
ESE	1.90E+01	1.00E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.90E+01
SE	2.10E+01	3.00E+01	2.00E+00	0.00E+00	0.00E+00	0.00E+00	5.30E+01
SSE	1.40E+01	3.00E+01	7.00E+00	0.00E+00	0.00E+00	0.00E+00	5.10E+01
S	1.30E+01	3.60E+01	2.00E+00	0.00E+00	0.00E+00	0.00E+00	5.10E+01
SSW	1.50E+01	4.10E+01	1.00E+00	0.00E+00	0.00E+00	0.00E+00	5.70E+01
SW	2.20E+01	3.20E+01	2.00E+00	0.00E+00	0.00E+00	0.00E+00	5.60E+01
WSW	1.60E+01	3.40E+01	1.10E+01	0.00E+00	0.00E+00	0.00E+00	6.10E+01
W	1.90E+01	1.70E+01	4.00E+00	0.00E+00	0.00E+00	0.00E+00	4.00E+01
WNW	9.00E+00	3.60E+01	1.00E+00	0.00E+00	0.00E+00	0.00E+00	4.60E+01
NW	1.00E+01	3.40E+01	2.00E+00	0.00E+00	0.00E+00	0.00E+00	4.60E+01
NNW	5.00E+00	1.20E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.70E+01
Total	2.69E+02	4.19E+02	3.60E+01	2.00E+00	0.00E+00	0.00E+00	7.26E+02

Periods of Calm (Hours): 4.00E+00

Hours of Invalid Data: 0.00E+00

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## JOINT WIND FREQUENCY DISTRIBUTION BY STABILITY CLASS

Data Period: January 1, 1995 - December 31, 1995

## STABILITY CLASS G

60 METER (All tabled values are Hours)

SECTOR	1-3 mph	4-7 mph	8-12 mph	13-18 mph	19-24 mph	>24 mph	TOTAL
N	3.00E+00	6.00E+00	1.20E+01	1.20E+01	0.00E+00	0.00E+00	3.30E+01
NNE	0.00E+00	7.00E+00	8.00E+00	9.00E+00	0.00E+00	0.00E+00	2.40E+01
NE	4.00E+00	6.00E+00	1.20E+01	1.00E+01	0.00E+00	0.00E+00	3.20E+01
ENE	2.00E+00	3.00E+00	1.90E+01	1.80E+01	0.00E+00	0.00E+00	4.20E+01
E	1.00E+00	3.00E+00	1.50E+01	9.00E+00	0.00E+00	0.00E+00	2.80E+01
ESE	4.00E+00	3.00E+00	1.00E+00	1.00E+00	0.00E+00	0.00E+00	9.00E+00
SE	1.00E+00	2.00E+00	1.00E+00	3.00E+00	0.00E+00	0.00E+00	7.00E+00
SSE	2.00E+00	5.00E+00	3.00E+00	1.00E+00	0.00E+00	0.00E+00	1.10E+01
S	0.00E+00	7.00E+00	1.00E+00	2.00E+00	0.00E+00	0.00E+00	1.00E+01
SSW	0.00E+00	2.00E+00	5.00E+00	6.00E+00	1.00E+00	0.00E+00	1.40E+01
SW	1.00E+00	8.00E+00	1.70E+01	7.00E+00	0.00E+00	0.00E+00	3.30E+01
WSW	1.00E+00	6.00E+00	1.70E+01	9.00E+00	0.00E+00	0.00E+00	3.30E+01
W	1.00E+00	6.00E+00	6.00E+00	0.00E+00	0.00E+00	0.00E+00	1.30E+01
WNW	2.00E+00	4.00E+00	6.00E+00	5.00E+00	0.00E+00	0.00E+00	1.70E+01
NW	3.00E+00	4.00E+00	1.10E+01	6.00E+00	0.00E+00	0.00E+00	2.40E+01
NNW	5.00E+00	8.00E+00	5.00E+00	3.00E+00	0.00E+00	0.00E+00	2.10E+01
Total	3.00E+01	8.00E+01	1.39E+02	1.01E+02	1.00E+00	0.00E+00	3.51E+02

Periods of Calm (Hours): 2.00E+00

Hours of Invalid Data: 0.00E+00

10 METER (All tabled values are Hours)

SECTOR	1-3 mph	4-7 mph	8-12 mph	13-18 mph	19-24 mph	>24 mph	TOTAL
N	9.00E+00	7.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.60E+01
NNE	1.50E+01	2.20E+01	1.00E+00	0.00E+00	0.00E+00	0.00E+00	3.80E+01
NE	2.80E+01	4.10E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.90E+01
ENE	2.10E+01	5.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.60E+01
E	9.00E+00	1.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.00E+01
ESE	1.00E+01	3.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.30E+01
SE	6.00E+00	2.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.00E+00
SSE	4.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.00E+00
S	3.00E+00	1.00E+00	1.00E+00	0.00E+00	0.00E+00	0.00E+00	5.00E+00
SSW	1.00E+01	8.00E+00	2.00E+00	0.00E+00	0.00E+00	0.00E+00	2.00E+01
SW	1.60E+01	1.10E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.70E+01
WSW	2.40E+01	1.50E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.90E+01
W	1.30E+01	5.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.80E+01
WNW	1.10E+01	6.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.70E+01
NW	1.30E+01	2.00E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.30E+01
NNW	3.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.00E+00
Total	1.95E+02	1.47E+02	4.00E+00	0.00E+00	0.00E+00	0.00E+00	3.46E+02

Periods of Calm (Hours): 7.00E+00

Hours of Invalid Data: 0.00E+00

TABLE 10, Page 8 of 8

## JOINT WIND FREQUENCY DISTRIBUTION BY STABILITY CLASS

Data Period: January 1, 1995 - December 31, 1995

## ALL STABILITY CLASSES

60 METER (All tabled values are Percents)

SECTOR	1-3 mph	4-7 mph	8-12 mph	13-18 mph	19-24 mph	>24 mph	TOTAL
N	2.05E-01	9.82E-01	2.33E+00	1.88E+00	1.03E-01	3.42E-02	5.54E+00
NNE	2.51E-01	1.11E+00	1.54E+00	1.27E+00	2.74E-01	6.85E-02	4.51E+00
NE	2.40E-01	7.42E-01	1.54E+00	1.43E+00	1.60E-01	1.14E-01	4.22E+00
ENE	1.71E-01	7.53E-01	1.26E+00	1.42E+00	2.40E-01	9.13E-02	3.93E+00
E	3.77E-01	1.08E+00	1.35E+00	9.59E-01	1.71E-01	1.14E-02	3.95E+00
ESE	6.16E-01	1.51E+00	8.90E-01	2.97E-01	4.57E-02	0.00E+00	3.36E+00
SE	4.22E-01	1.00E+00	1.22E+00	9.93E 01	2.28E-01	1.83E-01	4.05E+00
SSE	5.25E-01	1.44E+00	1.74E+00	2.47E+00	9.59E-01	3.77E-01	7.50E+00
S	2.97E-01	1.31E+00	2.28E+00	3.03E+00	1.39E+00	8.22E-01	9.13E+00
SSW	2.63E-01	1.07E+00	2.45E+00	1.63E+00	5.37E-01	2.85E-01	6.24E+00
SW	1.71E-01	1.31E+00	2.65E+00	1.52E+00	3.42E-01	2.51E-01	6.24E+00
WSW	3.31E-01	9.59E-01	2.24E+00	2.02E+00	9.25E-01	4.79E-01	6.95E+00
W	2.17E-01	7.42E-01	2.07E+00	2.09E+00	1.14E+00	2.97E-01	6.55E+00
WNW	3.31E-01	6.28E-01	2.09E+00	2.00E+00	7.76E-01	5.48E-01	6.37E+00
NW	2.85E-01	7.31E-01	2.27E+00	1.60E+00	5.82E-01	2.63E-01	5.73E+00
NNW	3.20E-01	1.02E+00	1.83E+00	1.34E+00	1.60E-01	6.85E-02	4.73E+00
Total	5.02E+00	1.64E+01	2.97E+01	2.59E+01	8.04E+00	3.89E+00	8.90E+01

Periods of Calm (Hours): 2.60E+01

Hours of Invalid Data: 1.60E+02

Hours of Good Data: 7.80E+03 89.0% of Total Hours

10 METER (All tabled values are Percents)

SECTOR	1-3 mph	4-7 mph	8-12 mph	13-18 mph	19-24 mph	> 24 mph	TOTAL
N	4.22E-01	1.67E+00	2.35E+00	3.77E-01	3.42E-02	0.00E+00	4.85E+00
NNE	7.65E-01	1.96E+00	1.29E+00	5.37E-01	1.14E-02	0.00E+00	4.57E+00
NE	1.14E+00	2.28E+00	1.54E+00	2.17E-01	1.03E-01	1.14E-02	5.30E+00
ENE	9.82E-01	1.27E+00	1.22E+00	1.83E-01	4.57E-02	0.00E+00	3.70E+00
E	1.04E+00	1.67E+00	7.08E-01	2.28E-02	0.00E+00	0.00E+00	3.44E+00
ESE	1.14E+00	1.74E+00	6.51E-01	1.14E-02	0.00E+00	0.00E+00	3.54E+00
SE	8.56E-01	2.00E+00	9.93E-01	2.05E-01	0.00E+00	0.00E+00	4.05E+00
SSE	9.59E-01	2.72E+00	1.79E+00	4.11E-01	0.00E+00	0.00E+00	5.88E+00
S	8.45E-01	3.07E+00	3.13E+00	1.28E+00	2.28E-01	0.00E+00	8.55E+00
SSW	9.25E-01	2.96E+00	2.39E+00	1.26E+00	1.48E-01	1.14E-01	7.79E+00
SW	1.13E+00	2.91E+00	1.55E+00	4.22E-01	9.13E-02	3.42E-02	6.14E+00
WSW	9.02E-01	2.55E+00	1.94E+00	8.79E-01	3.08E-01	9.13E-02	6.67E+00
W	6.51E-01	1.79E+00	2.59E+00	1.86E+00	3.42E-01	1.14E-02	7.25E+00
WNW	5.71E-01	1.96E+00	3.05E+00	1.87E+00	4.45E-01	1.26E-01	8.03E+00
NW	6.16E-01	2.26E+00	2.23E+00	1.16E+00	2.28E-01	2.28E-02	6.52E+00
NNW	2.40E-01	1.55E+00	1.63E+00	3.77E-01	4.57E-02	1.14E-02	3.86E+00
Total	1.32E+01	3.43E+01	2.91E+01	1.11E+01	2.03E+00	4.22E-01	9.01E+01

Periods of Calm (Hours): 3.40E+01

Hours of Invalid Data: 5.50E+01

Hours of Good Data: 7.90E+03 90.1% of Total Hours

SECTION 6  
DOSE MEASUREMENTS AND ASSESSMENTS

TABLE 11  
MAXIMUM\* OFFSITE DOSES AND DOSE COMMITMENTS  
TO MEMBERS OF THE PUBLIC  
Data Period: January 1, 1995 - December 31, 1995

---

A. Waterborne Effluents (mrem):

Organ	0.00E+00
Total Body	0.00E+00

---

B. Airborne Effluents:

1. Iodines and particulates (mrem):

Organ	3.13E-03 <sup>1</sup>
Total Body	1.93E-03 <sup>1</sup>

2. Noble Gases (mrad):

Gamma	4.26E-06 <sup>2</sup>
Beta	5.45E-06 <sup>2</sup>

---

C. Direct Radiation (mrem):

0.00E+00

THERE ARE NO OTHER URANIUM FUEL CYCLE FACILITIES WITHIN 8 KM OF CPS

\* "Maximum" means the largest fraction of the corresponding Appendix I dose design objective.

<sup>1</sup> Dose to the Child Thyroid via the inhalation, ground plane, meat and vegetation pathways. Noble gas total body doses also added to organ dose. Calculated at 1.68 km in the North direction using the methodology contained in the CPS ODCM.

<sup>2</sup> Dose to total body and skin of all occupants regardless of age. Calculated at 1.68 km in the North direction using the methodology contained in the CPS ODCM.

## DOSES TO MEMBERS OF THE PUBLIC WITHIN THE SITE BOUNDARY

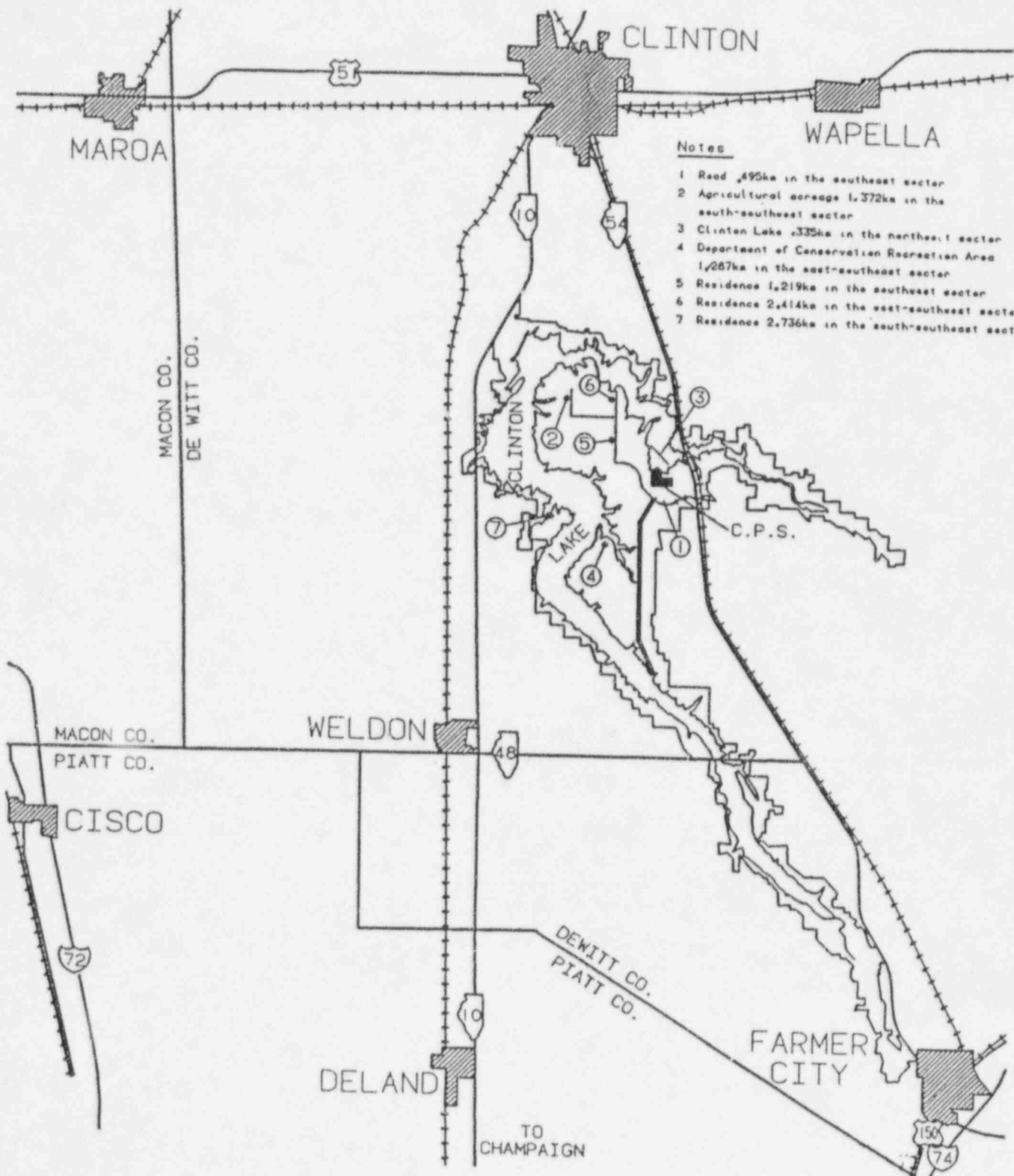
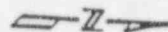
CPS Offsite Dose Calculation Manual section 7.2 requires that the Radioactive Effluent Release Report include an assessment of the radiation doses from radioactive liquids and gaseous effluents to MEMBERS OF THE PUBLIC due to their activities inside the SITE BOUNDARY. Within the CPS site boundary there are seven areas which are open to members of the public as identified by CPS ODCM Table 3.4-4 (see Figure 4):

- A road at 0.495 kilometers (0.3 miles) in the SE sector
- Agricultural acreage at 1.372 kilometers (0.9 miles) in the SSW sector
- A portion of Clinton Lake at 0.335 kilometers (0.2 miles) in the NW sector
- The Department of Conservation Recreation Area at 1.287 kilometers (0.8 miles) in the ESE sector
- A residence at 1.219 kilometers (0.8 miles) in the SW sector
- A residence at 2.414 kilometers (1.5 miles) in the WSW sector
- A residence at 2.736 kilometers (1.7 miles) in the SSE sector

At all of the above locations, the plume, inhalation and ground-plane exposure pathways are used for dose calculations. No other exposure pathways were identified by the 1995 Annual Land Use Census. All dose calculations were performed using the methodology contained in the CPS ODCM.



AREAS WITHIN THE CPS SITE BOUNDARY OPEN  
TO MEMBERS OF THE PUBLIC



Notes

- 1 Road .495ka in the southeast sector
- 2 Agricultural acreage 1,372ka in the south-southeast sector
- 3 Clinton Lake .335ka in the northeast sector
- 4 Department of Conservation Recreation Area 1,287ka in the east-southeast sector
- 5 Residence 1,219ka in the southeast sector
- 6 Residence 2,414ka in the west-southeast sector
- 7 Residence 2,736ka in the south-southeast sector

TABLE 12

CALCULATED DOSES TO MEMBERS OF THE PUBLIC DURING  
 USE OF THE ROAD IN THE SOUTHEAST SECTOR  
 WITHIN THE CPS SITE BOUNDARY

Data Period: January 1, 1995 - December 31, 1995

<u>Exposure Pathway</u>	<u>Organs</u>	<u>Dose (mrem)</u>
plume*	total body	3.08E-07
	skin	3.95E-07
ground plane*	total body	6.98E-05
	skin	8.21E-05
inhalation; age group highest organ doses:		
	teen thyroid	2.47E-05
	adult thyroid	2.36E-05
	child thyroid	2.33E-05
	infant thyroid	1.52E-05

\* Doses via these pathways are not dependent upon age-group.

TABLE 13

CALCULATED DOSES TO MEMBERS OF THE PUBLIC  
DURING USE OF THE AGRICULTURAL ACREAGE  
IN THE SOUTH-SOUTHWEST SECTOR WITHIN  
THE CPS SITE BOUNDARY

Data Period: January 1, 1995 - December 31, 1995

<u>Exposure Pathway</u>	<u>Organs</u>	<u>Dose (mrem)</u>
plume*	total body	3.88E-08
	skin	4.97E-08
ground plane*	total body	1.33E-06
	skin	1.57E-06
inhalation; age group highest organ doses:		
	teen thyroid	3.11E-06
	adult thyroid	2.97E-06
	infant thyroid	1.91E-06
	child thyroid	2.94E-06

\* Doses via these pathways are not dependent upon age-group.

TABLE 14

CALCULATED DOSES TO MEMBERS OF THE PUBLIC  
DURING USE OF CLINTON LAKE IN THE  
NORTHWEST SECTOR WITHIN THE CPS  
SITE BOUNDARY

Data Period: January 1, 1995 - December 31, 1995

<u>Exposure Pathway</u>	<u>Organs</u>	<u>Dose (mrem)</u>
plume*	total body	2.33E-06
	skin	2.99E-06
ground plane*	total body	2.54E-04
	skin	2.99E-04
inhalation; age group highest organ doses:		
	teen thyroid	1.87E-04
	adult thyroid	1.79E-04
	child thyroid	1.77E-04
	infant thyroid	1.15E-04

\* Doses via these pathways are not dependent upon age-group.

TABLE 15

CALCULATED DOSES TO MEMBERS OF THE PUBLIC  
DURING USE OF THE DEPARTMENT OF CONSERVATION  
RECREATION AREA IN THE EAST-SOUTHEAST SECTOR  
WITHIN THE CPS SITE BOUNDARY

Data Period: January 1, 1995 - December 31, 1995

<u>Exposure Pathway</u>	<u>Organs</u>	<u>Dose (mrem)</u>
plume*	total body	8.39E-07
	skin	1.08E-06
ground plane*	total body	1.78E-04
	skin	2.09E-04
inhalation; age group highest organ doses:		
	teen thyroid	6.73E-05
	adult thyroid	6.43E-05
	child thyroid	6.36E-05
	infant thyroid	4.13E-05

\* Doses via these pathways are not dependent upon age-group.

TABLE 16

CALCULATED DOSES FOR THE RESIDENTS  
IN THE SOUTHWEST SECTOR WITHIN  
THE CPS SITE BOUNDARY

Data Period: January 1, 1995 - December 31, 1995

<u>Exposure Pathway</u>	<u>Organs</u>	<u>Dose (mrem)</u>
plume*	total body	6.01E-07
	skin	7.70E-07
ground plane*	total body	1.81E-05
	skin	2.13E-05
inhalation; age group highest organ doses:		
	adult thyroid	4.61E-05
	teen thyroid	0.00E-00
	child thyroid	0.00E-00
	infant thyroid	0.00E-00

\* Doses via these pathways are not dependent upon age-group.

NOTE: A value of 0.00E-00 indicates that no individual of this age group is residing in this receptor location.

TABLE 17

CALCULATED DOSES FOR THE RESIDENTS  
IN THE WEST-SOUTHWEST SECTOR WITHIN  
THE CPS SITE BOUNDARY

Data Period: January 1, 1995 - December 31, 1995

<u>Exposure Pathway</u>	<u>Organs</u>	<u>Dose (mrem)</u>
plume*	total body	2.13E-08
	skin	2.73E-08
ground plane*	total body	7.03E-07
	skin	8.27E-07
inhalation; age group highest organ doses:		
	adult thyroid	1.63E-06
	teen thyroid	0.00E-00
	child thyroid	0.00E-00
	infant thyroid	0.00E-00

\* Doses via these pathways are not dependent upon age-group.

NOTE: A value of 0.00E-00 indicates that no individual of this age group is residing in this receptor location.

TABLE 18

CALCULATED DOSES FOR THE RESIDENTS  
IN THE SOUTH-SOUTHEAST SECTOR WITHIN  
THE CPS SITE BOUNDARY

Data Period: January 1, 1995 - December 31, 1995

<u>Exposure Pathway</u>	<u>Organs</u>	<u>Dose (mrem)</u>
plume*	total body	1.02E-06
	skin	1.30E-06
ground plane*	total body	1.31E-04
	skin	1.54E-04
inhalation; age group highest organ doses:		
	adult thyroid	7.80E-05
	teen thyroid	0.00E-00
	child thyroid	0.00E-00
	infant thyroid	0.00E-00

\* Doses via these pathways are not dependent upon age-group.

NOTE: A value of 0.00E-00 indicates that no individual of this age group is residing in this receptor location.



SECTION 7  
CHANGES TO THE OFFSITE DOSE CALCULATION MANUAL

Revision 12 to the Offsite Dose Calculation Manual (ODCM) was issued in April 1995. This revision was primarily implemented to change reference numbers to the Improved Technical Specifications. Each of the changes are summarized below:

<u>ODCM Section</u>	<u>Description of change</u>
Table 2.3-1, Notation c	Tech Spec 6.9.1.7 changed to 5.6.3
2.5.2	Tech Spec 3.7.7 changed to ORM 2.4.4
Table 3.4-1 Notation 1	Tech Spec 6.9.1.7 changed to 5.6.3
3.9.2	Tech Spec 3.7.8.2 changed to 3.7.5
3.9.2 b.	Tech Spec 6.9.1.7 changed to 5.6.3
5.1 a.	Tech Spec 6.9.1.6 changed to 5.6.2
5.1 c.	Tech Spec 6.9.1.7 changed to 5.6.3
Table 5.1-1, Notation a	Tech Spec 6.9.1.6 changed to 5.6.2 Tech Spec 6.9.1.7 changed to 5.6.3
Table 5.1-3, Notation a	Tech Spec 6.9.1.6 changed to 5.6.2
Table 5.1-3, Notation c	Tech Spec 6.9.1.6 changed to 5.6.2
5.2 a.	Tech Spec 6.9.1.7 changed to 5.6.3
5.2 b.	Tech Spec 6.9.1.7 changed to 5.6.3
5.2.1	Tech Spec 6.9.1.6 changed to 5.6.2
5.3.1 a.	Tech Spec 6.9.1.6 changed to 5.6.2
5.3.1.1	Tech Spec 6.9.1.6 changed to 5.6.2
7.1	Tech Spec 6.9.1.6 changed to 5.6.2
7.2	Tech Spec 6.9.1.7 changed to 5.6.3

7.2.5

Tech Spec 6.14 changed to 5.5.1

9.2.8

Typos: changed:  $0.0^\circ < WD < 11.25$  or  $348.75^\circ \leq WD < 360.00^\circ$  to:  $0.0^\circ \leq WD < 11.25$  or  $348.75^\circ \leq WD \leq 360.00^\circ$

changed:  $56.25^\circ \leq WD < 78.25^\circ$  to:  $56.25^\circ \leq WD < 78.75^\circ$

changed:  $168.25^\circ \leq WD < 191.25^\circ$  to:  $168.75^\circ \leq WD < 191.25^\circ$

changed:  $281.75^\circ \leq WD < 303.75^\circ$  to:  $281.25^\circ \leq WD < 303.75^\circ$

SECTION 8  
ODCM OPERATIONAL REQUIREMENT REPORTS

In accordance with ODCM sections 2.7.1 and 3.9.2 inoperable radioactive liquid and gaseous effluent monitoring instrumentation channels remaining in an inoperable condition for greater than 30 days shall be reported in the Radioactive Effluent Release Report.

During the January 1, 1995 through December 31, 1995 reporting period there were no monitors inoperable for greater than 30 days.

SECTION 9

MAJOR CHANGES TO RADIOACTIVE WASTE TREATMENT SYSTEMS

In accordance with the CPS ODCM section 7.2, licensee-initiated major changes to the liquid, gaseous or solid radioactive waste treatment systems shall be reported in the Radioactive Effluent Release Report. No major changes to the Waste Treatment Systems were reviewed and approved during this reporting period.

SECTION 10

NEW LOCATIONS FOR DOSE CALCULATION AND/OR ENVIRONMENTAL MONITORING

In accordance with the CPS ODCM, new locations for dose calculations and/or environmental monitoring identified by the Annual Land Use Census shall be reported in the Radioactive Effluent Release Report.

The following is a summary of the 1995 Annual Land Use Census.

1.0 Nearest Residence

The nearest resident identified in each of the 16 sectors are shown below:

	1994			1995		
	RESIDENT	AGE GROUP		RESIDENT	AGE GROUP	
N	DAUGHERTY	C	T A	DAUGHERTY	C	T A
NNE	BROWN	A		BROWN	A	
NE	BARTIMUS	C	A	BARTIMUS	C	A
ENE	DEFEBAGH	T	A	DEFEBAGH	T	A
E	REYNOLDS*	A		UNKNOWN		
ESE	EDWARDS	C	A	EDWARDS	C	A
SE	TWIST	A		TWIST	A	
SSE	JACOBS	A		JACOBS	A	
S	DISNEY	A		DISNEY	A	
SSW	BABER	A		BABER	T	A
SW	REYNOLDS	A		REYNOLDS	A	
WSW	LYNN	A		LYNN	A	
W	SANDERS	C	T A	SANDERS	C	T A
WNW	LORD	C	A	LORD	C	T A
NW	ENOS	C	A	ENOS	C	A
NNW	BURTON	A		CRABTREE	T	A

(I)nfant (C)hild (T)een (A)dult \* Part-time resident

## 2.0 Broadleaf Garden Census

Over 100 gardens within 5 miles were located in the 16 sectors surrounding CPS of which approximately 60 produced broad leaf vegetation. Specifically broad leaf vegetation was identified for this report. Other crops grown in this area were identified but will not be addressed in this report.

The nearest garden identified in each of the 16 sectors are shown below:

SECTOR	1994			1995				
	GARDENS	AGE GROUPS			GARDENS	AGE GROUPS		
N	DAUGHERTY	C	T	A	DAUGHERTY	C	T	A
NNE	BURTON	A			BROWN	A		
NE	LARRY	A			SPENCER	A		
ENE	DEFEBROUGH	T	A		WHITEHEAD	A		
E	BRATCHER	A			BRATCHER	A		
ESE	EDWARDS	C	A		EDWARDS	C	A	
SE	TWIST	A			TWIST	A		
SSE	THRASHER	A			UNKNOWN	A		
S	DISNEY	A			DISNEY	A		
SSW	BABER	A			BABER	T	A	
SW	PEVERLY	A			WANTLAND	A		
WSW	SZYMKIEWICZ	C	A		MEYERS	A		
W	SANDERS	C	T	A	SANDERS	C	T	A
WNW	STAPLETON	A			STAPLETON	A		
NW	RODERICK	T	A		RODERICK	T	A	
NNW	COPE	C	T	A	STAPLETON	T	A	

---

(I)nfant (C)hild (T)een (A)dult

### 3.0 Milking Animal Census

Milking animals within 5 miles were located in 10 of the 16 sectors surrounding CPS. The cattle were used for nursing (nursing of calves) and were being used for meat production (both own use and to be sold). There was only one resident that milked cows for human consumption. Goats were found at two residences, however, only one of the residents used the milk for both their own use and sold.

Milking animals were specifically identified for this report. Other livestock raised in this area were identified but will not be addressed in this report.

The nearest milking animals identified in each of the 16 sectors are shown below:

SECTOR	1994 MILKING			1995 MILKING		
	ANIMALS	AGE GROUPS		ANIMALS	AGE GROUPS	
N	DAUGHERTY	C	T A	DAUGHERTY	C	T A
NNE	LARRY	A		LARRY	A	
NE	LARRY	A		SPENCER	A	
ENE	DAWSON	A		DAWSON	A	
E	NONE			NONE		
ESE	NONE			NONE		
SE	NONE			NONE		
SSE	MOODY	A		MOODY	A	
S	MARTIN	T	A	NONE		
SSW	WANTLAND	A		WANTLAND	A	
SW	WANTLAND	A		WANTLAND	A	
WSW	BEST	A		BEST	A	
W	LANUM	A		LANUM	I	A
WNW	NONE			NONE		
NW	NONE			NONE		
NNW	WILSON	A		WILSON	A	

(I)nfant (C)hild (T)een (A)dult

SECTION 11  
CORRECTIONS TO DATA REPORTED IN PREVIOUS REPORTS

The January 1, 1994 - December 31, 1994 Radioactive Effluent Release Report contained typographical and reporting errors. The errors have been identified and the corrections are listed by page number below:

Page 1 The report date should be April 29, 1995 vs April 29, 1994.  
Page 22 Table 1 "Effluent and Waste Disposal Data", the total curies released for fission and activation gasses is 1.17E+00 Ci versus 3.26E+01 Ci.

Page 32 There were several errors reported in Table 7, "Solid Waste and Irradiated Fuel Shipments". The corrected values are shown below:

A. SOLID WASTE SHIPPED OFFSITE FOR BURIAL OR DISPOSAL (not irradiated fuel) January 1, 1994 -- December 31, 1994

1.	TYPE OF WASTE	UNIT	VALUE
a.	Resins, filter sludges, evaporator bottoms, etc.	Ci	1.3E+03
b.	Dry compactible waste, contaminated equipment, etc.	m <sup>3</sup> Ci	3.17E+02 1.39E+01

2. ESTIMATE OF MAJOR NUCLIDE COMPOSITION

	NUCLIDE NAME	PERCENT ABUNDANCE	CURIES
a.	Fe-55		8.09E+02
	Co-60		2.54E+02
	Mn-54		1.71E+02
	Cr-51		4.58E+01
	Co-58		1.79E+01
	OTHER		1.69E+00
b.	Fe-55	88.5%	1.22E+01
	Co-60	7.40%	1.02E+00
	Mn-54	2.55%	3.52E-01
	Cr-51	1.52%	2.09E-01
	Co-58	0.0242%	3.34E-03