SALEM GENERATING STATION SEMIANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT SGS RERR-28

SALEM UNIT NOS. 1 & 2

UNIT 1 DOCKET NO. 50-272 UNIT 2 DOCKET NO. 50-311 OPERATING LICENSE NO. DPR-70 OPERATING LICENSE NO. DPR-75





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# SALEM GENERATING STATION RADIOACTIVE EFFLUENT RELEASE REPORT JANUARY - JUNE 1990

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### SALEM GENERATING STATION RADIOACTIVE EFFLUENT RELEASE REPORT JANUARY - JUNE 1990

#### INTRODUCTION

This report, SGS-RERR-28, summarizes information pertaining to the releases of radioactive materials in liquid, gaseous and solid form from the Salem Generating Station (SGS) Units 1 and 2 for the period January 1, 1990 to June 30, 1990.

This Semiannual RERR is submitted for both Salem Units and combines those sections which are common to each unit. Separate tables of releases and release totals are included whenever separate processing systems exist.

Salem Unit 1 is a Westinghouse Pressurized Water Reactor which has a licensed core power of 3411 MWt and an approximate net electrical output of 1158 MW(e). Salem Unit 1 achieved initial criticality on December 11, 1976 and went into commercial operations on June 30, 1977.

Salem Unit 2 is a Westinghouse Pressurized Water Reactor which has a licensed core power of 3411 MWt and an approximate net electrical output of 1115 MW(e). Salem Unit 2 achieved initial criticality on August 2, 1980 and went into commercial operations on October 13, 1981.

The report is prepared in the format of Regulatory Guide 1.21, Appendix B, as required by Specification 6.9.1.11 of the Salem Technical Specifications. Preceding the tables summarizing the gaseous and liquid discharges and solid waste shipments are our responses to parts A-F of the "Supplemental Information" section of Regulatory Guide 1.21, Appendix B.

As required by Regulatory Guide 1.21, our Technical Specification limits are described in detail within this report along with a summary description of how measurements and determinations of the total activity discharged were developed.





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To facilitate determination of compliance with 40CFR190 requirements, the following information on electrical output is provided.

Unit 1 generated 2,742,500 megawatt-hours of electrical energy (net) during the reporting period.

Unit 2 generated 2,157,320 megawatt-hours of electrical energy (net) during the reporting period.

Results of liquid and gaseous composites analyzed for Sr-89, Sr-90 and Fe-55 for the second quarter of 1990 were not available for inclusion in this report. The results of these composites will be provided in the next Radioactive Effluent Release Report.

The Sr-89, Sr-90 and Fe-55 analyses for the last half of 1989 (refer to RERR-27) have been completed; amended pages to RERR-27 are included in this report.





#### PART A. PRELIMINARY SUPPLEMENTAL INFORMATION

#### 1.0 REGULATORY LIMITS

1.1 Noble Gas Release Limits

The dose rate 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:

For noble gases: Less than or equal to 500 mrems/yr to the total body and less than or equal to 3000 mrems/yr to the skin.

In addition, the air dose due to noble gases released in gaseous effluents, from each reactor unit, from the site to areas at and beyond the site boundary, shall be limited to the following:

During any calendar quarter: Less than or equal to 5 mrad for gamma radiation and less than or equal to 10 mrad for beta radiation, and

During any calendar year: Less than or equal to 10 mrad for gamma radiation and less than or equal to 20 mrad for beta radiation.

1.2 Iodine Particulates, and Tritium

The dose rate 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:

For Iodine-131, for tritium, and for all radionuclides in particulate form with half lives greater than 8 days: Less than or equal to 1500 mrems/yr to any organ.

In addition, the dose to a member of the public from iodine-131, from tritium, and from all radionuclides in particulate form with half-lives greater than 8 days in gaseous effluents released, from each reactor unit, from the site to areas at and beyond the site boundary, shall be limited to the following:

During any calendar quarter: Less than or equal to 7.5 mrems to any organ, and

During any calendar year: Less than or equal to 15 mrems to any organ.

### 1.3 Liquid Effluents Release Limits

The concentration of radioactive material released in liquid effluents to unrestricted areas shall be limit to the concentrations specified in 10 CFR, Part 20, Appendix B, Table II, Column 2 for radionuclides other than dissolved or entrained noble gases. For dissolved or entrained noble gases, the concentration shall be limited to 2E-4 microcuries per milliliter.

In addition, the dose or dose commitment to a member of the public from radioactive materials in liquid effluents released to unrestricted areas shall be limited:

During any calendar quarter to less than or equal to 1.5 mrems to the total body and to less than or equal to 5 mrems to any organ, and

During any calendar year to less than or equal to 3 mrems to the total body and to less than or equal to 10 mrems to any organ.

1.4 Total Dose Limit

The annual (calendar year) dose or dose commitment to any member of the public, due to releases of radioactivity and radiation, from uranium fuel cycle sources shall be limited to less than or equal to 25 mrems to the total body or any organ (except the thyroid, which shall be limited to less than or equal to 75 mrems).

#### 2.0 MAXIMUM PERMISSIBLE CONCENTRATIONS (MPC)

Regulatory Guide 1.21 requires that the licensee provide the MPCs used in determining allowable release rates for radioactive releases.

- a. MPC values were not used to determine the maximum release rates for fission gases, iodines, or particulates.
- b. MPC values as stated in 10CFR20, Appendix B, Table II, Column 2 were used for liquids.
- c. MPC value used for dissolved or entrained noble gases was 2E-4 microcuries per milliliter.



#### 3.0 AVERAGE ENERGY

Regulatory Guide 1.21 requires that the licensee provide the average energy of the radionuclide mixture in releases of fission and activation gases, if applicable.

Release limits for SGS are not based upon average energy, hence, this section does not apply.

- 4.0 MEASUREMENTS AND APPROXIMATION OF TOTAL RADIOACTIVITY
  - Liquid effluents are monitored in accordance with Table 4.1 4.11-1 of the Technical Specifications. During the period of record, all wastes from the chemical drain tank and the laundry, and hot shower tanks were routed to the hold-up tanks for monitoring prior to release. Technical Specifications require these tanks to be uniformly mixed for sampling and analysis before being released. Batch releases are defined as releases from the waste monitor hold-up tank and the chemical and volume control tanks. Continuous liquid releases are defined as condensate releases from intermittent blowdown of the steam generators. The preponderant gamma emitting isotopes detected in sampling were Co-58, Co-60 and Mn-54. Specific activity from analyses were multiplied by the volume of effluent discharged to the environment in order to estimate the total liquid activity discharged.

The detection requirements of Table 4.11-1 of the Technical Specifications are achieved or exceeded. Nuclides existing at concentrations below the achieved detection limit are treated as being present. Nuclides for which no activity was detected while meeting the required sensitivity values (LLDs) are treated as not being present.

Gaseous effluent streams are monitored and sampled in 4.2 accordance with Table 4.11-2 of the Technical Specifications. The plant vent is the final release point of all planned gaseous effluents and is continuously monitored by beta scintillators and high range GM tubes. The vent is also continuously sampled for iodine and particulates with a charcoal cartridge and filter paper connected in series to a low volume air sampler. The filter and charcoal are changed weekly, and analyzed on a multi-channel analyzer in the laboratory. Sampling is also performed on all gas decay tanks and containment purges prior to their release to the environment. The plant vent is sampled for noble gases monthly.

The detection requirements of Tables 4.11-1 and 4.11-2 of the Technical Specifications are achieved or exceeded. Isotopes existing at concentrations below the achieved detection limit are treated as not being present.

<u>Continuous Mode</u> gaseous releases are quantified by routine (monthly or weekly) sampling and isotopic analyses of the plant vent. Specific activities for each isotope detected are multiplied by the total vent flow volume for the entire sampling period in order to estimate the normal continuous release of radioactivity through the plant vent.

Slightly elevated plant vent radiation monitor readings are treated as continuous releases. The monitors response is converted to a "specific activity" using historical efficiency factors. The "specific activity" is multiplied by a default volume of effluent discharge to estimate the total activity discharged.

<u>Batch Mode</u> gaseous releases are quantified by sampling each gas decay tank or containment purge prior to discharge. Specific activities for each isotope are multiplied by the total volume of gas discharged.

Elevated plant vent radiation monitoring system readings while the channel is in an alarm state are treated as batch mode releases. If specific activity data from grab samples taken is not available, then the abnormal release is quantified by the use of the plant vent radiation monitors. The monitor's response is converted to a "specific activity" using historical efficiency factors. The "specific activity" is multiplied by the volume of effluent discharged while the channel was in an alarm state in order to estimate the total activity discharged.

4.3 The estimated total error of reported liquid releases is within 25%.

The estimated total error of the reported continuous gaseous releases is within 50% when concentrations exceed detectable levels. This error is due primarily to variability of waste stream flow rates and changes in isotopic distributions of waste streams between sampling periods. The estimated total error of the reported batch gaseous releases is within 10%. Error estimates for releases where sample activity is below the detectable concentration levels are not included since error estimates at the LLD are not defined.

The estimated total error of reported solid releases is within 25%.

#### 5.0 BATCH RELEASES

Summaries of batch releases of gaseous and liquid effluents are provided in Tables 4A-1 and 4B-1 for Unit 1 and 4A-2 and 4B-2 for Unit 2.

#### 6.0 UNPLANNED RELEASES

During this reporting period there were no unplanned releases.

#### 7.0 ELEVATED R-16/R41C CHANNEL RESPONSES

During this reporting period, the plant vent radiation monitors indicated slightly elevated readings on several occasions. As indicated above, elevated R16/R41C readings were quantified and treated as continuous releases. It was assumed that they were Xe-133 since it the preponderant isotope released. The releases due to the elevated readings were thus included in Tables 1B-1 and 1B-2.

8.0 MODIFICATION TO PREVIOUS RADIOACTIVE EFFLUENT RELEASE REPORTS

Our last report (RERR-27) did not include the quarterly Sr-89, Sr-90 and Fe-55 composite data for the last half of 1989. Amended pages to RERR-27 are included at the end of this report.

#### PART B. GASEOUS EFFLUENTS

See Summary Tables 1A-1 through 1C for Salem Unit 1 Operations.

See Summary Tables 1A-2 through 1C for Salem Unit 2 Operations.

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### PART C. LIQUID EFFLUENTS

See Summary Tables 2A-1 through 2C for Salem Unit 1 Operations.

See Summary Tables 2A-2 through 2C for Salem Unit 2 Operations.

PART D. SOLID WASTE

See Summary in Table 3.

### PART E. RADIOLOGICAL IMPACT ON MAN

The calculated individual doses in this section are based on actual locations of nearby residents and farms. The population dose impact is based on historical site specific data i.e., food production, milk production, feed for milk animals and seafood production.

The doses were calculated using methods described in Regulatory Guide 1.109 and represent calculations for the six month reporting interval. Individual doses from batch and continuous releases were calculated using the annual average historic meteorological dispersion coefficients as described in the Offsite Dose Calculation Manual. Population doses were calculated using the meteorological dispersion coefficients for the six month reporting interval.

Liquid Pathways

Doses to individuals in the population from liquid releases are primarily from the seafood ingestion pathway. The total body dose to an individual was calculated to be 2.82E-01 mrem. The calculated highest organ dose from liquid releases was 1.07E+00 mrem to the GI-LLI. The calculated population total body dose was 9.77E-02 person-rem. The calculated average total body dose to the population within fifty miles of the site was 1.64E-05 mrem/person.

#### Air Pathways

The resulting total body and skin doses to an individual were calculated to be 3.04E-03 mrem and 7.41E-03 mrem respectively. The calculated highest organ dose due to radioiodine an particulates with at greater than eight day half-life was 1.13E-02 mrem to the thyroid. The calculated population total body dose was 4.05E-01 person-rem. The calculated average total body dose to the population within fifty miles of the site was 6.78E-05 mrem/person.

Direct Radiation

Direct radiation may be estimated by Thermoluminescent dosimetric (TLD) measurements. One method for comparing TLD measurements is by comparison with preoperational data. It should be noted that the TLDs measure direct radiation from both the Salem and Hope Creek Generating Stations at Artificial Island.

TLDs at onsite locations 2S-2 and 5S-1, which are 0.3 miles and 0.9 miles from the point of origin, averaged 4.6 and 4.1 mrads/month respectively. The values for stations 2S-2 and 5S-1 are within the statistical variation associated with the preoperational program results.

It should be noted the nearest resident is 3.5 miles away. It can thus be concluded that there is no measurable dose to any offsite location from direct radiation.

#### PART F. METEOROLOGICAL DATA

Cumulative joint wind frequency distributions by atmospheric stability class at the 300 foot elevation are provided for the first and second quarters of 1990 in Tables 5 and 6.

# PART G. ODCM CHANGES

During the reporting period between January 1, 1990 and June 30, 1990, the Salem ODCM was revised. Revision 6 was subsequently SORC approved on April 11, 1990. In accordance with Salem Technical Specifications 6.9.1.11 and 6.14, information on the changes is being provided. The current revision 6 of the ODCM includes changes which :

- reflect more current release information to ensure that recommended default alarm setpoints for liquid releases are representative of the current releases;
- (2) change the impact reflecting the use of dose equations (i.e. changing the requirement to use the ODCM dose equations from "may use" to "shall use"); and
- (3) are in response to Technical Evaluation Report (TER), SIM-20-89.

Below is a breakdown of the revisions made to the revised ODCM:

Dose factors in equations 2.6 and 2.11 on pages 22 and 26 were changed to include subscripts for the R, dose factors in order to avoid any possible misinterpretation of which dose factors should be used for a given pathway.

A footnote was also added to page 36 stating that no public drinking or irrigation water samples are taken for the REMP program as these pathways are not directly affected by liquid discharges from Salem.

Figure 1-3 on page 40 was also revised to provide a more simplified illustration of the solid radwaste treatment system. The previous figure was too complex for quick reference and did not depict current treatment methods.

Figure 2-4 was revised to include "inhalation" to the pathway list for the infant age group to insure that all pathways are analyzed for this controlling age group.

The direction and distance to the nearest dairy/residence was also corrected in Table 2-4 on page 51.

Equation 2.16 on page 30 was corrected by removing the summation sign before the term  $(C_i * SF_j)$  since this equation is to be used for one radionuclide and one pathway. The definition of  $C_{ii}$  was also added to equation 2.16.

The words "...and the child age group is controlling for the vegetation pathway " were removed from the first sentence on page 27. The words "and pathway " were removed from "only the controlling age group and pathway as identified in Table 2-4" The reason for these revisions was to ensure that dose analyses are performed for all pathways and not just controlling pathways.



The dose conversion factor for Ce-141 in the child vegetation pathway was corrected in Table 2-5. No dose calculations have been affected as Ce-141 has not been identified in any gaseous effluents.

Per the requirements of Technical Specification 6.9.1.11, a copy of the revised ODCM is attached for NRC records.

These changes will not reduce the accuracy or reliability of the dose calculations or the setpoint calculations as outlined in the ODCM.

#### PART H. INOPERABLE MONITORS

Between the period of January 1, 1990 and June 30, 1990, there were three instances of radioactive effluent monitors being out of service for periods greater than 30 days. Per Salem Technical Specification 3.3.3.8, an explanation of why the inoperability was not corrected in a timely manner is given below :

On April 7, 1990, the number 14 steam generator blowdown line flow indicator was declared inoperable because of a malfunction in the flow indication. Unit 1 entered an outage between April 9 and June 7 for Safety Injection Pump related work. During the outage, work was performed to bring the monitor back into service. The initial work order was completed on April 10. The operability retest required to return the monitor to service could not be performed within the 30 day limit due to the unavailability of steam generator blowdown process flow. The monitor was out of service for 59 days.

Steam Generator process flow is not available during modes 5 and 6. The plant did not reach a mode in which the retest could be performed until June 5. This was well after the 30 day requirement. The cause of the monitor being out of service for greater than 30 days was due to plant conditions which would not allow a test of monitor operability to be performed.

During this reporting period, the A,B,C and D channels of the Salem Unit 2 steam generator blowdown radiation monitors exceeded the Technical Specification 3.3.3.8 thirty day inoperability limit. Channel 2R19C exceeded the thirty day limit on April 21, 1990. Channels A,B and D exceeded the thirty day limit on April 30, 1990. All four monitors became inoperable due to the loss of



secondary system blowdown flow which was due to the Unit 2 March 30 refueling outage.

The Salem Unit 2 22 steam generator blowdown flow monitor was declared inoperable on April 9, 1990 due to faulty flow indication. Unit 2 was shutdown between March 30 and June 22 for a refueling outage. During the outage, work was performed to bring the monitor back into service. The initial work order was completed on April 19. The operability retest required to return the monitor to service could not be performed within the 30 day limit due to the unavailability of steam generator blowdown flow during the outage. The retest was performed on June 26 after the Unit start up. This retest failed and another work order was issued to replace the flow transmitter. The Unit was then shutdown on June 27 for an MSIV outage. The transmitter was replaced and the monitor was declared operable on July 24 while in mode 3. The monitor was inoperable for 106 days.

Steam generator blowdown process flow is not available during modes 5 an 6. The plant did not reach a mode in which the initial retest could be performed until June 26. This was well after the 30 day requirement. The cause of the monitor being out of service for greater than 30 days was due to plant conditions which would not allow a test of monitor operability to be performed.

# SALEM GENERATING STATION TABLE 1A-1

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# EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT JANUARY - JUNE 1990

# UNIT 1

GASEOUS EFFLUENTS-SUMMATI	ON OF	ALL	RELEASES
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		Units	lst Quarter	2nd Quarter	Est. Total Error	ક
Α.	Fission and Activation					
	1. Total release 2. Average release	Ci	3.69E+01	4.60E+01	25	
	rate for period 3. Percent of technical specification limit	uCi/sec	4.69E+00	5.86E+00		
	(T.S. 3.11.2.2(a))	8	2.78E-02	3.47E-02		
в.	Iodines	Ci	3 448-04	6 98 <b>F</b> -04	25	
	2. Average release	CI	J.44E-04	0.906-04	23	
	rate for period 3. Percent of technical specification limit	uCi/sec	4.38E-05	8.87E-05		
	(T.S. 3.11.2.3(a))	(2) %	1.67E-02	3.37E-02		
c.	Particulates 1. Particulates with		•			
	half-lives >8 days 2. Average release	Ci	3.31E-06	1.93E-05	25	
	rate for period 3. Percent of technical specification limit	uCi/sec	4.21E-07	2 <b>.</b> 45E-06		
	(T.S. 3.11.2.3(a))	(~) *	1.67E-02	3.37E-02		
	4. Gross alpha	Ci	0.00E+00	0.00E+00		
c.	Tritium 1. Total Release	Ci	1.84E+01	4.26E+01	25	
	<ol> <li>Average release rate for period</li> <li>Percent of technical</li> </ol>	uCi/sec	2.33E+00	5.42E+00		
	specification limit (T.S. 3.11.2.3(a))	(2) 욱	1.67E-02	3.37E-02		

(1) For batch releases the estimated overall error is within 10%(2) Iodine, tritium and particulates are treated as a group

### SALEM GENERATING STATION TABLE 1A-2

# EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT JANUARY - JUNE 1990

# UNIT 2

GASEOUS	EFFLUENTS	S-SUMMATION	OF	ALL	RELEASES
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		Units	lst Quarter	2nd Quarter	Est. Total Error %	
Α.	Fission and Activation					
	1. Total release 2. Average release	Ci	5.00E+01	1.28E+01	25	
	rate for period 3. Percent of technical specification limit	uCi/sec	6.36E+00	1.63E+00		
	(T.S. 3.11.2.2(a))	ક	3.74E-02	9.63E-03		
в.	Iodines	_ •				
	1. Total iodine-131 2. Average release	Ci	7.06E-05	1.07E-04	25	
	rate for period	uCi/sec	8.99E-06	1.36E-05		
	3. Percent of technical specification limit	(2)				
	(T.S. 3.11.2.3(a))	`* *	3.88E-03	5.96E-03		
c.	Particulates					
	1. Particulates with	<b>c</b> ;	7 225 06	1 000-05	25	
	2. Average release	CI	/.22E-06	1.895-05	25	
	rate for period	uCi/sec	9.18E-07	2.40E-06		
	3. Percent of technical	(2)				
	(T.S. 3.11.2.3(a))	(2) %	3.88E-03	5.96E-03		
	4. Gross alpha	Ci	0.00E+00	0.00E+00		
с.	Tritium					
	1. Total Release	Ci	2.09E+01	3.56E+01	25	
	2. Average release rate for period	uCi/sec	2.66E+00	4.53E+00		
	3. Percent of technical	,	-			
	(T.S. 3.11.2.3(a))	(2) *	3.88E-03	5.96E-03		

(1) For batch releases the estimated overall error is within 10%
 (2) Iodine, tritium and particulates are treated as a group

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# SALEM GENERATING STATION TABLE 1B-1

# EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT JANUARY - JUNE 1990 GASEOUS EFFLUENTS-ELEVATED RELEASES UNIT 1

			CONTINU	IOUS MODE	BATCH	MODE
Nu	Nuclides Released Unit		1st Quarter	2nd Quarter	lst Quarter	2nd Quarter
1.	Fission Gases					
	Krypton-85 Krypton-85m Krypton-88 Xenon-131m Xenon-133 Xenon-133m Xenon-135 Argon-41	Ci Ci Ci Ci Ci Ci	0.00E+00 0.00E+00 0.00E+00 1.77E+01 0.00E+00 3.92E-01 0.00E+00	0.00E+00 0.00E+00 0.00E+00 3.32E+00 0.00E+00 0.00E+00 0.00E+00	2.63E-01 5.43E-03 3.69E-03 3.99E-01 1.79E+01 1.41E-01 1.34E-01 7.22E-04	1.09E+00 6.22E-04 2.20E-04 1.03E+00 4.01E+01 3.50E-01 1.43E-01 0.00E+00
	Total for Period	d Ci	1.81E+01	3.32E+00	1.88E+01	4.27E+01
2.	Iodines	. •		•		
	Iodine-131	Ci	3.44E-04	6.98E-04	0.00E+00	0.00E+00
	Total for Period	i Ci	3.44E-04	6.94E-04	0.00E+00	0.00E+00
3.	Particulates (half-live >8 da	ays				
	Cobalt-58 Cobalt-60	Ci Ci	8.10E-07 2.50E-06	1.33E-05 6.00E-06	0.00E+00 0.00E+00	0.00E+00 0.00E+00
	Total for Period	I Ci	3.31E-06	1.93E-05	0.00E+00	0.00E+00

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# SALEM GENERATING STATION TABLE 1B-2

### EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT JANUARY - JUNE 1990 GASEOUS EFFLUENTS-ELEVATED RELEASES UNIT 2

		_	CONTINU	OUS MODE	BATCH	MODE
Nu	clides Released	Unit	lst Quarter	2nd Quarter	lst Quarter	2nd Quarter
1.	Fission Gases					
	Krypton-85 Krypton-85m Krypton-87 Krypton-88 Xenon-131m Xenon-133 Xenon-133m Xenon-135 Argon-41	Ci Ci Ci Ci Ci Ci Ci	0.00E+00 0.00E+00 0.00E+00 0.00E+00 4.09E+01 0.00E+00 0.00E+00 0.00E+00	0.00E+00 0.00E+00 0.00E+00 0.00E+00 2.86E+00 0.00E+00 0.00E+00 0.00E+00	4.13E-01 1.56E-02 3.70E-04 1.16E-02 8.92E-02 7.93E+00 1.04E-01 5.04E-01 9.44E-03	2.93E-01 0.00E+00 0.00E+00 1.14E-01 9.50E+00 4.94E-02 2.75E-02 0.00E+00
2.	Total for Period Iodines	l Ci	4.09E+01	2.86E+00	9.08E+00	9.98E+00
	Iodine-131	Ci	7.06E-05	1.07E-04	0.00E+00	0.00E+00
3.	Total for Period Particulates (half-live >8 da	l Ci lys	7.06E-05	1.07E-04	0.00E+00	0.00E+00
_	Cobalt-58 Cobalt-60 Cesium-137	Ci Ci Ci	3.15E-06 3.16E-06 9.06E-07	1.48E-05 4.10E-06 0.00E+00	0.00E+00 0.00E+00 0.00E+00	0.00E+00 0.00E+00 0.00E+00
	Total for Period	Ci	7.22E-06	1.89E-05	0.00E+00	0.00E+00

### SALEM GENERATING STATION TABLE 1C

# EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT JANUARY - JUNE 1990 UNITS 1 AND 2

# GASEOUS EFFLUENTS-GROUND-LEVEL RELEASES

		CONTIN	UOUS MODE	BATCH	MODE
Nuclides Released	Unit	lst Quarter	2nd Quarter	1st Quarter	2nd Quarter

There were no ground level gaseous releases during this reporting period.



### SALEM GENERATING STATION TABLE 2A-1

# EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT JANUARY - JUNE 1990

UNIT 1

# LIQUID EFFLUENTS-SUMMATION OF ALL RELEASES

		Units	lst Quarter	2nd Quarter	Est. Total Error %
Α.	Fission and activation products 1. Total release (not including tritium.			- - -	
	gases, alpha) (1) 2. Average diluted concentration during	Ci	6.60E-01	1.12E+00	) 25
	period 3. Percent of technical specification limit	uCi/ml	6.51E-09	1.34E-07	7
в	(T.S. 3.11.1.2.(a))	ફ	2.57E+00	7.66E+00	)
<b>D</b> •	1. Total release 2. Average diluted	Ci	1.74E+02	2.42E+01	25
	<ul> <li>period</li> <li>3. Percent of technical</li> </ul>	uCi/ml	1.71E-06	2.91E-06	5
-	(T.S. 3.11.1.1)	···	5.72E-02	6.96E-02	2
с.	Dissolved and entrained noble gases 1. Total release 2. Average diluted concentration during	Ci	2.28E-01	2.64E-01	25
	periòd 3. Percent of technical specification limit	uCi/ml	2.25E-09	3.16E-08	3
	(T.S. 3.11.1.1)	ક	1.13E-03	1.58E-02	2
D.	Gross alpha activity 1. Total release (2)	Ci	0.00E+00	0.00E+00	)
E.	Volume of waste release (prior to dilution - Batch Release)	liters	2.45E+06	2.38E+06	5
F.	Volume of dilution water used during entire period	d liters	1.01E+11	8.34E+09	)

(1) Fe<sup>55</sup>, Sr<sup>89</sup>, and Sr<sup>90</sup> analyses for the second quarter are not available for inclusion in this report.
 (2) Gross alpha analyses for the second quarter are not available for inclusion in this report.

# SALEM GENERATING STATION TABLE 2A-2

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# EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT JANUARY - JUNE 1990 UNIT 2

### LIQUID EFFLUENTS-SUMMATION OF ALL RELEASES

	Units	lst Quarter	2nd Quarter	Est. Total Error %
A. Fission and activation products 1. Total release (not including tritium,				
gases, alpha) (1) 2. Average diluted	Ci	8.38E-01	9.69E-01	L 25
period 3. Percent of technical	uCi/ml	8.06E-08	1.18E-07	7
(T.S. 3.11.1.2.(a))	*	3.70E+00	7.74E+00	)
<ul> <li>B. Tritium</li> <li>1. Total release</li> <li>2. Average diluted</li> <li>concentration during</li> </ul>	Ci	1.44E+02	1.57E+01	L 25
period 3. Percent of technical	uCi/ml	1.38E-05	1.91E-06	5
(T.S. 3.11.1.1)	ફ	4.60E-01	6.38E-02	2
C. Dissolved and entrained noble gases				
<ol> <li>Total release</li> <li>Average diluted</li> <li>concentration during</li> </ol>	Ci	5.53E-01	2.59E-01	L 25
period 3. Percent of technical	uCi/ml	5.31E-08	3.16E-08	3
specification limit (T.S. 3.11.1.1)	¥	2.66E-02	1.58E-02	2
D. Gross alpha activity 1. Total release (2)	Ci	0.00E+00	0.00E+00	)
E. Volume of waste release (prior to dilution - Batch Release)	liters	2.44E+06	2.28E+06	5
F. Volume of dilution water				
USED during entire perio (1) Fe <sup>55</sup> , Sr <sup>89</sup> , and Sr <sup>90</sup> analyses for the se (2) Gross alpha analyses for the second gua	d liters cond quarter a rter are not a	1.04E+10 renot available f vailable for inclu	8.20E+09 or inclusion in sion in this rec	) this report. xort.



# SALEM GENERATING STATION TABLE 2B-1

# EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT JANUARY - JUNE 1990

# LIQUID EFFLUENTS UNIT 1

CONTINUOUS MODE BATCH MODE

Nuclides Released	Unit	lst Quarter	2nd Quarter	lst Quarter	2nd Quarter
Sodium-24	Ci	0.00E+00	0.00E+00	1.02E-03	8.82E-05
Chromium-51	Ci	0.00E+00	0.00E+00	0.00E+00	5.70E-03
Manganese-54	Ci	0.00E+00	0.00E+00	4.99E-02	6.44E-02
Iron-55	Ci	0.00E+00	0.00E+00	5.38E-02	0.00E+00
Cobalt-57	Ci	0.00E+00	0.00E+00	6.78E-04	2.89E-03
Cobalt-58	Ci	0.00E+00	0.00E+00	3.54E-01	8.20E-01
Iron-59	Ci	0.00E+00	0.00E+00	3.09E-04	4.48E-04
Cobalt-60	Ci	0.00E+00	0.00E+00	2.37E-02	6.64E-02
Zinc-65	Ci	0.00E+00	0.00E+00	0.00E+00	7.50E-03
Strontium-89	Ci	0.00E+00	0.00E+00	1.44E-03	0.00E+00
Strontium-90	Ci	0.00E+00	0.00E+00	9.78E-05	0.00E+00
Niobium-95	Ci	0.00E+00	0.00E+00	4.78E-05	5.01E-04
Iodine-135	Ci	0.00E+00	0.00E+00	1.42E-04	0.00E+00
Zirconium-95	Ci	0.00E+00	0.00E+00	0.00E+00	7.74E-05
Technetium-99m	Ci	0.00E+00	0.00E+00	7.96E-04	7.99E-06
Silver-110m	Ci	0.00E+00	0.00E+00	0.00E+00	4.72E-04
Antimony-122	Ci	0.00E+00	0.00E+00	0.00E+00	1.60E-03
Antimony-124	Ci	0.00E+00	0.00E+00	7.03E-03	9.67E-03
Antimony-125	Ci	0.00E+00	0.00E+00	1.68E-02	2.48E-02
Iodine-131	Ci	0.00E+00	0.00E+00	1.30E-02	1.22E-02
Iodine-133	Ci	0.00E+00	0.00E+00	5.96E-03	3.05E-05
Cesium-134	Ci	0.00E+00	0.00E+00	6.44E-02	5.00E-02
Cesium-136	Ci	0.00E+00	0.00E+00	2.96E-04	8.04E-04
Cesium-137	Ci	0.00E+00	0.00E+00	6.30E-02	5.74E-02
Lanthanum-140	Ci	0.00E+00	0.00E+00	3.75E-04	1.60E-04
Cerium-144	Ci	0.00E+00	0.00E+00	1.11E-04	0.00E+00
Cadmium-109	Ci	0.00E+00	0.00E+00	4.07E-04	0.00E+00
Beryllium-7	Ci	0.00E+00	0.00E+00	1.87E-03	0.00E+00
Tellurium-132	Ci	0.00E+00	0.00E+00	1.81E-05	3.83E-05
Bromine-84	Ci	0.00E+00	0.00E+00	7.11E-05	0.00E+00
Rhodium-105	Ci	0.00E+00	0.00E+00	1.02E-04	0.00E+00
Technetium-101	Ci	0.00E+00	0.00E+00	8.69E-05	0.00E+00
Cesium-138	Ci	0.00E+00	0.00E+00	1.69E-04	0.00E+00
Lanthanum-141	Ci	0.00E+00	0.00E+00	1.49E-03	2.73E-04
Antimony-126	Ci	0.00E+00	0.00E+00	0.00E+00	6.38E-05
Tin-113	Ci	0.00E+00	0.00E+00	5.30E-05	4.52E-05
Barium-140	Ci	0.00E+00	0.00E+00	0.00E+00	1.10E-04
Praseodymium-147	Ci	0.00E+00	0.00E+00	0.00E+00	5.66E-04
	<u>a</u> :		0.007.00		1 100100
TUTALS	C1	<b>U.UOE+00</b>	0.005+00	0.00E-0I	T.TSE+00

# SALEM GENERATING STATION TABLE 2B-1 (Continued)

# EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT JANUARY - JUNE 1990

# LIQUID EFFLUENTS UNIT 1

		CONTINUOUS MODE		BATCH MODE	
Nuclides Released	Unit	1st Quarter	2nd Quarter	lst Quarter	2nd Quarter
Tritium	Ci	0.00E+00	0.00E+00	1.74E+02	2.42E+01
Krypton-88	Ci	0.00E+00	0.00E+00	5.92E-05	0.00E-00
Xenon-131m	Ci	0.00E+00	0.00E+00	3.99E-04	4.79E-03
Xenon-133m	Ci	0.00E+00	0.00E+00	2.14E-03	1.07E-03
Xenon-133	Ci	0.00E+00	0.00E+00	2.18E-01	2.56E-01
Xenon-135	Ci	0.00E+00	0.00E+00	7.24E-03	1.22E-03
Argon-41	Ci	0.00E+00	0.00E+00	1.26E-06	0.00E+00
TOTALS	Ci	0.00E+00	0.00E+00	1.74E+02	2.45E+01

# SALEM GENERATING STATION TABLE 2B-2

# EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT JANUARY - JUNE 1990

# LIQUID EFFLUENTS UNIT 2

CONTINUOUS MODE BATCH MODE

Nuclides Released	Unit	lst Quarter	2nd Quarter	lst Quarter	2nd Quarter
Sodium-24	Ci	0.00E+00	0.00E+00	1.87E-03	1.65E-05
Chromium-51	Ci	0.00E+00	0.00E+00	1.32E-03	8.70E-03
Manganese-54	Ci	0.00E+00	0.00E+00	4.26E-02	6.52E-02
Iron-55	Ci	0.00E+00	0.00E+00	6.35E-02	0.00E+00
Cobalt-58	Ci	0.00E+00	0.00E+00	5.16E-01	6.77E-01
Iron-59	Ci	0.00E+00	0.00E+00	2.88E-04	4.53E-04
Cobalt-60	Ci	0.00E+00	0.00E+00	3.34E-02	6.07E-02
Zinc-65	Ci	0.00E+00	0.00E+00	0.00E+00	1.01E-02
Strontium-89	Ci	0.00E+00	0.00E+00	1.47E-03	0.00E+00
Strontium-90	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Niobium-95	Ci	0.00E+00	0.00E+00	7.19E-04	1.06E-03
Zirconium-95	Ci	0.00E+00	0.00E+00	3.78E-04	4.80E-04
Technetium-99m	Ci	0.00E+00	0.00E+00	8.26E-04	4.05E-05
Silver-110m	Ci	0.00E+00	0.00E+00	0.00E+00	1.49E-03
Antimony-122	Ci	0.00E+00	0.00E+00	3.05E-05	1.84E-03
Antimony-124	Ci	0.00E+00	0.00E+00	8.22E-03	1.02E-02
Antimony-125	Ci	0.00E+00	0.00E+00	2.15E-02	2.55E-02
Iodine-131	Ci	0.00E+00	0.00E+00	1.36E-02	9.91E-03
Iodine-133	Ci	0.00E+00	0.00E+00	9.26E-03	0.00E+00
Cesium-134	Ci	0.00E+00	0.00E+00	5.90E-02	4.08E-02
Cesium-136	Ci	0.00E+00	0.00E+00	3.60E-04	5.01E-04
Cesium-137	Ci	0.00E+00	0.00E+00	5.86E-02	4.72E-02
Lanthanum-140	Ci	0.00E+00	0.00E+00	4.39E-04	1.41E-04
Cerium-144	Ci	0.00E+00	0.00E+00	0.00E+00	7.67E-05
Cobalt-57	Ci	0.00E+00	0.00E+00	1.19E-03	2.42E-03
Iodine-135	Ci	0.00E+00	0.00E+00	7.09E-04	0.00E+00
Tin-113	Ci	0.00E+00	0.00E+00	2.53E-04	1.07E-04
Cesium-138	Ci	0.00E+00	0.00E+00	2.10E-04	0.00E+00
Beryllium-7	Ci	0.00E+00	0.00E+00	4.82E-04	0.00E+00
Antimony-126	Ci	0.00E+00	0.00E+00	0.00E+00	5.95E-05
Lanthanum-141	Ci	0.00E+00	0.00E+00	0.00E+00	1.06E-03
Tellurium-132	Ci	0.00E+00	0.00E+00	0.00E+00	2.08E-05
Zinc-69m	Ci	0.00E+00	0.00E+00	0.00E+00	4.29E-05
Cerium-141	Ci	0.00E+00	0.00E+00	0.00E+00	4.24E-05
Strontium-92	Ci	0.00E+00	0.00E+00	0.00E+00	4.41E-05
Rubidium-88	Ci	0.00E+00	0.00E+00	3.32E-04	0.00E+00
TOTALS	Ci	0.00E+00	0.00E+00	8.38E-01	9.69E-01



### SALEM GENERATING STATION TABLE 2B-2 (Continued)

# EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT JANUARY - JUNE 1990

# LIQUID EFFLUENTS UNIT 2

		CONTINUO	US MODE	BATCH MODE				
Nuclides Released	Unit	1st Quarter	2nd Quarter	lst Quarter	2nd Quarter			
Tritium	Ci	0.00E+00	0.00E+00	1.44E+02	1.57E+01			
Krypton-85m	Ci	0.00E+00	0.00E+00	1.52E-04	0.00E+00			
Xenon-131m	Ci	0.00E+00	0.00E+00	1.24E-03	2.62E-03			
Xenon-133m	Ci	0.00E+00	0.00E+00	6.89E-03	5.55E-04			
Xenon-133	Ci	0.00E+00	0.00E+00	5.15E-01	2.55E-01			
Xenon-135	Ci	0.00E+00	0.00E+00	2.97E-02	3.29E-04			
Argon-41	Ci	0.00E+00	0.00E+00	2.75E-05	0.00E+00			
TOTALS	Ci	0.0 <u>0</u> E+00	0.00E+00	1.44E+02	1.59E+01			

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### SALEM GENERATING STATION TABLE 3

# EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT JANUARY - JUNE 1990 UNITS 1 AND 2 SOLID WASTE AND IRRADIATED FUEL SHIPMENTS

SOLID WASTE SHIPPED OFFSITE FOR BURIAL OR DISPOSAL (Not irradiated fuel)

1.	Тур	e of waste	Units(1)	6-month period	Est. Total Error, %
	a.	Spent resins, filters, sludges, evaporator bottoms	m3 Ci	0.00E+00 0.00E+00	25
	b.	Dry compressible waste, contaminated equipment.	m3 Ci	4.61E+01 1.16E+00	25
	c.	Irradiated components, control rods	m3 Ci	0.00E+00 0.00E+00	25
	d.	Others (described)	m3 Ci	0.00E+00 0.00E+00	25

Estimate of major nuclide composition (for Type A and B waste) 2. Resins DAW (%) (Ci) (%) (Ci) Tritium - 3 0.00E+00 1.16E-03 0.0 0.1 0.00E+00 Cobalt-58 56.6 6.57E-01 0.0 Iron - 550.00E+00 15.7 1.82E-01 0.0 Manganese - 54 0.0 0.00E+00 1.20 1.39E-02 Cobalt - 60 0.0 0.00E+00 9.39 1.10E-01 Nickel - 63 0.0 0.00E+00 9.11 1.05E-01 Cesium - 134 0.0 0.00E+00 2.13 2.47E-02 Cesium - 137 0.0 0.00E+00 4.21 4.88E-02 Cerium - 144 2.67E-03 0.0 0.00E+00 0.23 Plutonium - 241 0.0 0.00E+00 1.25 1.45E-02

(1) Volumes are measured, activities are estimated

# SALEM GENERATING STATION TABLE 3 (Continued)

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT JANUARY - JUNE 1990 UNITS 1 AND 2 SOLID WASTE AND IRRADIATED FUEL SHIPMENTS

# 3. Solid Waste Disposition

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Number of	Mode of	Destination	Type of
Shipments	Transportation		Containers
11	Truck	Barnwell, SC	Large Tight Box



4. IRRADIATED FUEL SHIPMENTS (Disposition)

Number of Shipments	Mode of Transportation	Destination
None	N/A	N/A

### SALEM GENERATING STATION TABLE 4A-1

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT JANUARY - JUNE 1990 SUMMARY SHEET FOR RADIOACTIVE EFFLUENTS RELEASED IN A BATCH MODE UNIT 1

#### BATCH RELEASES ONLY

:

- 1. Dates: January 1 March 31, 1990
- 2. Type of release: Gas
- 3. Number of releases during the 1st Quarter: 44
- Total time duration for all releases of type listed above:
   3.51E+03 minutes
- 5. Maximum duration for release of type listed above: 1.06E+02 minutes
- Average duration for release of type listed above: 7.98E+01 minutes
- Minimum duration for release of type listed above:
   3.40E+01 minutes
- 8. Average stream flow (dilution flow) during the period of release: N/A

SALEM GENERATING STATION TABLE 4A-1 (Continued)

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT JANUARY - JUNE 1990 SUMMARY SHEET FOR RADIOACTIVE EFFLUENTS RELEASED IN A BATCH MODE UNIT 1

- 1. Dates: April 1 June 30, 1990
- 2. Type of release: Gas
- 3. Number of releases during the 2nd Quarter: 50
- 4. Total time duration for all releases of type listed above: 4.72E+03 minutes
- 5. Maximum duration for release of type listed above: 4.45E+02 minutes
- Average duration for release of type listed above: 9.43E+01 minutes
- 7. Minimum duration for release of type listed above: 2.70E+01 minutes
- 8. Average stream flow (dilution flow) during the period of release: N/A

### SALEM GENERATING STATION TABLE 4A-2

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT JANUARY - JUNE 1990 SUMMARY SHEET FOR RADIOACTIVE EFFLUENTS RELEASED IN A BATCH MODE UNIT 2

- 1. Dates: January 1 March 31, 1990
- 2. Type of release: Gas
- 3. Number of releases during the 1st Quarter: 14
- Total time duration for all releases of type listed above: 1.19E+03 minutes
- 5. Maximum duration for release of type listed above: 1.46E+02 minutes
- Average duration for release of type listed above:
   8.50E+01 minutes
- Minimum duration for release of type listed above:
   2.80E+01 minutes
- 8. Average stream flow (dilution flow) during the period of release: N/A

SALEM GENERATING STATION TABLE 4A-2 (Continued)

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT JANUARY - JUNE 1990 SUMMARY SHEET FOR RADIOACTIVE EFFLUENTS RELEASED IN A BATCH MODE UNIT 2

- 1. Dates: April 1 June 30, 1990
- 2. Type of release: Gas
- 3. Number of releases during the 2nd Quarter: 33
- 4. Total time duration for all releases of type listed above: 2.57E+04 minutes
- 5. Maximum duration for release of type listed above: 5.60E+03 minutes
- Average duration for release of type listed above:
   7.80E+02 minutes
  - 7. Minimum duration for release of type listed above: 2.60E+01 minutes
  - 8. Average stream flow (dilution flow) during the period of release: N/A

# SALEM GENERATING STATION TABLE 4B-1

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT JANUARY - JUNE 1990 SUMMARY SHEET FOR RADIOACTIVE EFFLUENTS RELEASED IN A BATCH MODE UNIT 1

#### BATCH RELEASES ONLY

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- 1. Dates: January 1 March 31, 1990
- 2. Type of release: Liquid
- 3. Number of releases during the 1st Quarter: 41
- Total time duration for all releases of type listed above: 1.38E+05 minutes
- 5. Maximum duration for release of type listed above: 9.79E+04 minutes
- Average duration for release of type listed above:
   3.36E+03 minutes
- 7. Minimum duration for release of type listed above: 2.01E+02 minutes
- Average stream flow (dilution flow) during the period of release: 1.94E+05 gpm

SALEM GENERATING STATION TABLE 4B-1 (Continued)

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT JANUARY - JUNE 1990 SUMMARY SHEET FOR RADIOACTIVE EFFLUENTS RELEASED IN A BATCH MODE UNIT 1

- 1. Dates: April 1 June 30, 1990
- 2. Type of release: Liquid
- 3. Number of releases during the 2nd Quarter: 38
- 4. Total time duration for all releases of type listed above: 9.97E+03 minutes
- 5. Maximum duration for release of type listed above: 4.76E+02 minutes
- 6. Average duration for release of type listed above: 2.62E+02 minutes
  - 7. Minimum duration for release of type listed above: 2.19E+02 minutes
  - 8. Average stream flow (dilution flow) during the period of release: 2.21E+05 gpm

SALEM GENERATING STATION TABLE 4B-2

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT JANUARY - JUNE 1990 SUMMARY SHEET FOR RADIOACTIVE EFFLUENTS RELEASED IN A BATCH MODE UNIT 2

- 1. Dates: January 1 March 31, 1990
- 2. Type of release: Liquid
- 3. Number of releases during the 1st Quarter: 38
- Total time duration for all releases of type listed above: 9.62E+03 minutes
- 5. Maximum duration for release of type listed above: 5.24E+02 minutes
- 6. Average duration for release of type listed above: 2.53E+02 minutes
- Minimum duration for release of type listed above:
   2.07E+02 minutes
- 8. Average stream flow (dilution flow) during the period of release: 2.86E+05 gpm

SALEM GENERATING STATION TABLE 4B-2 (Continued)

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT JANUARY - JUNE 1990 SUMMARY SHEET FOR RADIOACTIVE EFFLUENTS RELEASED IN A BATCH MODE UNIT 2

- 1. Dates: April 1 June 30, 1990
- 2. Type of release: Liquid
- 3. Number of releases during the 2nd Quarter: 36
- Total time duration for all releases of type listed above: 9.30E+03 minutes
- 5. Maximum duration for release of type listed above: 3.61E+02 minutes
- 6. Average duration for release of type listed above: 2.58E+02 minutes
- 7. Minimum duration for release of type listed above: 2.11E+02 minutes
- 8. Average stream flow (dilution flow) during the period of release: 2.33E+05 gpm



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ARTIFICIAL ISLAND 1/90 - 3/90

# JOINT DISTRIBUTION OF WIND DIRECTION AND SPEED BY ATMOSPHERIC STABILITY CLASS WIND: 300 FT DELTA T: (300-33FT)

LAPSE RATE:	LE -1.9	DEG C/100M
		CLASS A

# WIND SPEED GROUPS (MPH)

	0.0	-0.5	0.6	-3.5	3.6	-7.5	7.6-12.5 12.6-1		-18.5	5 18.6-24.5		GE 24.6		SUM PERCEN		
DIRECTION	SUM P	ERCENT	SUM P	ERCENT	sum p	ERCENT	SUM PERCENT		SUM PERCENT		SUM PERCENT		SUM PERCENT			
N	0	0.0	0	0.0	0	0.0	1	0.0	0	0.0	0	0.0	0	0.0	1	0.0
NNE	0	0.0	0	0.0	0	0.0	5	0.2	2	0.1	0	0.0	0	0.0	7	0.3
. NE	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
ENE	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
E	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
ESE	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
SE	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
SSE	0	0.0	1	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	0.0
S	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	D	0.0	0	0.0	0	0.0
SS₩	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
S₩	0	0.0	0	0.0	0	0.0	0	0.0	Ō	0.0	0	0.0	0	0.0	0	0.0
VSV	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
V	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
VNV	0	0.0	0	0.0	0	0.0	1	0.0	3	0.1	1	0.0	7	0.3	12	0.6
NV	0	0.0	0	0.0	0	0.0	4	0.2	19	0.9	6	0.3	3	0.1	32	1.5
NNV	0	0.0	0	0.0	0	0.0	6	0.3	8	0.4	0	0.0	0	0.0	14	0.7
	0	0.0	1	0.0	0	0.0	17	0.8	32	1.5	7	0.3	10	0.5	67	3.1

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ARTIFICIAL ISLAND 1/90 - 3/90

JOINT DISTRIBUTION OF WIND DIRECTION AND SPEED BY ATMOSPHERIC STABILITY CLASS WIND: 300 FT DELTA T: (300-33FT)

LAPSE RATE: -1.8 TO -1.7 DEG C/100M CLASS B

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#### WIND SPEED GROUPS (MPH)

7.6-12.5		12.6-18.5		18.6-24.5		24.6	SUM PERCENT	
Percent	sum f	PERCENT	SUM PERCENT		SUM PERCENT			
0.0	1	0.0	0	0.0	0	0.0	4	0.2
0.0	0	0.0	0	0.0	0	0.0	0	0.0
0.0	0	0.0	0	0.0	0	0.0	0	0.0
0.0	0	0.0	0	0.0	0	0.0	0	0.0
0.0	0	0.0	0	0.0	0	0.0	0	0.0
0.0	0	0.0	0	0.0	0	0.0	0	0.0
0.0	0	0.0	0	0.0	0	0.0	0	0.0
0.0	0	0.0	0	0.0	0	0.0	0	0.0
0.0	0	0.0	0	0.0	0	0.0	0	0.0
0.0	0	0.0	0	0.0	0	0.0	0	0.0
0.0	1	0.0	0	0.0	0	0.0	1	0.0
0.0	0	0.0	0	0.0	0	0.0	1	0.0
0.0	0	0.0	1	0.0	0	0.0	1	0.0
0.1	0	0.0	3	0.1	5	0.2	10	0.5
0.0	3	0.1	2	0.1	3	0.1	10	0.5
0.1	6	0.3	0	0.0	0	0.0	9	0.4
0.4	11	0.5	6	0.3	8	0.4	36	1.7
	0.4	0.4 11	0.4 11 0.5	0.4 11 0.5 6	0.4 11 0.5 6 0.3	0.4 11 0.5 6 0.3 8	0.4 11 0.5 6 0.3 8 0.4	0.4 11 0.5 6 0.3 8 0.4 36



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ARTIFICIAL ISLAND 1/90 - 3/90

# JOINT DISTRIBUTION OF WIND DIRECTION AND SPEED BY ATMOSPHERIC STABILITY CLASS WIND: 300 FT DELTA T: (300-33FT)

LAPSE RATE: -1.6 TO -1.5 DEG C/100M CLASS C

# WIND SPEED GROUPS (MPH)

	0.0	-0.5	0.6	-3.5	3.6	-7.5	7.6	-12.5	12.6-	-18.5	18.6-	-24.5	GE a	24.6	SUM PE	ERCENT
DIRECTION	sum pi	UM PERCENT SUM PERCENT		SUM PERCENT		SUM PERCENT		SUM PERCENT		SUM PERCENT		SUM PERCENT				
N	0	0.0	0	0.0	1	0.0	1	0.0	1	· 0.0	1	0.0	0	0.0	4	0.2
NNE	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
NE	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
ENE	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Ε	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
ESE	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
SE	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
SSE	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
S	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
SSV	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	·0	0.0
SV	0	0.0	0	0.0	0	0.0	0	0.0	1	0.0	0	0.0	0	0.0	1 -	0.0
WSW	0	0.0	0	0.0	0	0.0	1	0.0	1	0.0	0	0.0	0	0.0	2	0.1
V	0	0.0	0	0.0	0	0.0	0	0.0	1	0.0	6	0.3	0	0.0	7	0.3
WNW	0	0.0	0	0.0	0	0.0	1	0.0	0	0.0	2	0.1	5	0.2	8	0.4
NV	0	0.0	0	0.0	1	0.0	1	0.0	3	0.1	2	0.1	1	0.0	8	0.4
NNV	0	0.0	0	0.0	0	0.0	2	0.1	0	0.0	1	0.0	0	0.0	3	0.1
	0	0.0	0	0.0	2	0.1	6	0:3	7	0.3	12	0.6	6	0.3	33	1.5

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ARTIFICIAL ISLAND 1/90 - 3/90

# JOINT DISTRIBUTION OF WIND DIRECTION AND SPEED BY ATMOSPHERIC STABILITY CLASS WIND: 300 FT DELTA T: (300-33FT)

LAPSE RATE: -1.4 TO -0.5 DEG C/100M CLASS D

.

#### WIND SPEED GROUPS (MPH)

0.0	-0.5	0.6	-3.5	3.6	-7.5	7.6-12.5		12.6-18.5 18.6		-24.5	GE 24.6		SUM PERCENT		
sum p	ercent	sum pi	ERCENT	sum pi	ERCENT	sum pi	Ercent	sum pi	ERCENT	SUM PERCENT		SUM PERCENT			
0	0.0	0	0.0	3	0.1	1	0.0	3	0.1	6	0.3	. 0	0.0	13	0.6
0	0.0	0	0.0	1	0.0	3	0.1	1	0.0	1	0.0	0	0.0	6	0.3
0	0.0	1	0.0	0	0.0	5	0.2	3	0.1	0	0.0	0	0.0	9	0.4
0	0.0	1	0.0	1	0.0	6	0.3	6	0.3	0	0.0	0	0.0	14	0.7
0	0.0	0	0.0	1	0.0	10	0.5	4	0.2	0	0.0	0	0.0	15	0.7
0	0.0	0	0.0	0	0.0	3	0.1	4	0.2	1	0.0	0	0.0	8	0.4
0	0.0	0	0.0	0	0.0	1	0.0	1	0.0	0	0.0	0	0.0	2	0.1
0	0.0	1	0.0	0	0.0	0	0.0	1	0.0	0	0.0	0	0.0	2	0.1
0	0.0	0	0.0	0	0.0	1	0.0	0	0.0	0	0.0	0	0.0	1	0.0
0	0.0	2	0.1	5	0.2	3	0.1	1	0.0	0	0.0	0	0.0	11	0.5
0	0.0	0	0.0	3	0.1	11	0.5	7	0.3	0	0.0	0	0.0	21	1.0
0	0.0	0	0.0	1	0.0	19	0.9	14	0.7	1	0.0	4	0.2	39	1.8
0	0.0	0	0.0	3	0.1	3	0.1	11	0.5	19	0.9	17	0.8	53	2.5
0	0.0	0	0.0	3	0.1	2	0.1	6	0.3	15	0.7	28	1.3	54	2.5
0	0.0	0	0.0	5	0.2	2	0.1	10	0.5	12	0.6	5	0.2	34	1.6
0	0.0	1	0.0	0	0.0	3	0.1	9	0.4	2	0.1	3	0.1	18	0.8
0	0.0	6	0.3	26	1.2	73	3.4	81	3.8	57	2.6	57	2.6	300	13.9
	0.0 SUM P 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0.0-0.5 SUM PERCENT 0 0.0 0	D.D-D.S         D.6           SUM PERCENT         SUM PI           0         0.0         0           0         0.0         0           0         0.0         0           0         0.0         1           0         0.0         1           0         0.0         1           0         0.0         0           0         0.0         0           0         0.0         0           0         0.0         1           0         0.0         0           0         0.0         0           0         0.0         0           0         0.0         0           0         0.0         0           0         0.0         0           0         0.0         1           0         0.0         1	0.0-0.5         0.6-3.5           SUM PERCENT         SUM PERCENT           0         0.0         0         0.0           0         0.0         0         0.0           0         0.0         0         0.0           0         0.0         1         0.0           0         0.0         1         0.0           0         0.0         1         0.0           0         0.0         0         0.0           0         0.0         0         0.0           0         0.0         0         0.0           0         0.0         0         0.0           0         0.0         0         0.0           0         0.0         0         0.0           0         0.0         0         0.0           0         0.0         0         0.0           0         0.0         0         0.0           0         0.0         0         0.0           0         0.0         0         0.0           0         0.0         0         0.0           0         0.0         1         0.0	0.0-0.5         0.6-3.5         3.6           SUM PERCENT         SUM PERCENT         SUM PI           0         0.0         0         0.0         3           0         0.0         0         0.0         3           0         0.0         0         0.0         1           0         0.0         1         0.0         1           0         0.0         1         0.0         1           0         0.0         1         0.0         1           0         0.0         0         0.0         1           0         0.0         0         0.0         1           0         0.0         0         0.0         0           0         0.0         0         0.0         0           0         0.0         0         0.0         3           0         0.0         0         0.0         3           0         0.0         0         0.0         3           0         0.0         0         0.0         3           0         0.0         0         0.0         0           0         0.0         1         0.0	0.0-0.5         0.6-3.5         3.6-7.5           SUM PERCENT         SUM PERCENT         SUM PERCENT         SUM PERCENT           0         0.0         0         0.0         3         0.1           0         0.0         0         0.0         3         0.1           0         0.0         0         0.0         1         0.0           0         0.0         1         0.0         1         0.0           0         0.0         1         0.0         0         0.0           0         0.0         1         0.0         0         0.0           0         0.0         0         0.0         1         0.0           0         0.0         0         0.0         0         0.0           0         0.0         0         0.0         0         0.0           0         0.0         0         0.0         0         0.0           0         0.0         0         0.0         3         0.1           0         0.0         0         0.0         3         0.1           0         0.0         0         0.0         0         0.0	0.0-0.5         0.6-3.5         3.6-7.5         7.6           SUM PERCENT         SUM PERCENT         SUM PERCENT         SUM PERCENT         SUM PERCENT           0         0.0         0         0.0         3         0.1         1           0         0.0         0         0.0         3         0.1         1           0         0.0         0         0.0         1         0.0         3           0         0.0         1         0.0         3         0.1         1           0         0.0         1         0.0         3         0.1         1           0         0.0         1         0.0         0         0.0         5           0         0.0         1         0.0         1         0.0         6           0         0.0         0         0.0         1         0         0           0         0.0         0         0.0         1         0         0           0         0.0         0         0.0         1         1         0           0         0.0         0         0.0         1         1         1           0	0.0-0.5         0.6-3.5         3.6-7.5         7.6-12.5           SUM PERCENT         SUM PERCENT         SUM PERCENT         SUM PERCENT         SUM PERCENT           0         0.0         0         0.0         3         0.1         1         0.0           0         0.0         0         0.0         1         0.0         3         0.1           0         0.0         1         0.0         3         0.1         1         0.0           0         0.0         1         0.0         3         0.1         0.0         3         0.1           0         0.0         1         0.0         3         0.1         0.0         3         0.1           0         0.0         1         0.0         0         0.0         3         0.1           0         0.0         0         0.0         1         0.0         0         0.0           0         0.0         0         0.0         0         0.0         0         0.0           0         0.0         0         0.0         0         0.0         0         0.0           0         0.0         0         0.0         0	0.0-0.5         0.6-3.5         3.6-7.5         7.6-12.5         12.6           SUM PERCENT         SUM PERCENT	0.0-0.5         0.6-3.5         3.6-7.5         7.6-12.5         12.6-18.5           SUM PERCENT         SUM PERCENT         SUM PERCENT         SUM PERCENT         SUM PERCENT         SUM PERCENT           0         0.0         0         0.0         3         0.1         1         0.0         3         0.1           0         0.0         0         0.0         1         0.0         3         0.1         1         0.0           0         0.0         1         0.0         3         0.1         1         0.0           0         0.0         1         0.0         3         0.1         1         0.0           0         0.0         1         0.0         5         0.2         3         0.1           0         0.0         1         0.0         6         0.3         6         0.3           0         0.0         0         0.0         1         0.0         1         0.0           0         0.0         0         0.0         0         0.0         1         0.0           0         0.0         0         0.0         0         0.0         1         0.0	0.0-0.5         0.6-3.5         3.6-7.5         7.6-12.5         12.6-18.5         18.6           SUM PERCENT         SUM PERCENT <t< td=""><td>0.0-0.5         0.6-3.5         3.6-7.5         7.6-12.5         12.6-18.5         18.6-24.5           SUM PERCENT           0         0.0         0         0.0         1         0.0         3         0.1         1         0.0         1         0.0           0         0.0         1         0.0         1         0.0         1         0.0         0         0.0           0         0.0         0         0.0         1         0.0         0         0.0         0         0.0         0         0.0         0.0         0.0         0.0         0.0         0.0         0.0</td><td>0.0-0.5         0.6-3.5         3.6-7.5         7.6-12.5         12.6-18.5         18.6-24.5         GE 1           SUM PERCENT           0         0.0         0</td><td>0.0-0.5         0.6-3.5         3.6-7.5         7.6-12.5         12.6-18.5         18.6-24.5         GE 24.6           SUM PERCENT           0         0.0         0         0.0         1         0.0         3         0.1         1         0.0         0         0.0           0         0.0         1         0.0         3         0.1         4         0.2         0         0.0         0         0.0           0         0.0         0         0.0         1         0.0         0         0.0         0         0.0         0         0.0         0         0.0         0         0.</td><td>0.0-0.5         0.6-3.5         3.6-7.5         7.6-12.5         12.6-18.5         18.6-24.5         GE 24.6         SUM PERCENT           SUM PERCENT         &lt;</td></t<>	0.0-0.5         0.6-3.5         3.6-7.5         7.6-12.5         12.6-18.5         18.6-24.5           SUM PERCENT           0         0.0         0         0.0         1         0.0         3         0.1         1         0.0         1         0.0           0         0.0         1         0.0         1         0.0         1         0.0         0         0.0           0         0.0         0         0.0         1         0.0         0         0.0         0         0.0         0         0.0         0.0         0.0         0.0         0.0         0.0         0.0	0.0-0.5         0.6-3.5         3.6-7.5         7.6-12.5         12.6-18.5         18.6-24.5         GE 1           SUM PERCENT           0         0.0         0	0.0-0.5         0.6-3.5         3.6-7.5         7.6-12.5         12.6-18.5         18.6-24.5         GE 24.6           SUM PERCENT           0         0.0         0         0.0         1         0.0         3         0.1         1         0.0         0         0.0           0         0.0         1         0.0         3         0.1         4         0.2         0         0.0         0         0.0           0         0.0         0         0.0         1         0.0         0         0.0         0         0.0         0         0.0         0         0.0         0         0.	0.0-0.5         0.6-3.5         3.6-7.5         7.6-12.5         12.6-18.5         18.6-24.5         GE 24.6         SUM PERCENT           SUM PERCENT         <

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ARTIFICIAL ISLAND 1/90 - 3/90

JOINT DISTRIBUTION OF WIND DIRECTION AND SPEED. BY ATMOSPHERIC STABILITY CLASS WIND: 300 FT DELTA T: (300-33FT)

LAPSE RATE: -0.4 TO 1.5 DEG C/100M CLASS E

# WIND SPEED GROUPS (MPH)

	0.0	-0.5	0.6-3.5 3.6-7.5 7.6-12.5 12.6-		.6-18.5 18.6-24.5			GE	24.6	SUM PERCENT						
DIRECTION	sum p	JM PERCENT		ERCENT	sum p	ERCENT	sum f	PERCENT	Sum p	PERCENT	sum p	ERCENT	sum p	ERCENT	ł	
N	0	0.0	3	0.1	1	0.0	7	0.3	15	0.7	7	0.3	0	0.0	33	1.5
NNE	0	0.0	5	0.2	8	0.4	20	0.9	37	1.7	3	0.1	0	0.0	73	3.4
. NE	0	0.0	5	0.2	12	0.6	. 20	0.9	14	0.7	4	0.2	0	0.0	55	2.6
ENE	0	0.0	6	0.3	13	0.6	14	0.7	8	0.4	6	0.3	1	0.0	48	2.2
E	0	0.0	2	0.1	14	0.7	8	0.4	6	0.3	2	0.1	0	0.0	32	1.5
ESE	0	0.0	3	0.1	5	0.2	3	0.1	5	0.2	4	0.2	0	0.0	20	0.9
SE	0	0.0	3	0.1	4	0.2	3	0.1	8	0.4	5	0.2	3	0.1	26	.1.2
· SSE	0	0.0	1	0.0	13	0.6	11	0.5	19	0.9	10	0.5	2	0.1	56	2.6
S	0	0.0	· 0	0.0	5	0.2	11	0.5	10	0.5	14	0.7	2	0.1	42	2.0
SSW	0	0.0	1	0.0	12	0.6	30	1.4	26	1.2	9	0.4	8	0.4	86	4.0
SV	0	0.0	1	0.0	9	0.4	23	1.1	. 29	1.3	5	0.2	0	0.0	67	3.1
VSV	0	0.0	2	0.1	7	0.3	19	0.9	14	0.7	11	0.5	5	0.2	58	2.7
V	0	0.0	1	0.0	10	0.5	14	0.7	23	1.1	21	1.0	16	0.7	85	4.0
WNW	0	0.0	2	0.1	10	0.5	17	0.8	18	0.8	31	1.4	13	0.6	91	4.2
NV	0	0.0	2	0.1	3	0.1	10	0.5	21	1.0	26	1.2	21	1.0	83	3.9
NNV	0	0.0	5	0.2	9	0.4	5	0.2	11	0.5	11	0.5	10	0.5	51	2.4
									·.							
	0	0.0	42	2.0	135	6.3	215	10.0	264	12.3	169	7.9	81	3.8	906	42.1

MEAN WIND SPEED: 14.3 2



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ARTIFICIAL ISLAND 1/90 - 3/90

# JOINT DISTRIBUTION OF WIND DIRECTION AND SPEED BY ATMOSPHERIC STABILITY CLASS WIND: 300 FT DELTA T: (300-33FT)

LAPSE RATE: 1.6 TO 4.0 DEG C/100M CLASS F

2

#### WIND SPEED GROUPS (MPH)

	0.0-0.5		0.0-0.5		0.0-0.5		0.6	-3.5	3.6	-7.5	7.6	-12.5	12.6	-18.5	18.6	-24.5	GE	24.6	SUM P	ERCENT
DIRECTION	sum p	ERCENT	sum pi	ERCENT	SUM PERCENT		SUM PERCENT		SUM PERCENT		SUM PERCENT		SUM PERCENT							
N	0	0.0	0	0.0	1	0.0	4	0.2	0	0.0	0	0.0	0	0.0	5	0.2				
NNE	0	0.0	0	0.0	1	0.0	1	0.0	1	0.0	0	0.0	0	0.0	3	0.1				
NE	0	0.0	1	0.0	1	0.0	2	0.1	1	0.0	0	0.0	0	0.0	5	0.2				
ENE	0	0.0	0	0.0	1	0.0	1	0.0	1	0.0	0	0.0	0	0.0	3	0.1				
Ε	0	0.0	0	0.0	6	0.3	5	0.2	1	0.0	0	0.0	0	0.0	12	0.6				
ESE	0	0.0	1	0.0	5	0.2	8	0.4	1	0.0	1	0.0	1	0.0	17	0.8				
SE	0	0.0	2	0.1	14	0.7	9	0.4	13	0.6	7	0.3	7	0.3	52	2.4				
SSE	0	0.0	4	0.2	9	0.4	18	0.8	18	0.8	16	0.7	6	0.3	71	3.3				
S	0	0.0	2	0.1	13	0.6	30	1.4	24	1.1	22	1.0	18	0.8	109	5.1				
SSV	0	0.0	2	0.1	6	0.3	19	0.9	36	1.7	21	1.0	45	2.1	129	6.0				
SV	0	0.0	3	0.1	12	0.6	17	0.8	22	1.0	13	0.6	6	0.3	73	3.4				
VSV	0	0.0	1	0.0	4	0.2	7	0.3	3	0.1	2	0.1	0	0.0	17	0.8				
¥	0	0.0	1	0.0	2	0.1	1	0.0	6	0.3	0	0.0	0	0.0	10	0.5				
WNW	0	0.0	2	0.1	0	0.0	4	0.2	3	0.1	2	0.1	0	0.0	11	0.5				
NV	0	0.0	0	0.0	1	0.0	2	0.1	12	0.6	9	0.4	0	0.0	24	1.1				
NNV	0	0.0	0	0.0	0	0.0	4	0.2	2	0.1	0	0.0	0	0.0	6	0.3				
	0	0.0	19	0.9	76	3.5	132	6.1	144	6.7	93	4.3	83	3.9	547	25.4				



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ARTIFICIAL ISLAND 1/90 - 3/90

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# JOINT DISTRIBUTION OF WIND DIRECTION AND SPEED BY ATMOSPHERIC STABILITY CLASS WIND: 300 FT DELTA T: (300-33FT)

LAPSE RATE: GT 4.0 DEG C/100M CLASS G

# WIND SPEED GROUPS (MPH)

	0.0	-0.5	0.6	-3.5	3.6	-7.5	7.6	-12.5	12.6 <sup>.</sup>	-18.5	18.6 <sup>.</sup>	-24.5	GE 2	24.6	sum p	ERCENT
DIRECTION	sum p	ERCENT	sum pi	ERCENT	sum pi	ERCENT	sum pi	ERCENT	sum pi	ercent	sum pi	ERCENT	sum pi	ERCENT		
N	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
NNE	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
NE	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
ENE	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
E	0	0.0	0	0.0	0	0.0	1	0.0	0	0.0	0	0.0	0	0.0	1	0.0
ESE	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
SE	0	0.0	0	0.0	1	<b>0.0</b> <sup>.</sup>	6	0.3	5	0.2	10	0.5	1	0.0	23	1.1
SSE	0	0.0	2	0.1	4	0.2	8	0.4	7	0.3	6	0.3	3	0.1	30	1.4
S	0	0.0	0	0.0	8	0.4	15	0.7	28	1.3	34	1.6	4	0.2	89	4.1
SSW	0	0.0	1	0.0	6	0.3	17	0.8	16	0.7	8	0.4	4	0.2	52	2.4
SW	0	0.0	0	0.0	1	0.0	16	0.7	12	0.6	6	0.3	1	0.0	36	1.7
WSW	0	0.0	0	0.0	0	0.0	4	0.2	9	0.4	1	0.0	0	0.0	14	0.7
V	0	0.0	1	0.0	1	0.0	2	0.1	7	0.3	0	0.0	0	0.0	11	0.5
WNW	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	2	0.1	0	0.0	2	0.1
NV	0	0.0	0	0.0	1	0.0	0	0.0	3	0.1	0	0.0	0	0.0	4	0.2
NNV	0	0.0	0	0.0	0	0.0	. 0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
	0	0.0	4	0.2	22	1.0	69	3.2	87	4.0	67	3.1	13	0.6	262	12.2

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ARTIFICIAL ISLAND 1/90 - 3/90

# JOINT DISTRIBUTION OF WIND DIRECTION AND SPEED BY ATMOSPHERIC STABILITY CLASS WIND: 300 FT DELTA T: (300-33FT)

ALL STABILITY CLASSES

VIND	SPEED	GROUPS	(MPH)
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	0.0	-0.5	0.6	-3.5	3.6	5-7.5	7.6	5-12.5	12.6	5-18.5	18.6	-24.5	GE	24.6	SUM	PERCENT
DIRECTION	sum p	ERCENT	sum pi	ERCENT	sum f	PERCENT	sum f	PERCENT	sum p	PERCENT	sum p	ERCENT	sum p	ERCENT		
N	O	0.0	3	0.1	8	0.4	15	0.7	20	0.9	14	0.7	0	0.0	60	2.8
NNE	0	0.0	5	0.2	10	0.5	29	1.3	41	1.9	4	0.2	0	0.0	89	4.1
NE	0	0.0	7	0.3	13	0.6	27	1.3	18	0.8	4	0.2	0	0.0	69	3.2
ENE	0	0.0	7	0.3	15	0.7	21	1.0	15	0.7	6	0.3	1	0.0	65	3.0
E	0	0.0	2	0.1	21	1.0	24	1.1	11	0.5	2	0.1	0	0.0	60	2.8
ESE	0	0.0	4	0.2	10	0.5	14	0.7	10	0.5	6	0.3	1	0.0	45	2.1
SE	0	0.0	5	0.2	19	0.9	19	0.9	27	1.3	22	1.0	11	0.5	103	4.8
SSE	0	0.0	9	0.4	26	1.2	37	1.7	45	2.1	32	1.5	11	0.5	160	7.4
S	0	0.0	2	0.1	26	1.2	57	2.6	62	2.9	70	3.3	24	1.1	241	11.2
SSV	0	0.0	6	0.3	29	1.3	69	3.2	79	3.7	38	1.8	57	2.6	278	12.9
SV	0	0.0	4	0.2	25	1.2	67	3.1	72	3.3	24	1.1	7	0.3	199	9.3
VSV	0	0.0	3	0.1	12	0.6	51	2.4	41	1.9	15	0.7	9	0.4	131	6.1
V	0	0.0	3	0.1	16	0.7	20	0.9	48	2.2	47	2.2	33	1.5	167	7.8
VNV	0	0.0	4	0.2	13	0.6	27	1.3	30	1.4	56	2.6	58	2.7	188	8.7
NV	0	0.0	2	0.1	12	0.6	20	0.9	71	3.3	57	2.6	33	1.5	195	9.1
NNV	0	0.0	6	0.3	9	0.4	23	1.1	36	1.7	14	0.7	13	0.6	101	4.7
		• •						· ·		·						
	U	0.0	72	3.3	264	12.3	520	24.2	626	29.1	411	19.1	258	12.0	2151	100.0

MISSING HOURS: 9



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# PAGE 9 of 9

ARTIFICIAL ISLAND 1/90 - 3/90

# JOINT DISTRIBUTION OF WIND DIRECTION AND SPEED BY ATMOSPHERIC STABILITY CLASS WIND: 300 FT DELTA T: (300-33FT)

DIRECTION VS SPEED ONLY

VIND SPEED GROUPS (	MPH)
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sum p	ERCENT	sum pi	ERCENT	sum p	ERCENT	sum p	ercent ·	sum p	ERCENT	sum p	ERCENT	sum p	ercent		
0	0.0	3	0.1	8	0.4	15	0.7	20	0.9	14	0.6	0	0.0	60	2.8
0	0.0	5	0.2	10	0.5	29	1.3	41	1.9	4	0.2	0	0.0	89	4.1
0	0.0	7	0.3	13	0.6	27	1.3	18	0.8	4	0.2	0	0.0	69	3.2
0	0.0	7	0.3	15	0.7	21	1.0	15	0.7	6	0.3	1	0.0	65	3.0
0	0.0	2	0.1	21	1.0	24	1.1	11	0.5	2	0.1	0	0.0	60	2.8
0	0.0	4	0.2	10	0.5	14	0.6	10	0.5	6	0.3	1	0.0	45	2.1
0	0.0	5	0.2	19	0.9	19	0.9	27	1.3	22	1.0	11	0.5	103	4.8
0	0.0	9	0.4	26	1.2	37	1.7	45	2.1	32	1.5	11	0.5	160	7.4
0	0.0	2	0.1	26	1.2	57	2.6	62	2.9	71	3.3	24	1.1	242	11.2
0	0.0	6	0.3	29	1.3	69	3.2	79	3.7	38	1.8	57	2.6	278	12.9
0	0.0	4	0.2	25	1.2	67	3.1	72	3.3	24	1.1	7	0.3	199	9.2
Q	0.0	3	0.1	12	0.6	52	2.4	41	1.9	15	0.7	9	0.4	132	6.1
0	0.0	3	0.1	16	0.7	21	1.0	51	2.4	47	2.2	33	1.5	171	7.9
0	0.0	4	0.2	13	0.6	27	1.3	30	1.4	56	2.6	5 <b>8</b>	2.7	188	8.7
0	0.0	2	0.1	12	0.6	20	0.9	71	3.3	57	2.6	33	1.5	195	9.0
0	0.0	6	0.3	10	0.5	23	1.1	36	1.7	14	0.6	13	0.6	102	4.7
0	0.0	72	3.3	265	12.3	522	24.2	629	29.1	412	19.1	258	12.0	2158	100.0
	SUM P 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0       0.0         0       0.0	SUM PERCENT       SUM PERCENT         0       0.0       3         0       0.0       5         0       0.0       7         0       0.0       7         0       0.0       7         0       0.0       2         0       0.0       2         0       0.0       5         0       0.0       9         0       0.0       2         0       0.0       4         0       0.0       3         0       0.0       4         0       0.0       2         0       0.0       4         0       0.0       2         0       0.0       2         0       0.0       2         0       0.0       2         0       0.0       2         0       0.0       6	SUM PERCENT         SUM PERCENT           0         0.0         3         0.1           0         0.0         5         0.2           0         0.0         7         0.3           0         0.0         7         0.3           0         0.0         7         0.3           0         0.0         7         0.3           0         0.0         7         0.3           0         0.0         7         0.3           0         0.0         2         0.1           0         0.0         4         0.2           0         0.0         5         0.2           0         0.0         5         0.2           0         0.0         5         0.2           0         0.0         2         0.1           0         0.0         4         0.2           0         0.0         4         0.2           0         0.0         4         0.2           0         0.0         6         0.3           0         0.0         6         0.3           0         0.0         72         3.3 </td <td>SUM PERCENT         SUM PERCENT         SUM PERCENT         SUM P           0         0.0         3         0.1         8           0         0.0         5         0.2         10           0         0.0         7         0.3         13           0         0.0         7         0.3         15           0         0.0         7         0.3         15           0         0.0         2         0.1         21           0         0.0         2         0.1         21           0         0.0         4         0.2         10           0         0.0         5         0.2         19           0         0.0         5         0.2         19           0         0.0         2         0.1         26           0         0.0         2         0.1         12           0         0.0         3         0.1         16           0         0.0         4         0.2         13           0         0.0         4         0.3         10           0         0.0         6         0.3         10</td> <td>SUM PERCENT         SUM PERCENT         SUM PERCENT         SUM PERCENT           0         0.0         3         0.1         8         0.4           0         0.0         5         0.2         10         0.5           0         0.0         7         0.3         13         0.6           0         0.0         7         0.3         15         0.7           0         0.0         7         0.3         15         0.7           0         0.0         2         0.1         21         1.0           0         0.0         2         0.1         21         1.0           0         0.0         4         0.2         10         0.5           0         0.0         5         0.2         19         0.9           0         0.0         2         0.1         26         1.2           0         0.0         2         0.1         26         1.2           0         0.0         4         0.2         25         1.2           0         0.0         3         0.1         16         0.7           0         0.0         2         0.1</td> <td>SUM PERCENT         SUM PERCENT         SUM PERCENT         SUM PERCENT         SUM PERCENT           0         0.0         3         0.1         8         0.4         15           0         0.0         5         0.2         10         0.5         29           0         0.0         7         0.3         13         0.6         27           0         0.0         7         0.3         15         0.7         21           0         0.0         2         0.1         21         1.0         24           0         0.0         2         0.1         21         1.0         24           0         0.0         4         0.2         10         0.5         14           0         0.0         5         0.2         19         0.9         19           0         0.0         2         0.1         26         1.2         57           0         0.0         6         0.3         29         1.3         69           0         0.0         3         0.1         12         0.6         52           0         0.0         4         0.2         13</td> <td>SUM PERCENT         SUM PERCENT         SUM PERCENT         SUM PERCENT         SUM PERCENT           0         0.0         3         0.1         8         0.4         15         0.7           0         0.0         5         0.2         10         0.5         29         1.3           0         0.0         7         0.3         13         0.6         27         1.3           0         0.0         7         0.3         15         0.7         21         1.0           0         0.0         7         0.3         15         0.7         21         1.0           0         0.0         2         0.1         21         1.0         24         1.1           0         0.0         4         0.2         10         0.5         14         0.6           0         0.0         5         0.2         19         0.9         19         0.9           0         0.0         2         0.1         26         1.2         37         1.7           0         0.0         4         0.2         25         1.2         67         3.1           0         0.0         3</td> <td>SUM PERCENT         SUM PERCENT</td> <td>SUM PERCENT         SUM PERCENT           0         0.0         5         0.2         10         0.5         29         1.3         41         1.9           0         0.0         7         0.3         15         0.7         21         1.0         15         0.7           0         0.0         2         0.1         21         1.0         24         1.1         11         0.5           0         0.0         4         0.2         10         0.5         14         0.6         10         0.5           0         0.0         2         0.1         26         1.2         37         1.7         45         2.1           0         0.0         2         0.1         26         1.2         57         <td< td=""><td>SUM PERCENT         SUM PERCENT</td><td>SUM PERCENT         SUM PERCENT</td><td>SUM PERCENT         SUM PERCENT</td><td>SUM PERCENT         SUM PERCENT           0         0.0         5         0.2         10         0.5         29         1.3         41         1.9         4         0.2         0         0.0           0         0.0         7         0.3         15         0.7         21         1.0         15         0.7         6         0.3         1         0.0         0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0</td><td>SUM PERCENT         SUM PERCENT</td></td<></td>	SUM PERCENT         SUM PERCENT         SUM PERCENT         SUM P           0         0.0         3         0.1         8           0         0.0         5         0.2         10           0         0.0         7         0.3         13           0         0.0         7         0.3         15           0         0.0         7         0.3         15           0         0.0         2         0.1         21           0         0.0         2         0.1         21           0         0.0         4         0.2         10           0         0.0         5         0.2         19           0         0.0         5         0.2         19           0         0.0         2         0.1         26           0         0.0         2         0.1         12           0         0.0         3         0.1         16           0         0.0         4         0.2         13           0         0.0         4         0.3         10           0         0.0         6         0.3         10	SUM PERCENT         SUM PERCENT         SUM PERCENT         SUM PERCENT           0         0.0         3         0.1         8         0.4           0         0.0         5         0.2         10         0.5           0         0.0         7         0.3         13         0.6           0         0.0         7         0.3         15         0.7           0         0.0         7         0.3         15         0.7           0         0.0         2         0.1         21         1.0           0         0.0         2         0.1         21         1.0           0         0.0         4         0.2         10         0.5           0         0.0         5         0.2         19         0.9           0         0.0         2         0.1         26         1.2           0         0.0         2         0.1         26         1.2           0         0.0         4         0.2         25         1.2           0         0.0         3         0.1         16         0.7           0         0.0         2         0.1	SUM PERCENT         SUM PERCENT         SUM PERCENT         SUM PERCENT         SUM PERCENT           0         0.0         3         0.1         8         0.4         15           0         0.0         5         0.2         10         0.5         29           0         0.0         7         0.3         13         0.6         27           0         0.0         7         0.3         15         0.7         21           0         0.0         2         0.1         21         1.0         24           0         0.0         2         0.1         21         1.0         24           0         0.0         4         0.2         10         0.5         14           0         0.0         5         0.2         19         0.9         19           0         0.0         2         0.1         26         1.2         57           0         0.0         6         0.3         29         1.3         69           0         0.0         3         0.1         12         0.6         52           0         0.0         4         0.2         13	SUM PERCENT         SUM PERCENT         SUM PERCENT         SUM PERCENT         SUM PERCENT           0         0.0         3         0.1         8         0.4         15         0.7           0         0.0         5         0.2         10         0.5         29         1.3           0         0.0         7         0.3         13         0.6         27         1.3           0         0.0         7         0.3         15         0.7         21         1.0           0         0.0         7         0.3         15         0.7         21         1.0           0         0.0         2         0.1         21         1.0         24         1.1           0         0.0         4         0.2         10         0.5         14         0.6           0         0.0         5         0.2         19         0.9         19         0.9           0         0.0         2         0.1         26         1.2         37         1.7           0         0.0         4         0.2         25         1.2         67         3.1           0         0.0         3	SUM PERCENT         SUM PERCENT	SUM PERCENT           0         0.0         5         0.2         10         0.5         29         1.3         41         1.9           0         0.0         7         0.3         15         0.7         21         1.0         15         0.7           0         0.0         2         0.1         21         1.0         24         1.1         11         0.5           0         0.0         4         0.2         10         0.5         14         0.6         10         0.5           0         0.0         2         0.1         26         1.2         37         1.7         45         2.1           0         0.0         2         0.1         26         1.2         57 <td< td=""><td>SUM PERCENT         SUM PERCENT</td><td>SUM PERCENT         SUM PERCENT</td><td>SUM PERCENT         SUM PERCENT</td><td>SUM PERCENT         SUM PERCENT           0         0.0         5         0.2         10         0.5         29         1.3         41         1.9         4         0.2         0         0.0           0         0.0         7         0.3         15         0.7         21         1.0         15         0.7         6         0.3         1         0.0         0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0</td><td>SUM PERCENT         SUM PERCENT</td></td<>	SUM PERCENT         SUM PERCENT	SUM PERCENT         SUM PERCENT	SUM PERCENT         SUM PERCENT	SUM PERCENT           0         0.0         5         0.2         10         0.5         29         1.3         41         1.9         4         0.2         0         0.0           0         0.0         7         0.3         15         0.7         21         1.0         15         0.7         6         0.3         1         0.0         0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0	SUM PERCENT         SUM PERCENT

MISSING HOURS: 2



ARTIFICIAL ISLAND 4/90 - 6/90

# JOINT DISTRIBUTION OF WIND DIRECTION AND SPEED BY ATMOSPHERIC STABILITY CLASS

# WIND: 300 FT

LAPSE RATE: LE -1.9 DEG C/100M CLASS A

DELTA T: (300-33FT)

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	0.0	-0.5	0.6	-3.5	3.6	-7.5	7.6	-12.5	12.6	-18.5	18.6 <sup>.</sup>	-24.5	GE	24.6	SUM P	ERCENT
DIRECTION	sum p	ERCENT	SUM P	ERCENT	sum pi	ERCENT	sum p	ERCENT								
N	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
NNE	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
NE	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
ENE	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
E	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
ESE	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
SE	D	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
SSE	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
S	0	0.0	0	0.0	1	0.1	0	0.0	0	0.0	0	0.0	0	0.0	1	0.1
SSW	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
SW	0	0.0	0	0.0	2	0.1	0	0.0	0	0.0	0	0.0	0	0.0	2	0.1
WSW	0	0.0	0	0.0	0	0.0	0	0.0	1	0.1	1	0.1	0	0.0	2	0.1
W	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	3	0.2	0	0.0	3	0.2
VNV	0	0.0	0	0.0	0	0.0	0	0.0	7	0.4	1	0.1	0	0.0	8	0.4
NW	0	0.0	0	0.0	0	0.0	0	0.0	10	0.5	3	0.2	0	0.0	13	0.7
NNV	0	0.0	0	0.0	. 0	0.0	0	0.0	0	0.0	2	0.1	0	0.0	2	0.1
								<b>,</b>								
	0	0.0	n	nn	र	02	n	0.0	18	n o	10	05	n	0 0	31	1.6

#### WIND SPEED GROUPS (MPH)

MEAN WIND SPEED: 16.7 MISSING: 0



#### PAGE 2 of 9

ARTIFICIAL ISLAND 4/90 - 6/90

# JOINT DISTRIBUTION OF WIND DIRECTION AND SPEED BY ATMOSPHERIC STABILITY CLASS VIND: 300 FT DELTA T: (300-33FT)

LAPSE RATE: -1.8 TO -1.7 DEG C/100M CLASS B

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WIND SPEED GROUPS (MPH)

	0.0	-0.5	0.6	-3.5	3.6	-7.5	7.6	-12.5	12.6	-18.5	18.6	-24.5	GE	24.6	SUM P	ERCENT
DIRECTION	SUM P	ERCENT	sum pi	ERCENT	sum p	ERCENT	sum pi	ERCENT	sum pi	ercent	SUM P	ercent	SUM P	ERCENT		
N	0	0.0	0	0.0	0	0.0	1	0.1	1	0.1	0	0.0	0	0.0	2	0.1
NNE	0	0.0	0	0.0	1	0.1	0	0.0	0	0.0	0	0.0	0	0.0	1	0.1
NE	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
ENE	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	· 0	0.0
E	0	0.0	1	0.1	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	0.1
ESE	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
SE	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
SSE	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
S	0	0.0	0	0.0	0	0.0	2	0.1	0	0.0	0	0.0	0	0.0	2	0.1
SSW	0	0.0	1	0.1	2	0.1	0	0.0	0	0.0	0	0.0	0	0.0	3	0.2
SV	0	0.0	0	0.0	2	0.1	1	0.1	1	0.1	0	0.0	0	0.0	4	0.2
WSW	0	0.0	0	0.0	0	0.0	0	0.0	1	0.1	0	0.0	0	0.0	1	0.1
W	0	0.0	0	0.0	1	0.1	0	0.0	2	0.1	3	0.2	2	0.1	8	0.4
WNW	0	0.0	0	0.0	0	0.0	1	0.1	3	0.2	1	0.1	0	0.0	5	0.3
NV	0	0.0	0	0.0	0	0.0	1	0.1	4	0.2	0	0.0	0	0.0	5	0.3
NNV	0	0.0	1	0.1	1	0.1	8	0.4	1	0.1	1	0.1	0	0.0	12	0.6
	0	0.0	3	0.2	7	0.4	14	0.7	13	0.7	5	0.3	2	0.1	44	2.2

MEAN WIND SPEED: 12.7 0



#### PAGE 3 of 9

ARTIFICIAL ISLAND 4/90 - 6/90

JOINT DISTRIBUTION OF WIND DIRECTION AND SPEED BY ATMOSPHERIC STABILITY CLASS WIND: 300 FT DELTA T: (300-33FT)

LAPSE RATE: -1.6 TO -1.5 DEG C/100M CLASS C

# WIND SPEED GROUPS (MPH)

	0.0	-0.5	0.6	-3.5	3.6	-7.5	7.6	-12.5	12.6	-18.5	18.6	-24.5	GE	24.6	SUM PI	ERCENT
DIRECTION	sum p	ercent	sum p	ERCENT	sum p	ERCENT	sum p	ERCENT								
N	0	0.0	0	0.0	1	0.1	6	0.3	0	0.0	0	0.0	0	0.0	7	0.4
NNE	0	0.0	1	0.1	2	0.1	3	0.2	3	0.2	0	0.0	0	0.0	9	0.5
NE	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
ENE	0	0.0	1	0.1	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	0.1
E	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	D	0.0
ESE	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
SE	0	0.0	1	0.1	1	0.1	0	0.0	1	0.1	3	0.2	1	0.1	7	0.4
SSE	0	0.0	0	0.0	1	0.1	0	0.0	0	0.0	0	0.0	0	0.0	1	0.1
S	0	0.0	0	0.0	1	0.1	1	0.1	0	0.0	0	0.0	0	0.0	2	0.1
SSV	0	0.0	1	0.1	2	0.1	0	0.0	. <b>O</b>	0.0	0	0.0	0	0.0	3	0.2
S₩	0	0.0	0	0.0	6	0.3	3	0.2	3	0.2	0	0.0	0	0.0	12	0.6
VSV	0	0.0	0	0.0	2	0.1	1	0.1	2	0.1	0	0.0	0	0.0	5	0.3
v	0	0.0	0	0.0	1	0.1	4	0.2	6	0.3	4	0.2	0	0.0	15	0.8
VNV	0	0.0	0	0.0	2	0.1	3	0.2	6	0.3	1	0.1	0	0.0	12	0.6
NV	0	0.0	0	0.0	2	0.1	7	0.4	2	0.1	2	0.1	0	0.0	13	0.7
NNV	0	0.0	0	0.0	3	0.2	0	0.0	1	0.1	1	0.1	0	0.0	5	0.3
	0	0.0	4	0.2	24	1.2	28	1.4	24	1.2	11	0.6	1	0.1	92	4.7

MEAN WIND SPEED: 11.6

0



### PAGE 4 of 9

ARTIFICIAL ISLAND 4/90 - 6/90

# JOINT DISTRIBUTION OF WIND DIRECTION AND SPEED BY ATMOSPHERIC STABILITY CLASS WIND: 300 FT DELTA T: (300-33FT)

LAPSE RATE: -1.4 TO -0.5 DEG C/100M CLASS D

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VIND SPEED	GROUPS	(MPH)
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	0.0	-0.5	0.6	-3.5	3.6	-7.5	7.6	5-12.5	12.6	-18.5	18.6	-24.5	GE	24.6	sum p	PERCENT
DIRECTION	SUM P	ERCENT	sum p	ERCENT	sum p	ERCENT	SUM P	PERCENT	sum p	PERCENT	SUM P	ERCENT	SUM P	ERCENT		
N	0	0.0	0	0.0	3	0.2	10	0.5	16	0.8	2	0.1	0	0.0	31	1.6
NNE	0	0.0	3	0.2	3	0.2	11	0.6	6	0.3	1	0.1	0	0.0	24	1.2
NE	0	0.0	0	0.0	2	0.1	5	0.3	26	1.3	1	0.1	0	0.0	34	1.7
ENE	0	0.0	0	0.0	8	0.4	13	0.7	10	0.5	1	0.1	0	0.0	32	1.6
E	0	0.0	0	0.0	3	0.2	5	0.3	2	0.1	0	0.0	0	0.0	10	0.5
ESE	0	0.0	3	0.2	3	0.2	4	0.2	4	0.2	0	0.0	0	0.0	14	0.7
SE	0	0.0	1	0.1	8	0.4	6	0.3	10	0.5	13	0.7	6	0.3	44	2.2
SSE	0	0.0	2	0.1	15	0.8	26	1.3	31	1.6	10	0.5	2	0.1	86	4.4
S	0	0.0	5	0.3	17	0.9	29	1.5	21	1.1	5	0.3	0	0.0	· 77	3.9
SSW	0	0.0	1	0.1	6	0.3	8	0.4	10	0.5	12	0.6	2	0.1	39	2.0
SW	0	0.0	1	0.1	8	0.4	7	0.4	14	0.7	7	0.4	6	0.3	43	2.2
VSV	0	0.0	1	0.1	9	0.5	20	1.0	8	0.4	10	0.5	8	0.4	56	2.8
W	0	0.0	0	0.0	9	0.5	13	0.7	30	1.5	21	1.1	10	0.5	83	4.2
WNW	0	0.0	1	0.1	7	0.4	16	0.8	26	1.3	7	0.4	0	0.0	57	2.9
NV	0	0.0	1	0.1	6	0.3	8	0.4	26	1.3	25	1.3	9	0.5	75	3.8
NNV	0	0.0	1	0.1	10	0.5	20	1.0	17	0.9	12	0.6	7	0.4	67	3.4
							`									
	0	0.0	20	1.0	117	5.9	201	10.2	257	13.0	127	6.4	50	2.5	772	39.2

MEAN WIND SPEED: 13.9

0



ARTIFICIAL ISLAND 4/90 - 6/90

JOINT DISTRIBUTION OF WIND DIRECTION AND SPEED BY ATMOSPHERIC STABILITY CLASS WIND: 300 FT DELTA T: (300-33FT)

LAPSE RATE: -0.4 TO 1.5 DEG C/100M CLASS E

#### WIND SPEED GROUPS (MPH)

	0.0	-0.5	0.6	-3.5	3.6	-7.5	7.6	-12.5	12.6	5-18.5	18.6	-24.5	GE	24.6	sum p	ERCENT
DIRECTION	sum p	ERCENT	sum pi	ERCENT	sum p	ERCENT	sum pi	ERCENT	sum p	PERCENT	sum f	ERCENT	sum p	ERCENT		
N	0	0.0	0	0.0	4	0.2	5	0.3	11	0.6	8	0.4	6	0.3	34	1.7
NNE	0	0.0	2	0.1	2	0.1	4	0.2	3	0.2	0	0.0	0	0.0	11	0.6
NE	0	0.0	0	0.0	0	0.0	4	0.2	5	0.3	2	0.1	0	0.0	11	0.6
ENE	0	0.0	2	0.1	9	0.5	8	0.4	17	0.9	4	0.2	0	0.0	40	2.0
E	0	0.0	2	0.1	9	0.5	6	0.3	4	0.2	2	0.1	0	0.0	23	1.2
ESE	0	0.0	1	0.1	6	0.3	6	0.3	5	0.3	0	0.0	Ð	0.0	18	0.9
SE	0	0.0	1	0.1	5	0.3	8	0.4	12	0.6	10	0.5	10	0.5	46	2.3
SSE	0	0.0	2	0.1	10	0.5	10	0.5	14	0.7	13	0.7	12	0.6	61	3.1
S	0	0.0	3	0.2	16	0.8	14	0.7	28	1.4	20	1.0	7	0.4	88	4.5
SSW	0	0.0	2	0.1	7	0.4	17	0.9	39	2.0	37	1.9	15	0.8	117	5.9
S₩	0	0.0	2	0.1	13	0.7	<b>20</b> ·	1.0	31	1.6	32	1.6	1	0.1	99	5.0
WSW	0	0.0	3	0.2	4	0.2	15	0.8	12	0.6	16	0.8	3	0.2	53	2.7
W	0	0.0	1	0.1	6	0.3	14	0.7	15	0.8	8	0.4	0	0.0	44	2.2
VNV	0	0.0	1	0.1	3	0.2	10	0.5	9	0.5	8	0.4	0.	0.0	31	1.6
NW	0	0.0	3	0.2	3	0.2	9	0.5	29	1.5	25	1.3	8	0.4	77	3.9
NNV	0	0.0	0	0.0	3	0.2	9	0.5	26	1.3	14	0.7	1	0.1	53	2.7
	0	0.0	25	1.3	100	5.1	159	8.1	260	13.2	199	10.1	63	3.2	806	40.9



ARTIFICIAL ISLAND 4/90 - 6/90

# JOINT DISTRIBUTION OF WIND DIRECTION AND SPEED BY ATMOSPHERIC STABILITY CLASS VIND: 300 FT DELTA T: (300-33FT)

LAPSE RATE: 1.6 TO 4.0 DEG C/100M CLASS F

#### VIND SPEED GROUPS (MPH)

	0.0	-0.5	0.6	-3.5	3.6	-7.5	7.6	-12.5	12.6	-18.5	18.6	-24.5	GE	24.6	sum pi	ERCENT
DIRECTION	SUM P	ERCENT	sum pi	ERCENT	SUM P	ERCENT	sum pi	ERCENT	' sum pi	ERCENT	sum pi	ERCENT	sum pi	ERCENT		
N	0	0.0	0	0.0	2	0.1	0	0.0	1	0.1	2	0.1	0	0.0	5	0.3
NNE	0	0.0	0	0.0	0	0.0	4	0.2	1	0.1	0	0.0	0	0.0	5	0.3
NE	0	0.0	0	0.0	2	0.1	3	0.2	1	0.1	0	0.0	0	0.0	6	0.3
ENE	0	0.0	0	0.0	2	0.1	2	0.1	2	0.1	0	0.0	0	0.0	6	0.3
Ε	0	0.0	0	0.0	0	0.0	2	0.1	2	0.1	0	0.0	0	0.0	4	0.2
ESE	0	0.0	0	0.0	1	0.1	1	0.1	1	0.1	0	0.0	0	0.0	3	0.2
SE	0	0.0	0	0.0	1	0.1	2	0.1	1	0.1	0	0.0	0	0.0	4	0.2
SSE	0	0.0	0	0.0	1	0.1	4	0.2	3	0.2	2	0.1	0	0.0	10	0.5
S	0	0.0	0	0.0	1	0.1	1	0.1	6	0.3	2	0.1	4	0.2	14	0.7
SSV	0	0.0	1	0.1	0	0.0	3	0.2	9	0.5	8	0.4	1	0.1	22	1.1
SV	0	0.0	1	0.1	0	0.0	3	0.2	- 11	0.6	2	0.1	0	0.0	17	. 0.9
WSW	0	0.0	0	0.0	1	0.1	3	0.2	11	0.6	0	0.0	0	0.0	15	0.8
V	0	0.0	0	0.0	2	0.1	3	0.2	12	0.6	5	0.3	0	0.0	22	1.1
WNW	0	0.0	0	0.0	1	0.1	1	0.1	5	0.3	1	0.1	2	0.1	10	0.5
NV	0	0.0	0	0.0	2	0.1	1	0.1	5	0.3	1	0.1	0	0.0	9	0.5
NNV	0	0.0	0	0.0	0	0.0	2	0.1	6	0.3	0	0.0	0	0.0	8	0.4
	0	0.0	2	0.1	16	0.8	35	1.8	77	3.9	23	1.2	7	0.4	160	8.1



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# JOINT DISTRIBUTION OF WIND DIRECTION AND SPEED BY ATMOSPHERIC STABILITY CLASS WIND: 300 FT DELTA T: (300-33FT)

LAPSE RATE: GT 4.0 DEG C/100M CLASS G

WIND SPEED GROUPS (MPH)

	0.0	-0.5	0.6	-3.5	3.6	-7.5	7.6	-12.5	12.6	-18.5	18.6	-24.5	GE	24.6	SUM PI	ERCENT
DIRECTION	sum pi	ercent	sum pi	ercent	SUM P	ERCENT	sum pi	ercent	sum pi	ercent	sum pi	ERCENT	SUM P	ERCENT		
N	0	0.0	0	0.0	0	0.0	1	0.1	0	0.0	0	0.0	0	0.0	1	0.1
NNE	0	0.0	0	0.0	0	0.0	2	0.1	0	0.0	0	0.0	0	0.0	2	0.1
. NE	0	0.0	0	0.0	0	0.0	. 1	0.1	0	0.0	0	0.0	0	0.0	1	0.1
ENE	0	0.0	0	0.0	0	0.0	1	0.1	2	0.1	0	0.0	0	0.0	3	0.2
Ε	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
ESE	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
SE	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	. 0	0.0	0	0.0	0	0.0
SSE	0	0.0	0	0.0	2	0.1	4	0.2	8	0.4	1	0.1	0	0.0	15	0.8
S	0	0.0	0	0.0	0	0.0	4	0.2	8	0.4	6	0.3	1	0.1	19	1.0
SSW	0	0.0	0	0.0	1	0.1	2	0.1	3	0.2	1	0.1	0	0.0	7	0.4
SW	0	0.0	0	0.0	1	0.1	0	0.0	2	0.1	0	0.0	0	0.0	3	0.2
VSV	0	0.0	0	0.0	0	0.0	2	0.1	3	· 0.2	0	0.0	0	0.0	5	0.3
v	0	0.0	0	0.0	0	0.0	0	0.0	1	0.1	0	0.0	0	0.0	1	0.1
VNV	0	0.0	0	0.0	1	0.1	0	0.0	0	0.0	1	0.1	0	0.0	2	0.1
NV	0	0.0	0	0.0	1	0.1	0	0.0	5	0.3	0	0.0	0	0.0	6	0.3
NNV	0	0.0	0	0.0	0	0.0	1	0.1	0	0.0	0	0.0	0	0.0	1	0.1
	0	0.0	0	0.0	6	0.3	18	0.9	32	1.6	9	0.5	1	0.1	66	3.3

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ARTIFICIAL ISLAND 4/90 - 6/90

# JOINT DISTRIBUTION OF WIND DIRECTION AND SPEED BY ATMOSPHERIC STABILITY CLASS WIND: 300 FT DELTA T: (300-33FT)

ALL STABILITY CLASSES

# WIND SPEED GROUPS (MPH)

	0.0	-0.5	0.6	-3.5	3.6	-7.5	7.6	-12.5	12.6	-18.5	18.6	-24.5	GE 2	24.6	SUM F	PERCENT
DIRECTION	SUM P	ERCENT	sum pi	ERCENT	sum p	ercent	sum p	ERCENT	sum p	ERCENT	sum p	ERCENT	sum pi	ERCENT		
N	0	0.0	0	0.0	10	0.5	23	1.2	29 <sup>·</sup>	1.5	12	0.6	6	0.3	80	4.1
NNE	0	0.0	6	0.3	8	0.4	24	1.2	13	0.7	1	0.1	0	0.0	52	2.6
NE	0	0.0	0	0.0	4	0.2	13	0.7	32	1.6	3	0.2	0	0.0	52	2.6
ENE	0	0.0	3	0.2	19	1.0	24	1.2	31	1.6	5	0.3	0	0.0	82	4.2
E	0	0.0	3	0.2	12	0.6	13	0.7	8	0.4	2	0.1	0	0.0	38	1.9
ESE	0	0.0	4	0.2	10	0.5	11	0.6	10	0.5	0	0.0	0	0.0	35	1.8
SE	0	0.0	3	0.2	15	0:8	16	0.8	24	1.2	26	1.3	17	0.9	101	5.1
SSE	0	0.0	4	0.2	29	1.5	44	2.2	56	2.8	26	1.3	14	0.7	173	8.8
S	0	0.0	8	0.4	36	1.8	51	2.6	63	3.2	33	1.7	12	0.6	203	10.3
SSV	0	0.0	6	0.3	18	0.9	30	1.5	61	3.1	58	2.9	18	0.9	191	9.7
SV	0	0.0	4	0.2	32	1.6	34	1.7	62	3.1	41	2.1	7	0.4	180	9.1
WSW	0	0.0	4	0.2	16	0.8	41	2.1	38	1.9	27	1.4	11	0.6	137	7.0
v	0	0.0	1	0.1	19	1.0	34	1.7	66	3.3	44	2.2	12	0.6	176	8.9
WNW	0	0.0	2	0.1	14	0.7	31	1.6	56	2.8	20	1.0	2	0.1	125	6.3
NV	0	0.0	4	0.2	14	0.7	26	1.3	81	4.1	56	2.8	17	0.9	198	10.0
NNV	0	0.0	2	0.1	17	0.9	40	2.0	51	2.6	30	1.5	8	0.4	148	7.5
	0	0.0	54	2.7	273	13.9	455	23.1	681	34.6	384	19.5	124	6.3	İ971	100.0

MISSING HOURS: 213



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ARTIFICIAL ISLAND 4/90 - 6/90

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# JOINT DISTRIBUTION OF WIND DIRECTION AND SPEED BY ATMOSPHERIC STABILITY CLASS WIND: 300 FT DELTA T: (300-33FT)

DIRECTION VS SPEED ONLY

### WIND SPEED GROUPS (MPH)

	0.0	-0.5	0.6	-3.5	3.6	5-7.5	7.6	5-12.5	12.6	5-18.5	18.6	-24.5	GE	24.6	sum i	PERCENT
DIRECTION	sum p	ERCENT	SUM P	ERCENT	sum f	PERCENT	sum f	PERCENT	sum p	PERCENT	sum f	ERCENT	SUM P	ERCENT		
N	0	0.0	1	0.0	14	0.7	23	1.1	32	1.5	13	0.6	6	0.3	89	4.2
NNE	0	0.0	7	0.3	10	0.5	24	1.1	14	0.7	1	0.0	0	0.0	56	2.6
NE	0	0.0	0	0.0	6	0.3	14	0.7	33	1.5	3	0.1	0	0.0	56	2.6
ENE	0	0.0	3	0.1	22	1.0	29	1.4	32	1.5	5	0.2	0	0.0	91	4.3
E	0	0.0	3	0.1	14	0.7	18	0.8	8	0.4	2	0.1	0	0.0	45	2.1
ESE	0	0.0	4	0.2	11	0.5	14	0.7	16	0.7	0	0.0	0	0.0	45	2.1
SE	0	0.0	4	0.2	16	0.7	21	1.0	31	1.5	28	1.3	17	0.8	117	5.5
SSE	O	0.0	5	0.2	35	1.6	50	2.3	61	2.9	31	1.5	20	0.9	202	9.5
S	0	0.0	10	0.5	44	2.1	57	2.7	64	3.0	34	1.6	13	0.6	222	10.4
SSV	0	0.0	6	0.3	20	0.9	31	1.5	66	3.1	60	2.8	18	0.8	201	9.4
SV	0	0.0	4	0.2	36	1.7	35	1.6	64	3.0	43	2.0	7	0.3	189	8.8
WSW	0	0.0	4	0.2	19	0.9	42	2.0	40	1.9	27	1.3	13	0.6	145	6.8
V	0	0.0	3	0.1	19	0.9	40	1.9	68	3.2	44	2.1	12	0.6	186	8.7
- WNW	0	0.0	2	0.1	15	0.7	32	1.5	58	2.7	21	1.0	3	0.1	131	6.1
NV	0	0.0	5	0.2	14	0.7	28	1.3	85	4.0	56	2.6	17	0.8	205	9.6
NNV	0	0.0	3	0.1	18	0.8	43	2.0	53	2.5	30	1.4	9	0.4	156	7.3
	0	0.0	64	3.0	313	14.7	501	23.5	725	33.9	398	18.6	135	6.3	2136	100.0
													MISSI	NG HOURS:	48	

# PART J. AMENDMENT TO RERR 27

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### Liquid Pathways

Doses to individuals in the population from liquid releases are primarily from the seafood ingestion pathway. The total body dose to an individual was calculated to be 1.18E-01 mrem. The calculated highest organ dose from liquid releases was 5.88E-01 mrem to the GI-LLI. The calculated population total body dose was 6.65E-02 person-rem. The calculated average total body dose to the population within fifty miles of the site was 1.11E-05 mrem/person.

### Air Pathway

The resulting total body and skin doses to an individual were calculated to be 1.37E-02 mrem and 3.22E-02 mrem respectively. The calculated highest organ dose due to radioiodine and particulates with a greater that eight day half-life was 2.35E-02 mrem to the thyroid. The calculated population total body dose was 7.01E-01 person-rem. The calculated average total body dose to the population within fifty miles of the site was 1.17E-04 mrem/person.

#### Direct Radiation

Direct radiation may be estimated by Thermoluminescent dosimetric (TLD) measurements. One method for comparing TLD measurements is by comparison with preoperational data. It should be noted that the TLDs measure direct radiation from both the Salem and Hope Creek Generating Stations at Artificial Island.

TLDs at onsite locations 2S-2 and 5S-1, which are 0.3 miles and 0.9 miles from the point of origin, averaged 4.9 and 4.6 mrads/month, respectively. The values for stations 2S-2 and 5S-1 are within the statistical variation associated with the preoperational program results.

It should be noted that the nearest resident is 3.5 miles away. It can thus be concluded that there is no measurable dose to any offsite location from direct radiation.

#### Part F. METEOROLOGICAL DATA

Cumulative joint wind frequency distributions by atmospheric stability class at the 300 foot elevation are provided for the third and fourth quarters of 1989 in Tables 5 and 6.

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# SALEM GENERATING STATION TABLE 2A-1

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT JULY - DECEMBER 1989 UNIT 1 LIQUID EFFLUENTS-SUMMATION OF ALL RELEASES

<pre>A. Fission and activation products 1. Total release (not including tritium, gases, alpha) Ci 6.26E-01 7.17E-01 ; 2. Average diluted concentration during period uCi/ml 6.39E-08 7.00E-08 3. Percent of technical specification limit (T.S. 3.11.1.2.(a)) % 3.77E+00 3.33E+00 B. Tritium 1. Total release Ci 7.45E+01 2.56E+02 ; 2. Average diluted concentration during period uCi/ml 7.70E-06 2.50E-05 3. Percent of technical specification limit (T.S. 3.11.1.1) % 2.57E-01 8.33E-01 C. Dissolved and entrained noble gases 1. Total release Ci 7.49E-02 1.73E-01 ; 2. Average diluted concentration during period uCi/ml 7.65E-09 1.69E-08 3. Percent of technical specification limit (T.S. 3.11.1.1) % 3.82E-03 8.47E-03 D. Gross alpha activity 1. Total release Ci 0.00E+00 0.00E+00 E. Volume of waste release (prior to dilution - Batch Release) liters 1.68E+06 2.42E+06 E. Volume of dilution uniter (T.S. 4 dilution uniter) (Figure 1. Compared to technical specification limit (T.S. 3.11.1.1) % 3.82E-03 8.47E-03 D. Gross alpha activity 1. Total release Ci 0.00E+00 0.00E+00 E. Volume of waste release (prior to dilution - Batch Release) 1 ters 1.68E+06 2.42E+06 E. Volume of dilution uniter (T.S. 3.11.1.1) % 3.82E-03 8.47E-03 E. Volume of dilution uniter (T.S. 3.11.1.1) % 3.82E-03 8.47E-03 E. Volume of dilution uniter (T.S. 4.42E+06 E. Volume of dilution un</pre>	Total r %
<pre>1. Total release (not including tritium, gases, alpha) Ci 6.26E-01 7.17E-01 ; 2. Average diluted concentration during period uCi/ml 6.39E-08 7.00E-08 3. Percent of technical specification limit (T.S. 3.11.1.2.(a)) % 3.77E+00 3.33E+00 B. Tritium 1. Total release Ci 7.45E+01 2.56E+02 ; 2. Average diluted concentration during period uCi/ml 7.70E-06 2.50E-05 3. Percent of technical specification limit (T.S. 3.11.1.1) % 2.57E-01 8.33E-01 C. Dissolved and entrained noble gases 1. Total release Ci 7.49E-02 1.73E-01 ; 2. Average diluted concentration during period uCi/ml 7.65E-09 1.69E-08 3. Percent of technical specification limit (T.S. 3.11.1.1) % 3.82E-03 8.47E-03 D. Gross alpha activity 1. Total release Ci 0.00E+00 0.00E+00 E. Volume of waste release (prior to dilution - Batch Release) liters 1.68E+06 2.42E+06 E. Volume of dilution water</pre>	
<pre>2. Average diluted concentration during period uCi/ml 6.39E-08 7.00E-08 3. Percent of technical specification limit (T.S. 3.11.1.2.(a)) % 3.77E+00 3.33E+00 B. Tritium 1. Total release Ci 7.45E+01 2.56E+02 2. Average diluted concentration during period uCi/ml 7.70E-06 2.50E-05 3. Percent of technical specification limit (T.S. 3.11.1.1) % 2.57E-01 8.33E-01 C. Dissolved and entrained noble gases 1. Total release Ci 7.49E-02 1.73E-01 2 2. Average diluted concentration during period uCi/ml 7.65E-09 1.69E-08 3. Percent of technical specification limit (T.S. 3.11.1.1) % 3.82E-03 8.47E-03 D. Gross alpha activity 1. Total release Ci 0.00E+00 0.00E+00 E. Volume of waste release (prior to dilution - Batch Release) liters 1.68E+06 2.42E+06 E. Volume of dilution uniter</pre>	25
<pre>3. Percent of technical specification limit (T.S. 3.11.1.2.(a))</pre>	
B. Tritium          1. Total release       Ci       7.45E+01       2.56E+02         2. Average diluted       concentration during         period       uCi/ml       7.70E-06       2.50E-05         3. Percent of technical       specification limit         (T.S. 3.11.1.1)       \$ 2.57E-01       8.33E-01         C. Dissolved and entrained       noble gases         1. Total release       Ci       7.49E-02       1.73E-01         2. Average diluted       concentration during       period       uCi/ml       7.65E-09       1.69E-08         3. Percent of technical       specification limit       (T.S. 3.11.1.1)       \$ 3.82E-03       8.47E-03         D. Gross alpha activity       1. Total release       Ci       0.00E+00       0.00E+00         E. Volume of waste release       (prior to dilution -       Batch Release)       liters 1.68E+06       2.42E+06	
1. Total release       Ci       7.45E+01       2.56E+02       2         2. Average diluted       concentration during       period       uCi/ml       7.70E-06       2.50E-05         3. Percent of technical       specification limit       (T.S. 3.11.1.1)       \$ 2.57E-01       8.33E-01         C. Dissolved and entrained       noble gases       1. Total release       Ci       7.49E-02       1.73E-01       2         C. Dissolved and entrained       noble gases       1. Total release       Ci       7.49E-02       1.73E-01       2         2. Average diluted       concentration during       period       uCi/ml       7.65E-09       1.69E-08         3. Percent of technical       specification limit       (T.S. 3.11.1.1)       \$ 3.82E-03       8.47E-03         D. Gross alpha activity       1. Total release       Ci       0.00E+00       0.00E+00         E. Volume of waste release       (prior to dilution -       Batch Release)       liters       1.68E+06       2.42E+06	
<pre>concentration during period uCi/ml 7.70E-06 2.50E-05 3. Percent of technical specification limit (T.S. 3.11.1.1)</pre>	25
<pre>3. Percent of technical specification limit (T.S. 3.11.1.1)</pre>	
C. Dissolved and entrained noble gases 1. Total release Ci 7.49E-02 1.73E-01 2 2. Average diluted concentration during period uCi/ml 7.65E-09 1.69E-08 3. Percent of technical specification limit (T.S. 3.11.1.1) & 3.82E-03 8.47E-03 D. Gross alpha activity 1. Total release Ci 0.00E+00 0.00E+00 E. Volume of waste release (prior to dilution - Batch Release) liters 1.68E+06 2.42E+06 E. Volume of dilution water	
1. Total release       Ci       7.49E-02       1.73E-01       2         2. Average diluted       concentration during       period       uCi/ml       7.65E-09       1.69E-08         3. Percent of technical       specification limit       3.82E-03       8.47E-03         D. Gross alpha activity       3.82E-03       8.47E-03         D. Gross alpha activity       1. Total release       Ci       0.00E+00       0.00E+00         E. Volume of waste release       (prior to dilution -       Batch Release)       1iters       1.68E+06       2.42E+06	
2. Average diluted concentration during period uCi/ml 7.65E-09 1.69E-08 3. Percent of technical specification limit (T.S. 3.11.1.1) & 3.82E-03 8.47E-03 D. Gross alpha activity 1. Total release Ci 0.00E+00 0.00E+00 E. Volume of waste release (prior to dilution - Batch Release) liters 1.68E+06 2.42E+06 E. Volume of dilution water	25
<pre>3. Percent of technical specification limit (T.S. 3.11.1.1)</pre>	
D. Gross alpha activity         1. Total release       Ci       0.00E+00       0.00E+00         E. Volume of waste release (prior to dilution - Batch Release)       liters 1.68E+06       2.42E+06	
1. Total releaseCi0.00E+000.00E+00E. Volume of waste release (prior to dilution - Batch Release)liters 1.68E+062.42E+06	
E. Volume of waste release (prior to dilution - Batch Release) liters 1.68E+06 2.42E+06 E. Volume of dilution water	
E Volume of dilution water	
used during entire period liters 9.79E+09 1.02E+10	

SALEM GENERATING STATION TABLE 2A-1

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EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT JULY - DECEMBER 1989 UNIT 2 LIQUID EFFLUENTS-SUMMATION OF ALL RELEASES

		Units	3rd Quarter	4th Quarter	Est. Total Error %
Α.	Fission and activation products				
_	<ol> <li>Total release (not including tritium, gases, alpha)</li> </ol>	Ci	6.11E-01	7.66E-01	. 25
	2. Average diluted concentration during period	uCi/ml		7.19E-08	8
	3. Percent of technical specification limit (T.S. 3.11.1.2.(a))		3.32E+00	3,11E+00	)
<u>B.</u>	Tritium				
	<ol> <li>Total release</li> <li>Average diluted concentration during</li> </ol>	<u></u> <u>C1</u>	<u>1.00E+02</u>	<u>1.94E+02</u>	25
	3. Percent of technical specification limit	uCi/ml	<u>1.16E-05</u>	<u>1.82E-05</u>	<u> </u>
с.	(T.S. 3.11.1.1) Dissolved and entrained noble gases		3.88E-01	6.08E-01	<u></u>
	1. Total release	Ci	9.91E-02	1.13E-01	. 25
	2. Average diluted concentration during period	uCi/ml	1.15E-08	1.06E-08	
	3. Percent of technical specification limit (T.S. 3.11.1.1)	- 8	5.76E-03	5.29E-03	<u> </u>
<u>D.</u>	Gross alpha activity 1. Total release	Ci	0.00E+00	0.00E+00	)
Е.	Volume of waste release (prior to dilution - Batch Release)	liters	1.84E+06	2.13E+06	5
F.	Volume of dilution water used during entire period	r od liters	8.60E+09	1.07E+10	)

# SALEM GENERATING STATION TABLE 2B-1

# EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT JULY - DECEMBER 1989 LIQUID EFFLUENTS UNIT 1

	<u> </u>		CONTINUC	US MODE	BATCH	MODE
			3rd	4th	3rd	4th
Nuclides	Released	Unit	Quarter	Quarter	Quarter	Quarter
Fluorine	-18	Ci			8.73E-02	7.43E-02
Sodium-24	4	Ċi			2.55E-04	1.66E-04
Chromium.	-51	Ci			2.39E-03	9.48E-05
Manganese	e-54	Ċi			2.19E-02	3.84E-02
Iron-59	·	Ci			6.82E-04	2.48E-04
Cobalt-5	7	Ci			1.28E-03	9,95E-04
Cobalt-58	3	Ci		1.74E-05	2.88E-01	3.95E-01
Cobalt-60	<u>,                                     </u>	Ci		2.50E-05	3.34E-02	4.10E-02
Zinc-65	×	Ci			1.14E-04	1.97E-04
Bromine-8	32	Ci		····· · · · · · · · · · · · · · · · ·		1.80E-05
Strontiu	n=92				2.30E-05	
Zirconiu	<u>n-95</u>		· -	·· · ··-	1.398-03	
Nichiume	<u>*</u>			······	2 838-03	2.655-04
Niobium-	<u>7</u>				2.000-00	<u></u>
Technoti	<u>77</u>		· · · · · · · · · · · · · · · · · · ·		2 955-04	9 17E-05
Puthonium	<u>111-2211</u>				2.035-04	3 598-05
<u>Rucheniu</u>	<u>n-102</u>				1 708-02	<u>5.56E-05</u>
<u>SIIVer-1</u> ,					1.706-03	<u> </u>
<u>11n+113m</u>	100	<u> </u>				4.102-05
Antimony	-166		••••••••••••••••••••••••••••••••••••••		1 (28 02	2 108 03
Antimony	-124			····	1.022-03	3.105-03
Antimony	-125	<u> </u>		7 007 05	<u>1.73E-02</u>	1.03E-02
loaine-1	<u> </u>	<u> </u>	· · · ·	/.896-05	3.396-03	1.285-02
logine-1	33	<u></u>			<u>3.47E-03</u>	<u>1.79E-03</u>
Iodine-1	35	<u>C1</u>			1.94E-04	
<u>Cesium-1</u>	34	<u> </u>		<u>2.89E-05</u>	<u>4.96E-02</u>	<u>2.57E-02</u>
<u>Cesium-1</u>	36	<u>C1</u>	<u> </u>			<u>7.73E-04</u>
<u>Cesium-1</u>	<u> </u>	<u>Ci</u>		<u>2.32E-05</u>	<u>    5.19E-02</u>	<u>3.00E-02</u>
Telluriu	<u>n-133m</u>	<u></u>			<u>3.18E-05</u>	
Lanthanur	<u>n-140</u>	<u> </u>		<u> </u>	<u>1.44E-04</u>	
Strontiu	n-89	Ci			<u>2.85E-04</u>	<u>3.18E-04</u>
Strontiu	-90	<u>ci</u>	•		1.29E-04	<u>1.82E-04</u>
Iron-55		Ci			5.54E-02	7.95E-02
TOTALS		Ci		<u>1.73E-04</u>	6.26E-01	<u>7.16E-01</u>
		· · · ·				
<u>Tritium</u>		<u></u>		1.40E+01	7.54E+01	<u>2.42E+02</u>
Xenon-133	3 m	Ci			2.12E-04	<u>6.01E-04</u>
Xenon-133	3	Ci		3.10E-05	7.37E-02	<u>1.70E-01</u>
Xenon-135	5	Ci			<u>9.92E-04</u>	<u>2.81E-03</u>
TOTALS				<u>1.40E+01</u>	<u>7.54E+01</u>	<u>2.42E+02</u>



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#### SALEM GENERATING STATION TABLE 2B-1

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT JULY - DECEMBER 1989

### LIQUID EFFLUENTS UNIT 2

#### CONTINUOUS MODE BATCH MODE 3rd 4th 3rd 4th Nuclides Released Unit Quarter Quarter Quarter Quarter Fluorine-18 Ci 5.98E-02 8.35E-02 Sodium-24 Ci 3.45E-04 4.09E-04 Chromium-51 Ci 2.58E-03 2.77E-04 Manganese-54 Ci 2.73E-02 3.36E-02 3.50E-04 Iron-59 Ci 2.14E-04 Cobalt-57 Ċi .30E-03 1.10E-03 Cobalt-58 Ċi 2.86E-01 4.34E-01 Cobalt-60 Ĉi 3.61E-02 4.17E-02 Zinc-65 9.78E-05 Ci Strontium-92 Cj <u>3.11E-05</u> Zirconium-95 Ci 9,16E-04 1.46E-04 Niobium-95 Ci 2.30E-03 5.35E-04 1.43E-04 Niobium-97 Ci 5.54E-05 Technetium-99m 9.18E-05 Ci 4.85E-04 3.06E-04 Silver-110m Cj 9.85E-04 <u>Antimony-122</u> Ci 0.00E-00 5.67E-05 Antimony-124 Ĉi 2.13E-03 5.99E-03 Antimony-125 Ci 1.79E-02 1.18E-02 Iodine-131 Çi 4.85E-03 1.82E-02 5.04E-03 Iodine-133 Ci 2.24E-03 Iodine-135 5.17E-04 Ci <u>Cesium-134</u> 2.54E-02 Ci 4.48E-02 9.36E-04 <u>Cesium-136</u> Ci 2.88E-02 Cesium-137 4.82E-02 Ci 1.08E-04 Lanthanum-140 2.36E-04 Ci 2.90E-04 Cerium-144 Ci 2.81E-05 Mercury-203 Ci Strontium-90 Ci 1.81E-04 1.94E-04 Strontium-89 Ci 2.95E-04 2.98E-04 Iron-55 Ci 6.83E-02 7.46E-02 TOTALS Ci 6.11E-01 7.66E-01 1 048+02 008+03 ~1

TOTALS		1.00E+02	1.94E+02
Xenon-135	<u>Çi</u>	1.78E-03	2.00E-03
Xenon-133	Ci	9.63E-02	<u>1.11E-01</u>
Xenon-133m	Ci	6.87E-04	
Xenon-131m	Ci	3.19E-04	<u>2.07E-04</u>
Tritium			<u></u>

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