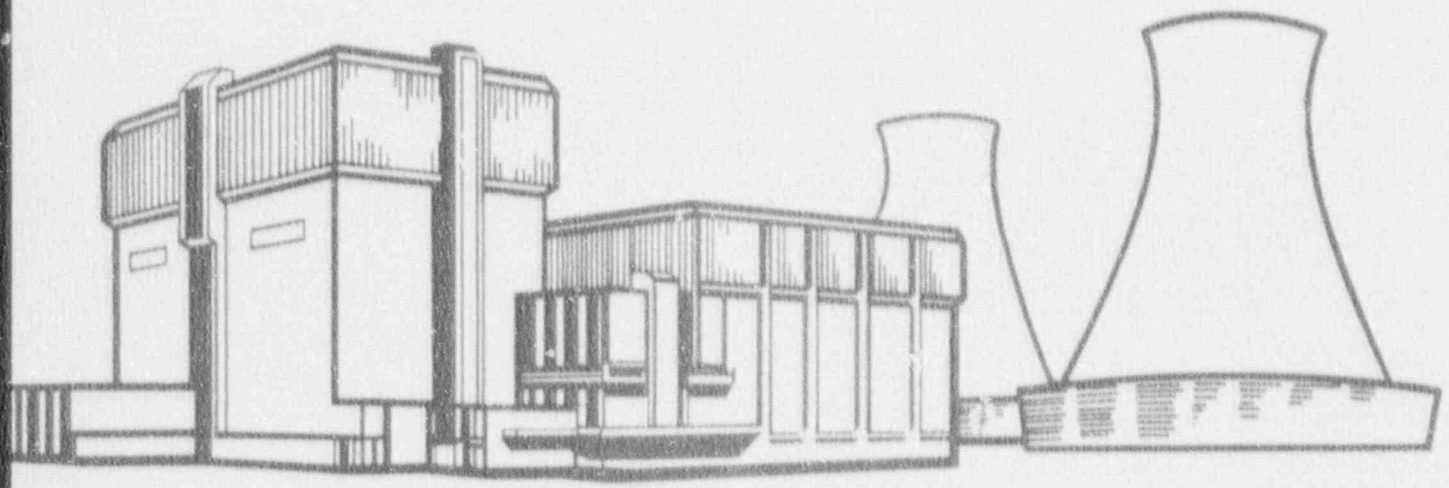
PHILADELPHIA ELECTRIC SERVICE ELECTRIC COMPANY

GAS



LIMERICK GENERATING STATION

PHILADELPHIA ELECTRIC COMPANY

LIMERICK GENERATING STATION
UNIT NO. 1 and UNIT NO. 2

DOCKET NO. 50-352 (Unit 1)
DOCKET NO. 50-353 (Unit 2)

SEMI-ANNUAL EFFLUENT RELEASE REPORT
NO. 13
JULY 1, 1990 THROUGH DECEMBER 31, 1990

Submitted to
The United States Nuclear Regulatory Commission
Pursuant to
Facility Operating Licenses NPF-39 (Unit 1)
and NPF-85 (Unit 2)

Preparation Directed by:
G. M. Leitch, Vice President
Limerick Generating Station

J. Doering, Jr. Plant Manager

TABLE OF CONTENTS

I. INTRODUCTION

This submittal complies with the format described in Regulatory Guide 1.21, "Measuring, Evaluating and Reporting Radioactivity in Solid Wastes and Releases of Radioactive Materials in Liquid and Gaseous Effluents from Light-Water Cooled Nuclear Power Plants", Revision 1, June, 1974.

Throughout this report "Technical Specifications" and "ODCM Controls" may be used concurrently due to dual controls during implemetation of NRC Generic letter 89-01. If control warrants specification of either Technical Specification or ODCM Control, it shall be so stated.

The following information is included as Tables to this report:

- A summary of the gaseous and liquid effluent releases for the report period. Where "0.00E+00" is used, it denotes the less than detectable level for the given isotope.

- Composite particulate air samples counted for beta emitters (eg. Sr-89, Sr-90) are submitted to an offsite vendor laboratory for analysis. Since data for the fourth quarter particulate air samples had not yet become available at the time this report was prepared, it will be necessary to submit an addendum in the future if fourth quarter particulate air samples results are reported >LLD.

- Since Limerick Technical Specification limits/ODCM Controls for liquid and gaseous effluent releases are prescribed in terms of quarterly and annual offsite doses, "percent Technical Specification limit/ODCM Controls" is entered as 0.00E+00 below effluent release rates and quantity totals.

- A summary of solid waste dispositioned during the report period, to include: total activity shipped by waste type and an estimate of the error in the reported totals; the estimated composition of each type of waste by isotope; the number of shipments, mode of transportation, destination, type of container, total container volume, and solidification agent.

II. TABLES

A. SUMMARY OF RADIOACTIVE GASEOUS EFFLUENTS

July 1, 1990 to December 31, 1990

Thirteen (13) pages are included in Table A

NIT: U1
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FFLUENT AND WASTE DISPOSAL REPORT

ASEOUS EFFLUENTS -- SUMMATION OF ALL RELEASES

	UNIT	QUARTER 2	QUARTER 1	EST. TOTAL ERROR, %
FISSION AND ACTIVATION GASES				
1. TOTAL RELEASE	CI	0.744E+01	0.155E+02	0.453E+02
2. AVERAGE RELEASE RATE FOR PERIOD	UCI/SEC	0.[illegible]76E+00	0.195E+01	
3. PERCENT OF TECHNICAL SPECIFICATION LIMIT	%	0.000E+00	0.000E+00	
IODINES				
1. TOTAL IODINE 131	CI	0.142E-04	0.000E+00	0.453E+02
2. AVERAGE RELEASE RATE FOR PERIOD	UCI/SEC	0.178E-05	0.000E+00	
3. PERCENT OF TECHNICAL SPECIFICATION LIMIT	%	0.000E+00	0.000E+00	
PARTICULATES				
1. PARTICULATES WITH HALF-LIVES 8 DAYS	CI	0.131E-03	0.544E-03	0.453E+02
2. AVERAGE RELEASE RATE FOR PERIOD	UCI/SEC	0.165E-04	0.685E-04	
3. PERCENT OF TECHNICAL SPECIFICATION LIMIT	%	0.000E+00	0.000E+00	
4. GROSS ALPHA RADIOACTIVITY	CI	0.000E+00	0.000E+00	
TRITIUM				
1. TOTAL RELEASE	CI	0.000E+00	0.000E+00	0.453E+02
2. AVERAGE RELEASE RATE FOR PERIOD	UCI/SEC	0.000E+00	0.000E+00	
3. PERCENT OF TECHNICAL SPECIFICATION LIMIT	%	0.000E+00	0.000E+00	

NTER [C] TO ERASE SCREEN AND CONTINUE : C

SITE: LIMERICK
UNIT: 01
USER: MARI
DATE: 02/12/91 14 51

EFFLUENT AND WASTE DISPOSAL REPORT

GASEOUS EFFLUENTS FOR RELEASE POINT: 1 NORTH STACK

NUCLIDES RELEASED	UNITS	CONTINUOUS MODE QUARTER 2	CONTINUOUS MODE QUARTER 3	BATCH MODE QUARTER 1	BATCH MODE QUARTER 4
1. FISSION GASES					
AR 41	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
KR 83M	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
KR 85M	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
KR 85	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
KR 87	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
KR 88	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
KR 89	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
KR 90	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
XE 131M	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
XE 133M	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+0
XE 133	CI	0.000E+00	0.155E+02	0.238E-01	0.609E-03
XE 135M	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
XE 135	CI	0.557E+01	0.000E+00	0.000E+00	0.000E+00
XE 137	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
XE 138	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
TOTAL FOR PERIOD (ABOVE)	CI	0.557E+01	0.155E+02	0.238E-01	0.609E-03

ENTER C C D TO ERASE SCREEN AND CONTINUE : C

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FLUENT AND WASTE DISPOSAL REPORT

GASEOUS EFFLUENTS FOR RELEASE POINT: 1 NORTH STACK

		CONTINUOUS MODE		BATCH MODE	
NUCLIDES RELEASED	UNITS	QUARTER 3	QUARTER 4	QUARTER 3	QUARTER 4
IODINES					
I131	CI	0.142E-04	0.000E+00	.000E+00	0.000E+00
I133	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
TOTAL FOR PERIOD (ABOVE)	CI	0.142E-04	0.000E+00	0.000E+00	0.000E+00
PARTICULATES					
C14	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
CR51	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
MN54	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
FE59	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
CO58	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
CO60	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
ZN65	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
SR89	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
SR90	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
ZR95	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
SB124	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
CS134	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
CS136	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
CS137	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00

ENTER [C] TO ERASE SCREEN AND CONTINUE : C

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UNIT: U1
USER: MART
DATE: 02/13/91 16:52

EFFLUENT AND WASTE DISPOSAL REPORT

CACCOUS EFFLUENTS FOR RELEASE POINT: 1 NORTH STACK

NUCLIDES RELEASED	UNITS	CONTINUOUS MODE QUARTER 3	CONTINUOUS MODE QUARTER 4	BATCH MODE QUARTER 3	BATCH MODE QUARTER 4
1. PARTICULATES (CONTD)					
BA140	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
CE141	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
CE144	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
TOTAL FOR PERIOD (ABOVE)	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00

ENTER [C] TO ERASE SCREEN AND CONTINUE : C

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UNIT: U1
USER: MART
DATE: 02/13/91 16:53

EFFLUENT AND WASTE DISPOSAL REPORT

GASEOUS EFFLUENTS FOR RELEASE POINT: 2 UNIT 1 - SOUTH STACK

NUCLIDES RELEASED	UNITS	CONTINUOUS MODE QUARTER 3	CONTINUOUS MODE QUARTER 4	BATCH MODE QUARTER 3	BATCH MODE QUARTER 4
FISSION GASES					
AR41	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
KR83M	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
KR85M	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
KR85	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
KR87	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
KR88	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
KR89	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
KR90	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
XE131M	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
XE133M	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
XE133	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
XE135M	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
XE135	CI	0.184E+01	0.000E+00	0.000E+00	0.000E+00
XE137	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
XE138	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
TOTAL FOR PERIOD (ABOVE)	CI	0.184E+01	0.000E+00	0.000E+00	0.000E+00

ENTER [C] TO ERASE SCREEN AND CONTINUE : C

SITE: LIMERICK
UNIT: U1
USER: MART
DATE: 02/13/91 16:53

EFFLUENT AND WASTE DISPOSAL REPORT

GASEOUS EFFLUENTS FOR RELEASE POINT: 2 UNIT 1 - SOUTH STACK

NUCLIDES RELEASED	UNITS	CONTINUOUS MODE QUARTER 3	CONTINUOUS MODE QUARTER 4	BATCH MODE QUARTER 3	BATCH MODE QUARTER 4
2. IODINES					
I131	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
I133	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
TOTAL FOR PERIOD (ABOVE)	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
3. PARTICULATES					
C14	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
CR51	CI	0.131E-03	0.000E+00	0.000E+00	0.000E+00
MN54	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
FE59	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
CO58	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
CO60	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
ZN65	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
SR89	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
SR90	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
ZR95	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
SB124	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
CS134	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
CS136	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
CS137	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00

ENTER [C] TO ERASE SCREEN AND CONTINUE : C

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FFLUENT AND WASTE DISPOSAL REPORT

ASEOUS EFFLUENTS FOR RELEASE POINT: 2 UNIT 1 - SOUTH STACK

		CONTINUOUS MODE		BATCH MODE	
NUCLIDES RELEASED	UNITS	QUARTER 3	QUARTER 4	QUARTER 3	QUARTER A
PARTICULATES (CONTD)					
BA140	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
CE141	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
CE144	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
TOTAL FOR PERIOD (ABOVE)	CI	0.131E 03	0.000E+00	0.000E+00	0.000E+00

TER [C] TO ERASE SCREEN AND CONTINUE : C

SITE: LIMERICK
UNIT: U1
USER: MART
DATE: 02/12/91 16:54

EFFLUENT AND WASTE DISPOSAL REPORT

2 GASEOUS EFFLUENTS FOR RELEASE POINT: 3 UNIT 2 - SOUTH STACK

		CONTINUOUS MODE		BATCH MODE	
NUCLIDES RELEASED	UNITS	QUARTER 3	QUARTER 4	QUARTER 3	QUARTER 4
FISSION GASES					
AR41	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
KR83M	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
KR85M	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
KR85	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
KR87	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
KR88	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
KR90	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
KR00	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
XE131M	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
XE133M	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
XE133	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
XE135M	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
XE135	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
XE137	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
XE138	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
TOTAL FOR PERIOD (ABOVE)	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00

ENTER [C] TO ERASE SCREEN AND CONTINUE : C

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ATE: 02/13/91 16:54

FFLUENT AND WASTE DISPOSAL REPORT

GASEOUS EFFLUENTS FOR RELEASE POINT: 3 UNIT 2 - SOUTH STACK

NUCLIDES RELEASED	UNITS	CONTINUOUS MODE QUARTER 3	CONTINUOUS MODE QUARTER 4	BATCH MODE QUARTER 3	BATCH MODE QUARTER 4
IODINES					
I131	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
I133	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
TOTAL FOR PERIOD (ABOVE)	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
PARTICULATES					
C14	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
CR51	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
MN54	CI	0.000E+00	0.192E-03	0.000E+00	0.000E+00
FE59	CI	0.000E+00	0.672E-04	0.000E+00	0.000E+00
CO58	CI	0.000E+00	0.112E-04	0.000E+00	0.000E+00
CO60	CI	0.000E+00	0.155E-03	0.000E+00	0.000E+00
ZN65	CI	0.000E+00	0.000E-04	0.000E+00	0.000E+00
SR89	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
SR90	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
ZR95	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
SB124	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
CS134	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
CS136	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
CS137	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00

TER [C] TO ERASE SCREEN AND CONTINUE : C

SITE: LIMERICK
UNIT: U1
USER: MART
DATE: 02/13/91 16:55

EFFLUENT AND WASTE DISPOSAL REPORT

GASEOUS EFFLUENTS FOR RELEASE POINT: 3 UNIT 2 - SOUTH STACK

NUCLIDES RELEASED	UNITS	CONTINUOUS MODE QUARTER 3	CONTINUOUS MODE QUARTER 4	BATCH MODE QUARTER 3	BATCH MODE QUARTER 4
3. PARTICULATES (CONTD)					
BA140	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
CE141	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
CE144	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
TOTAL FOR PERIOD (ABOVE)	CI	0.000E+00	0.544E-03	0.000E+00	0.000E+00

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SITE: LIMERICK
UNIT: U1
USER: MART
DATE: 02/13/91 16:55

EFFLUENT AND WASTE DISPOSAL REPORT

GASEOUS EFFLUENTS FOR RELEASE POINT: 4 HOT MAINTENANCE SHOP

		CONTINUOUS MODE		BATCH MODE	
NUCLIDES RELEASED	UNITS	QUARTER 3	QUARTER 4	QUARTER 3	QUARTER 4
1. FISSION GASES					
AR41	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
KR83M	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
KR85M	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
KR85	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
KR87	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
KR88	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
KR89	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
KR90	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
XE131M	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
XE133M	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
XE133	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
XE135M	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
XE135	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
XE137	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
XE138	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
TOTAL FOR PERIOD (ABOVE)	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00

ENTER [C] TO ERASE SCREEN AND CONTINUE : C

SITE: LIMERICK
UNIT: U1
USER: MART
DATE: 02/13/91 16:56

EFFLUENT AND WASTE DISPOSAL REPORT

GASEOUS EFFLUENTS FOR RELEASE POINT: 4 HOT MAINTENANCE SHOP

		CONTINUOUS MODE		BATCH MODE	
NUCLIDES RELEASED	UNITS	QUARTER 3	QUARTER 4	QUARTER 3	QUARTER 4
2. IODINES					
I131	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
I133	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
TOTAL FOR PERIOD (ABOVE)	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
3. PARTICULATES					
C14	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
CR51	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
MN54	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
FE59	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
CO58	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
CO60	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
ZN65	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
SR89	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
SR90	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
ZR95	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
SB124	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
CS134	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
CS136	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
CS137	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00

ENTER [C] TO ERASE SCREEN AND CONTINUE : C

ITE: LIMERICK
NIT: U1
ER: MART
TE: 02/13/91 16:56

FFLUENT AND WASTE DISPOSAL REPORT

ASEOUS EFFLUENTS FOR RELEASE POINT: 4 HOT MAINTENANCE SHOP

		CONTINUOUS MODE		BATCH MODE	
NUCLIDES RELEASED	UNITS	QUARTER 3	QUARTER 4	QUARTER 3	QUARTER 4
PARTICULATES (CONTD)					
BA140	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
CE141	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
CE144	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
TOTAL FOR PERIOD (ABOVE)	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00

TER [C] TO ERASE SCREEN AND CONTINUE : C

II. TABLES

B. SUMMARY OF RADIOACTIVE LIQUID EFFLUENTS

July 1, 1990 to December 31, 1990

Six (6) pages are included in Table B

NIT: U1
ER: MART
ATE: 02/13/91 16:57

FFLUENT AND WASTE DISPOSAL REPORT

IQUID EFFLUENTS -- SUMMATION OF ALL RELEASES

	UNITS	QUARTER 3	QUARTER 4	EST. ERROR, %	TOTAL
. FISSION AND ACTIVATION PRODUCTS					
1. TOTAL RELEASE (EXCL. TRIT., GASES, ALPHA)	CI	0.243E+00	0.565E-01	0.630E+01	
2. AVERAGE DILUTED CONC. DURING PERIOD	UCI/ML	0.132E-05	0.358E-06		
3. PERCENT OF APPLICABLE LIMIT	%	0.000E+00	0.000E+00		
. TRITIUM					
1. TOTAL RELEASE	CI	0.133E+02	0.755E+01	0.630E+01	
2. AVERAGE DILUTED CONC. DURING PERIOD	UCI/ML	0.725E-04	0.478E-04		
3. PERCENT OF APPLICABLE LIMIT	%	0.000E+00	0.000E+00		
. DISSOLVED AND ENTRAINED GASES					
1. TOTAL RELEASE	CI	0.121E-01	0.186E-02	0.630E+01	
2. AVERAGE DILUTED CONC. DURING PERIOD	UCI/ML	0.659E-07	0.118E-07		
3. PERCENT OF APPLICABLE LIMIT	%	0.329E-01	0.588E-02		
. GROSS ALPHA RADIOACTIVITY					
1. TOTAL RELEASE	CI	0.000E+00	0.000E+00	0.000E+00	
. VOLUME WASTE RELEASED (PRIOR TO DILUTION)	LITERS	0.645E+07	0.608E+07	0.000E+00	
. VOLUME DILUTION WATER USED DURING PERIOD	LITERS	0.184E+09	0.158E+09	0.000E+00	

UTER [C] TO ERASE SCREEN AND CONTINUE : C

SITE: LIMERICK
UNIT: U1
USER: MART
DATE: 02/13/91 16:57

EFFLUENT AND WASTE DISPOSAL REPORT

LIQUID EFFLUENTS FOR RELEASE POINT: 1 LIQUID RAD WASTE DISCHARGE TO SCHUYLKILL

NUCLIDES RELEASED	UNITS	CONTINUOUS MODE QUARTER 3	CONTINUOUS MODE QUARTER 4	BATCH MODE QUARTER 3	BATCH MODE QUARTER 4
H3	CI	0.000E+00	0.000E+00	0.133E+02	0.755E+01
C14	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
NA24	CI	0.000E+00	0.000E+00	0.000E+00	0.293E-04
P32	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
CR51	CI	0.000E+00	0.000E+00	0.759E-02	0.496E-02
MN54	CI	0.000E+00	0.000E+00	0.976E-04	0.372E-01
MN56	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
FE55	CI	0.000E+00	0.000E+00	0.230E+00	0.000E+00
FE59	CI	0.000E+00	0.000E+00	0.000E+00	0.251E-03
CO58	CI	0.000E+00	0.000E+00	0.192E-03	0.107E-02
CO60	CI	0.000E+00	0.000E+00	0.391E-03	0.281E-02
NI63	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
NI65	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
CU64	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
ZN65	CI	0.000E+00	0.000E+00	0.440E-02	0.914E-02
ZN69	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
BR83	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
BR84	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
BR85	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00

ENTER [C] TO ERASE SCREEN AND CONTINUE : C

ITE: LIMERICK
NIT: U1
SER: MART
ATE: 02/13/91 16:58

FFLUENT AND WASTE DISPOSAL REPORT

IQUID EFFLUENTS FOR RELEASE POINT: 1 LIQUID RAD WASTE DISCHARGE TO SCHUYLKILL

NUCLIDES RELEASED	UNITS	CONTINUOUS MODE QUARTER 3	CONTINUOUS MODE QUARTER 4	BATCH MODE QUARTER 3	BATCH MODE QUARTER 4
IQUID EFFLUENTS (CONTD)					
RB86	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
RB88	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
RB89	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
SR89	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
SR90	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
SR91	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
SR92	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Y90	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Y91M	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Y91	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Y92	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Y93	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
ZR95	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
ZR97	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
NB95	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
MO99	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
TC99M	CI	0.000E+00	0.000E+00	0.265E-05	0.148E-04
TC101	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00

NTER [C] TO ERASE SCREEN AND CONTINUE : C

SITE: LIMERICK
UNIT: U1
USER: MART
DATE: 02/13/91 16:58

EFFLUENT AND WASTE DISPOSAL REPORT

LIQUID EFFLUENTS FOR RELEASE POINT: 1 LIQUID RAD WASTE DISCHARGE TO SCHUYLKILL

		CONTINUOUS MODE		BATCH MODE	
NUCLIDES RELEASED	UNITS	QUARTER 3	QUARTER 4	QUARTER 3	QUARTER 4
LIQUID EFFLUENTS (CONTD)					
RU103	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
RU105	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
RU106	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
AG110M	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
TE125M	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
TE127M	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
TE127	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
TE129M	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
TE129	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
TE131M	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
TE131	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
TE132	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
I130	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
I131	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
I132	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
I133	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
I134	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
I135	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00

ENTER [C] TO ERASE SCREEN AND CONTINUE : C

TE: LIMERICK
IT: U1
ER: MART
TE: 02/13/91 16:59

FLUENT AND WASTE DISPOSAL REPORT

QUID EFFLUENTS FOR RELEASE POINT: 1 LIQUID RAD WASTE DISCHARGE TO SCHUYLKILL F

		CONTINUOUS MODE		BATCH MODE	
NUCLIDES RELEASED	UNITS	QUARTER 3	QUARTER 4	QUARTER 3	QUARTER
QUID EFFLUENTS (CONTD)					
CS134	CI	0.000E+00	0.000E+00	0.328E-03	0.312E-03
CS136	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
CS137	CI	0.000E+00	0.000E+00	0.724E-03	0.759E-03
CS138	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
BA139	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
BA140	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
BA141	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
BA142	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
LA140	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
LA142	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
CE141	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
CE143	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
CE144	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
PR143	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
PR144	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
ND147	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
AS76	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
W187	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00

TER [C] TO ERASE SCREEN AND CONTINUE : C

SITE: LIMERICK
UNIT: U1
USER: MART
DATE: 02/13/91 16:59

EFFLUENT AND WASTE DISPOSAL REPORT

LIQUID EFFLUENTS FOR RELEASE POINT: 1 LIQUID RAD WASTE DISCHARGE TO SCHUYLKIL

		CONTINUOUS MODE		BATCH MODE	
NUCLIDES RELEASED	UNITS	QUARTER 3	QUARTER 4	QUARTER 3	QUARTER 4
LIQUID EFFLUENTS (CONTD)					
NONE	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
TOTAL FOR PERIOD (ABOVE)	CI	0.000E+00	0.000E+00	0.136E+02	0.761E+01
XE-133	CI	0.000E+00	0.000E+00	0.754E-02	0.807E-03
XE-135	CI	0.000E+00	0.000E+00	0.458E-02	0.105E-02

EFFLUENT RELEASE SUMMARY OPTIONS

1 -- TERMINATE
2 -- ACCUMULATE GASEOUS RELEASES
3 -- ACCUMULATE LIQUID RELEASES
4 -- PRINT WASTE SUMMARY REPORT

ENTER OPTION SELECTION [1-4] :

II. TABLES

C. SOLID WASTE DISPOSITION REPORT

July 1, 1990 to December 31, 1990

Four (4) pages are included in Table C

SOLID WASTE AND IRRADIATED FUEL SHIPMENTS
PERIOD 07/01/90 TO 12/31/90

A. SOLID WASTE SHIPPED OFFSITE FOR BURIAL OR DISPOSAL (NOT IRRADIATED FUEL)

1. TYPE OF WASTE	UNIT	6 MONTH PERIOD	ERROR, %
a. SPENT RESINS, FILTER SLUDGES, EVAPORATOR BOTTOMS, ETC.	m3 CI	3.12E+02 5.40E+02	25%
*b. DRY COMPRESSIBLE WASTE, CONTAMINATED EQUIPMENT, ETC.	m3 CI	5.20E+01 2.17E+00	25%
c. IRRADIATED COMPONENTS, CONTROL RODS, ETC.	m3 CI	0.00E+00 0.00E+00	
d. OTHER (DESCRIBE) CRD FILTERS & TRASH	m3 CI	2.10E+00 2.35E+00	25%

*PORTIONS OF THE WASTE IS PROCESSED BY OFFSITE VENDORS (QUADREX, SEG)

ACTIVITY IS ESTIMATED.

2. ESTIMATE OF MAJOR NUCLIDE COMPOSITION (BY TYPE OF WASTE)

ISOTOPE	CATEGORY A - SPENT RESINS, FILTER SLUDGES, EVAPORATOR BOTTOMS, ETC.				CATEGORY B - DRY COMPRESSIBLE WASTE, CONTAMINATED EQUIPMENT, ETC.		CATEGORY D - CRD FILTERS, & TRASH	
	WASTE CLASS B ACTIVITY Ci	% ABUNDANCE	WASTE CLASS A ACTIVITY Ci	% ABUNDANCE	WASTE CLASS A ACTIVITY Ci	% ABUNDANCE	WASTE CLASS B ACTIVITY Ci	% ABUNDAN
Zn-65	1.58E+01	12.42%	1.50E+02	36.04%	1.31E+00	60.31%	1.06E+00	45.08%
Cr-51	8.47E+01	70.18%	1.57E+02	37.72%	1.23E-01	5.66%	0.00E+00	0.00%
Cs-137	9.41E+00	7.71%	4.00E+01	9.61%	3.07E-01	14.17%	1.97E-01	21.34%
Cs-134	3.32E+00	2.16%	2.53E+01	6.01%	1.85E-01	8.54%	2.03E-01	14.37%
I-131	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
Co-60	3.83E+00	3.17%	1.50E+01	3.60%	9.09E-02	4.25%	1.25E-01	8.32%
Co-58	2.45E+00	4.52%	9.89E+00	2.38%	3.77E-02	1.74%	0.00E+00	0.00%
Fe-55	0.00E+00	0.00%	9.16E+00	2.21%	4.60E-02	2.12%	0.00E+00	0.00%
Sr-89	0.00E+00	0.00%	0.00E+00	0.00%	1.63E-02	0.76%	0.00E+00	0.00%
C-14	4.95E-04	0.00%	4.00E-01	0.10%	6.72E-03	0.31%	1.53E-04	0.01%
Mn-54	1.34E+00	1.11%	9.00E+00	2.16%	2.05E-02	0.95%	9.06E-02	2.85%
Nb-95	0.00E+00	0.00%	0.00E+00	0.00%	8.91E-03	0.41%	0.00E+00	0.00%
H-3	2.10E-02	0.00%	1.10E-01	0.02%	1.40E-03	0.06%	0.00E+00	0.00%
Sa/La-140	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
Ni-63	3.56E+00	2.93%	5.37E+01	3.14%	4.91E-02	2.27%	0.00E+00	0.00%
Pb-[illegible]	0.00E+00	0.00%	0.00E+00	0.00%	1.26E-04	0.01%	0.00E+00	0.00%
Sb-[illegible]	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
P-32	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
Ag-[illegible]	2.11E-02	0.02%	2.30E-02	0.01%	2.40E-04	0.01%	7.6E-04	0.05%
Cd-[illegible]	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
Pu-[illegible]	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
I-[illegible]	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
Tc-[illegible]	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
Nb-94	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
Ni-59	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
Co-57	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
Ce-[illegible]	0.00E+00	0.00%	0.00E+00	0.00%	3.63E-02	0.12%	0.00E+00	0.00%
TOTALS	1.21E+02	100.00%	4.16E+02	100.00%	2.17E+00	100.00%	2.35E+00	100.00%

ACTIVITY IS ESTIMATED.
CATEGORY A (48 TYPE A LSA, 24)TYPE A LSA)1 CATEGORY B (51 TYPE A LSA),
CATEGORY C (NO SHIPMENTS MADE). NOTE: CATEGORY C IS IRRADIATED
COMPONEN S, CONTROL RODS, ETC. CATEGORY D (1)TYPE A LSA).
NOTE: CATEGORY D IS CRD FILTERS & TRASH.

3. SOLID WASTE DISPOSITION

NUMBER OF SHIPMENTS	MODE OF TRANSPORTATION	DESTINATION
53	TRUCK	LIMERICK TO BARNWELL
19	TRUCK	QUADREX TO BARNWELL
32	TRUCK	SEG TO BARNWELL

NOTE: DURING THIS 6 MONTH PERIOD THERE HAVE BEEN NO CHANGES TO THE PROCESS CONTROL PROGRAM (PCP).

B. IRRADIATED FUEL SHIPMENTS (DISPOSITION)

NUMBER OF SHIPMENTS	MODE OF TRANSPORATION	DESTINATION
N/A (NO SHIPMENTS MADE)		

COMMENTS:

02 SHIPMENTS WERE MADE FROM LIMERICK TO QUADREX FOR PROCESSING.

09 SHIPMENTS WERE MADE FROM LIMERICK TO SEG FOR PROCESSING.

NO SOLIDIFICATIONS WERE USED.

COMPLETED BY Heidi Pratt 1/25/91
DATE

REVIEWED BY [signature] 1/24/91
DATE

II. TABLES

D. OFFSITE RADIATION DOSE ASSESSMENT

January 1, 1990 to December 31, 1990

One (1) page is included in Table D.

TE: LIMERICK
IT: U1
ER: MART
TE: 02/15/91 10:22

SUMMARY OF MAXIMUM INDIVIDUAL DOSES
TOTAL ACCUMULATION FOR PERIODS:
LIQUID: FROM 01/01/90 0:00 TO 12/31/90 23:00
GASEOUS: FROM 01/01/90 0:00 TO 12/31/90 23:00
AIR: FROM 01/01/90 0:00 TO 12/31/90 23:00

FLUENT	APPLICABLE ORGAN	ESTIMATED DOSE (MREM)	AGE GROUP	LOCATION DIST (M)	DIR (TOWARD)	% OF APPLICABLE LIMIT	LIMIT (MR)
QUID	TOTAL BODY	6.77E-02	ADULT	RECEPTOR 1		1.1E+00	6.0
QUID	LIVER	1.15E-01	TEEN	RECEPTOR 1		5.8E-01	20.0
BLE GAS	AIR DOSE (GAMMA-MRAD)	1.31E-03		762.	ESE	6.5E-03	20.0
BLE GAS	AIR DOSE (BETA-MRAD)	1.36E-03		762.	ESE	4.7E-03	40.0
BLE GAS	T.BODY (GAMMA)	6.64E-04	ALL	965.	ESE	3.3E-03	20.0
BLE GAS	SKIN (BETA)	1.76E-03	ALL	965.	ESE	4.4E-03	40.0
DINE, RTICULATES	THYROID	4.50E-03	INFANT	965.	ESE	1.5E-02	30.0

SUMMARY OF POPULATION DOSES
TOTAL ACCUMULATION FOR PERIODS:
LIQUID: FROM 01/01/90 0:00 TO 12/31/90 23:00
GASEOUS: FROM 01/01/90 0:00 TO 12/31/90 23:00

FLUENT	APPLICABLE ORGAN	ESTIMATED POPULATION DOSE (PERSON-REM)
QUID	TOTAL BODY	2.5E+00
QUID	THYROID	1.8E+00
SEOUS	TOTAL BODY	7.4E-02
SEOUS	THYROID	8.4E-02

II. TABLES

E. RADIATION DOSES TO MEMBERS OF THE PUBLIC DUE TO THEIR ACTIVITIES INSIDE SITE BOUNDARY

January 1, 1990 to December 31, 1990

Two (2) pages are included in Table E

RADIATION DOSES TO MEMBERS OF THE PUBLIC DUE TO THEIR ACTIVITIES INSIDE SITE BOUNDARY

Per ODCM Control 3.6, the Semi-Annual Effluent Release Report shall include an assessment of the radiation doses from radioactive liquid and gaseous effluents to members of the public due to their activities inside the Site Boundary during the report period. Technical Specifications/ODCM Controls state that Members of the Public shall include all persons not occupationally associated with the plant. This category does not include employees of the utility or contractors. Also excluded from this category are persons who enter the site to service equipment or to make deliveries. This category does include persons who use portions of the site for recreational, occupational education, or other purposes not associated with the plant. The Limerick Information Center on Longview Road near the rear exit of the plant, Frick's Lock Environmental Laboratory on the west shore of the river and the railroad tracks which run above the east shore of the Schuylkill River are all areas within the site boundary where radiation dose of this type could occur. The radiation doses to Members of the Public have been estimated using methodology stated in the ODCM, including determination of the annual X/Q, depleted X/Q and deposition X/Q for these locations. The maximum gaseous dose to members of the public at these locations is based on the following assumptions:

1. Real time meteorology and acutal effluent releases.

2. Beta air dose attributed to noble gas releases.

3. Highest exposed sector of the railroad tracks (W), and the sectors enclosing Frick's Lock and the Information Center available for occupancy.

4. The maximum expected occupancy factor is a working year (or 25%) in any of the locations.

5. Distance to the railroad tracks, which pass through the Site Boundary in the W sector, is approximately 225 meters.

6. Distance to the Limerick Information Center is approximately 884 meters in the ESE sector.

7. Distance to Frick's Lock Environmental Laboratory is approximately 450 meters in the WSW sector.

A summary of gaseous radiation doses to members of the public at these locations is included in this Attachment.

RADIATION DOSE TO MEMBERS OF PUBLIC WITHIN LIMERICK GENERATING STATION SITE BOUNDARY FOR AFFECTED SECTORS AND DISTANCES

LOCATION	SECTOR	APPROXIMATE DISTANCE (METERS)	GAMMA AIR DOSE, MRAD	BETA AIR DOSE, MRAD	IODINE/PARTICULATE ORGAN DOSE, MREM	H-3/BETA-EMITTER INGESTION DOSE, MREM
FRICK'S LOCK	WSW	450	3.73E-9	5.88E-9	4.29E-4	0.00E0
INFO. CENTER	ESE	884	1.20E-8	1.87E-8	1.86E-3	0.00E0
R.R. TRACKS	W	225	1.73E-8	2.71E-8	2.06E-3	0.00E0

III. ATTACHMENTS

A. SUPPLEMENTAL INFORMATION

Facility: Limerick Generating Station - Unit 1 and Unit 2
License: NPF-39 (Unit 1) and NPF-85 (Unit 2)

. Regulatory Limits (ODCM Control Limits)

A. Noble Gases:

1. ≤ 500 mRems/Yr - total body ≤ 3000 mRems/yr - skin	- "instantaneous" limits per ODCM Controls I 3.3.2
2. ≤ 10 mRads - air gamma ≤ 20 mRads - air beta	- quarterly air dose limits per ODCM Controls. I 3.3.3
3. ≤ 20 mRads - air gamma ≤ 40 mRads - air beta	- yearly air dose limits per ODCM Controls. I 3.3.3

B. Iodines, tritium, particulates with half life > 8 days:

1. ≤ 1500 mRems/yr - any organ (inhalation path)	- "instantaneous" limits per ODCM Controls. I 3.3.2
2. ≤ 15 mRems - any organ	- quarterly dose limits per ODCM Controls I 3.3.4
3. ≤ 30 mRems - any organ	- yearly dose limits per ODCM Controls I 3.3.4

C. Liquid Effluents:

1. Concentration ≤ 10CFR20 Appendix B, Table II, Col. 2	- "instantaneous" limits per ODCM Controls I 3.2.2
2. ≤ 3 mRems - total body ≤ 10 mRems - any organ	- quarterly dose limits per ODCM Controls I 3.2.3
3. ≤ 6 mRems - total body ≤ 20 mRems - any organ	- yearly dose limits per ODCM Controls I 3.2.3

. Maximum Permissible Concentrations

Per LGS ODCM Controls I 3.2.2, MPCs are not used to calculate permissible release rates and concentrations for gaseous releases.

The MPCs specified in 10CFR20, Appendix B, Table II, Column 2 for identified nuclides are used to calculate permissible release rates and concentrations for liquid releases.

3. Average Energy

Based on gaseous effluent releases for the report period, average beta energy is 0.511 MeV and average gamma energy is 0.307 MeV.

4. Measurements and Approximations of Total Radioactivity

A. Fission and Activation Gases

The method used is the Canberra Series 90 Counting System; GS - Gas Marinelli.

B. Iodine:

The method used is the Canberra Series 90 Counting System; CH - Charcoal Cartridge.

C. Particulate:

The method used is the Canberra Series 90 Counting System; PT - Air Particulate Sample, 47 mm filter.

D. Liquid Effluents:

The method used is the Canberra Series 90 Counting System and the Radwaste Liquid Discharge Pre-Release Method with a 3.5 liter Marinelli.

5. Batch Releases

A. Liquid	Q3	Q4
# of Batch Releases:	107	102
Total Time period for batch releases, *	7102	6753
Maximum time period for a batch release, *	66.4	66.2
Average time period for batch release, *	90	90
Minimum time period for a batch release, *	55	20
Average stream flow (Schuylkill River) during periods of release of effluents into a flowing stream, gpm	4.82E5	1.15E6

* = Minutes

B. Gaseous	Q3	Q4
# of Batch Releases:	1	1
Total Time period for batch releases, *	540	720
Maximum time period for a batch release, *	540	720
Average time period for batch release, *	540	720
Minimum time period for a batch release, *	540	720

* = Minutes

6. Abnormal Releases

A. Liquid

None

B. Gaseous

None

7. Description of LGS Effluent Release Points

Release Point 1 = North Stack, Common

Release Point 2 = South Stack, Unit 1

Release Point 3 = South Stack, Unit 2

Release Point 4 = Hot Maintenance Shop

Liquid Release Point = LGS Liquid Radwaste Discharge

8. Description of LGS Liquid Dose Receptors

Receptor 1 = LGS Liquid Radwaste Discharge Point

Receptor 2 = Citizens Home Water Company

Receptor 3 = Phoenixville Water Company

Receptor 4 = Philadelphia Suburban Water Company

Receptor 5 = City of Philadelphia Crew Course

3. Average Energy

Based on gaseous effluent releases for the report period, average beta energy is 0.511 MeV and average gamma energy is 0.307 MeV.

4. Measurements and Approximations of Total Radioactivity

A. Fission and Activation Gases

The method used is the Canberra Series 90 Counting System; GS - Gas Marinelli.

B. Iodine:

The method used is the Canberra Series 90 Counting System; CH - Charcoal Cartridge.

C. Particulate:

The method used is the Canberra Series 90 Counting System PT - Air Particulate Sample, 47 mm filter.

D. Liquid Effluents:

The method used is the Canberra Series 90 Counting System and the Radwaste Liquid Discharge Pre-Release Method with a 3.5 liter Marinelli.

5. Batch Releases

A. Liquid	Q3	Q4
# of Batch Releases:	107	102
Total Time period for batch releases, *	7102	6753
Maximum time period for a batch release, *	66.4	66.2
Average time period for batch release, *	90	90
Minimum time period for a batch release, *	55	20
Average stream flow (Schuylkill River) during periods of release of effluents into a flowing stream, gpm	4.82E5	1.15E6

* = Minutes

III. ATTACHMENTS (continued)

B. RADIATION MONITORS OUT-OF-SERVICE CONDITION

No radiation monitors experienced out-of-service conditions beyond thirty (30) days during the reporting period.

III. ATTACHMENTS (continued)

C. PROCESS CONTROL PROGRAM (PCP), REVISION 8

No changes to the PCP were made during this period. No major changes to Radioactive Treatment Systems were effected during this period, as documented in the copy of the Surveillance Test (ST-0-RRR-990-0) included under separate cover.

III. ATTACHMENTS (continued)

D. O.D.C.M. Revision 9

Attached are the specific pages revised as denoted by revision bars in the right margin and revision number in bottom right hand corner of page.

1. Figures I.2.2-1 (a and b) have been deleted because they were retained in Technical Specification Figures I.2.2-1 (c and d) become I.2.2-1 (a and b). References to these figures in the body of the ODCM have been apporpriately revised.

2. Several sampling stations have been redesignated, consistent with Technical Specification 3.12.1. Surface water sampling station 13B1 replaces 16B2. Food product station 11S1 is replaced by two offsite locations of highest predicted annual average ground level depleted D/Q, and one location 15-30 Km distant on the least prevalent wind direction, reflecting most recent annual land use survey.

3. Figures B-1, B-2, B-3 and B-4 have been revised to show sampling station changes, with improved visual quality.

4. The Bioaccumulation Factor Table (p II-11) has been revised to incorporate factors for saltwater fish, to be consistent with the Reg. Guide 1.109 table in RMMS. Several typographic corrections have also been made.

5. Several classifications suggested by PECO's Quality Assurance Group in a recent audit have been entered, including gpm units for cooling tower blowdown (pp. 3 and 5). Table legibility has been improved where necessary. Gaseous dose factors for Xe-133, liquid dose factors Tables E-11, E-12, E-13 and E-14 have been reprinted for quality restoration.

6. Action 101 for radioactive liquid effluent monitoring instrumentation has been revised to specify gamma isotopic analysis instead of gross gamma analysis, with LLD's specified in Table I 3.2.3. LLD requirements have not been changed.

TABLE A-1

TECHNICAL SPECIFICATION/ODCM MATRIX

Technical Specification*	ODCM Section I Requirement	ODCM Equation Section II
3.3.7.11	3.2.1	1-1 1-2 1-3 1-4
3.3.7.12	3.3.1	2-1 (or 2-9) 2-2 (or 2-9) 2-4 (or 2-10) 2-5 (or 2-10)
3.11.1.1	3.2.2	1-1 1-2 1-3 1-4
3.11.1.2	3.2.3	1-5 1-6 1-7
3.11.1.3	3.2.4	1-8 1-9
3.11.2.1	3.3.2	2-22 2-23
3.11.2.3	3.3.4	2-26 2-27 2-28
3.11.2.2	3.3.3	2-24 2-25
3.11.2.3	3.3.4	2-26 2-27 2-28
3.11.2.4	3.3.5	2-33
3.11.2.7	3.3.6	2-4 2-5

* Transferred to ODCM via T.S. amendment nos. 48 and 11.

TABLE A-1

Technical Specification*	ODCM Section I Requirement	ODCM Equation Section II
6.9.1.8	3.6	1-5 1-6 1-7 2-24 2-25 2-26 2-27 2-28
3.11.4	3.3.7	3-1
3.12.1	3.4.1	Section II App. B
6.9.1.7	3.5	1-5
3.12.3	3.4.3	1-6 1-7 2-29 2-30 2-31 2-32 3-2

* Transferred to ODCM via T.S. amendment nos. 48 and 11.

2.0 BASES FOR EFFLUENT MONITORING CONTROLS

2.1 METEOROLOGICAL MONITORING INSTRUMENTATION

The OPERABILITY of the meteorological monitoring instrumentation ensures that sufficient meteorological data is available for estimating potential radiation doses to the public as a result of routine or accidental release of radioactive materials to the atmosphere. This capability is required to evaluate the need for initiating protective measures to protect the health and safety of the public. This instrumentation is consistent with the recommendations of Regulatory Guide 1.23 "Onsite Meteorological Programs," February, 1972.

Site data compiled since January 1972 provide correlation between Elevation 1 (lower 1) and Elevation 1 (Tower 2), and between Elevation 2 (Tower 1) and Elevation 2 (Tower 2). This correlation serves as justification for the use of the appropriate Tower 2 instrument as a back-up to the Tower 1 instrument as shown in Table I 3.1-1.

MAPS DEFINING UNRESTRICTED AREAS AND SITE BOUNDARY FOR RADIOACTIVE GASEOUS AND LIQUID EFFLUENTS

2.2 Information regarding radioactive gaseous and liquid effluents, which will allow identification of structures and release points as well as definition of UNRESTRICTED AREAS within the SITE BOUNDARY that are accessible to MEMBER OF THE PUBLIC, shall be shown in Technical Specifications Figures 5.1.3-1a and Figures 5.1.3-1b.

The exclusion area and low population zone shall be as shown in Figures I2.2.-1a and I2.2-1b.

2.3 RADIOACTIVE LIQUID EFFLUENT MONITORING INSTRUMENTATION

The radioactive liquid effluent instrumentation is provided to monitor and control, as applicable, the releases of radioactive materials in liquid effluents during actual or potential releases of liquid effluents. The alarm/trip setpoints for these instruments shall be calculated in accordance with the procedures in the ODCM part II to ensure that the alarm/trip will occur prior to exceeding the limits of 10 CFR Part 20. The OPERABILITY and use of this instrumentation is consistent with the requirements of General Design Criteria 60, 63, and 64 of Appendix A to 10 CFR Part 50.

H. P. RWB
Date 12/3/90
Rev. 9

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H. P. RKG
Date 12/3/90
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FIGURE I2.2-1a

EXCLUSION AREA

H. P. RKS
Date 12/3/90
Rev. 9

FIGURE I2.2-1b

LOW POPULATION ZONE

H. P. RWS
Date 12/5/90
Rev. 9

RADIOACTIVE LIQUID EFFLUENT MONITORING INSTRUMENTATION

CONTROLS

3.2.1 In accordance with LGS TS 3.3.7.11, the radioactive liquid effluent monitoring instrumentation channels shown in Table I3.2-1 shall be OPERABLE with their alarm/trip setpoints set to ensure that the limits of Control 3.2.2 are not exceeded. The alarm/trip setpoints* of these channels shall be determined and adjusted in accordance with the methodology and parameters in the OFFSITE DOSE CALCULATION MANUAL (ODCM).

APPLICABILITY: At all times.

ACTION:

a. With a radioactive liquid effluent monitoring instrumentation channel alarm/trip setpoint less conservative than required by the above control, immediately suspend the release of radioactive liquid effluents monitored by the affected channel, or declare the channel inoperable.

b. With less than the minimum number of radioactive liquid effluent monitoring instrumentation channels OPERABLE, take the ACTION shown in Table I3.2-1. Restore the inoperable instrumentation to OPERABLE status within the time specified in the ACTION or explain in the next Semiannual Radioactive Effluent Release Report why this inoperability was not corrected within the time specified.

SURVEILLANCE REQUIREMENTS

3.2.1.1 Each radioactive liquid effluent monitoring instrumentation channel shall be demonstrated OPERABLE by performance of the CHANNEL CHECK, SOURCE CHECK, CHANNEL CALIBRATION and CHANNEL FUNCTIONAL TEST operations at the frequencies shown in Table I3.2-2.

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* Excluding the flow rate measuring devices which are not determin and adjusted in accordance with the ODCM.

H. P. RLG
Date 12/2/90
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TABLE 13.2-1

RADIOACTIVE LIQUID EFFLUENT MONITORING INSTRUMENTATION

INSTRUMENT	MINIMUM CHANNELS OPERABLE	ACTION
1. GROSS RADIOACTIVITY MONITORS PROVIDING AUTOMATIC TERMINATION OF RELEASE		
a. Liquid Radwaste Effluent Line	1	100
b. RHR Service Water System Effluent Line	1/loop	101
2. GROSS RADIOACTIVITY MONITORS NOT PROVIDING AUTOMATIC TERMINATION OF RELEASE		
a. Service Water System Effluent Line	1	101
3. FLOW RATE MEASUREMENT DEVICES		
a. Liquid Radwaste Effluent Line	1	102
b. Discharge Line	1	102

ACTION STATEMENTS

ACTION 100 - With the number of channels OPERABLE less than required by the Minimum Channels OPERABLE requirement, effluent releases may continue for up to 1 days provided that prior to initiating a release:

a. At least two independent samples are analyzed in accordance with Table 13.2-3, and

b. At least two technically qualified members of the facility staff independently verify the release rate calculations and discharge line valving;

Otherwise, suspend release of radioactive effluents via this pathway.

ACTION 101 - With the number of channels OPERABLE less than required by the Minimum Channels OPERABLE requirement, effluent releases via this pathway may continue for up to 30 days provided that, at least once per 8 hours, gra samples are collected and analyzed for radioactivity by gamma isotopic analysis (Principal Gamma Emitters, I-131, and Dissolved/Entrained Gases as a Lower Limit of Detection as specified in table 13.2-3 or gross radioactivity (beta or gamma). Gross Beta is analyzed at a limit of detection of at least 1N7 microcurie/ml. Gross Gamma is analyzed at a limit of detection of at least 5N7 microcurie/ml.

ACTION 102 - With the number of channels OPERABLE less than required by the Minimum Channels OPERABLE requirement, effluent releases via this pathway may continue for up to 30 days provided the flow rate is estimated at least once per 4 hours during actual releases. Pump curves generated in situ may be used to estimate flow.

H. P. RCB
Date 12/4/90
Rev. 9

CONCENTRATION

CONTROLS

3.2.2 In accordance with LGS TS 3.11.1.1, the concentration of radioactive material released in liquid effluents to UNRESTRICTED AREAS (see Figure I2.2-1a,b) shall be limited to the concentrations specified in 10 CFR Part 20, Appendix B, Table II, Column 2 for radionuclides other than dissolved or entrained nobles gases. For dissolved or entrained noble gases, the concentration shall be limited to 2×10^{-4} microcuries/ml total activity.

APPLICABILITY: At all times.

ACTION:

With the concentration of radioactive material released in liquid effluents to UNRESTRICTED AREAS exceeding the above limits, immediately restore the concentration to within the above limits.

SURVEILLANCE REQUIREMENTS

3.2.2.1 Radioactive liquid wastes shall be sampled and analyzed according to the sampling and analysis program of Table I3.2-3.

3.2.2.2 The results of the radioactivity analyses shall be used in accordance with the methodology and parameters in the ODCM to assure that the concentrations at the point of release are maintained within the limits of Control 3.2.2.

H. P. RKG
Date 12/14/90
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DOSE

CONTROLS

3.2.3 In accordance with LGS TS 3.11.1.2, the dose or dose commitment to a MEMBER OF THE PUBLIC from radioactive materials in liquid effluents released from the site to UNRESTRICTED AREAS (See Figure I2.2-1a) shall be limited:

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

b. During any calendar year to less than or equal to 6 mrems to the total body and to less than or equal to 20 mrems to any organ.

APPLICABILITY: At all times.

ACTION:

a. With the calculated dose from the release of radioactive materials in liquid effluents exceeding any of the above limits, prepare and submit to the Commission within 30 days, pursuant to Technical Specification 6.9.2, a Special Report which identifies the cause(s) for exceeding the limit(s) and defines the corrective actions that have been taken to reduce the releases and the proposed corrective actions to be taken to assure that subsequent releases will be in compliance with the above limits. This Special Report shall also include the radiological impact on finished drinking water supplies at the nearest downstream drinking water source.

SURVEILLANCE REQUIREMENTS

3.2.3.1 Cumulative dose contributions from liquid effluents for the current calendar quarter and the current calendar year shall be determined in accordance with the methodology and parameters in the ODCM at least once per 31 days.

H. P. PLO
Date 12/12/90
Rev. 9

LIQUID RADWASTE TREATMENT SYSTEM

CONTROLS

3.2.4 In accordance with LGS TS 3.11.1.3, the liquid radwaste treatment system shall be OPERABLE and appropriate portions of the system shall be used to reduce the radioactive materials in liquid waste prior to their discharge when the projected doses due to the liquid effluent, from the site, to UNRESTRICTED AREAS (see Figure I2.2-1a) would exceed 0.06 mrem to the total body or 0.2 mrem to any organ in a 31-day period.

APPLICABILITY: At all times.

ACTION:

a. With radioactive liquid waste being discharged without treatment and in excess of the above limits, prepare and submit to the Commission within 30 days pursuant to Technical Specification 6.9.2 a Special Report which includes the following information:

1. Explanation of what liquid radwaste was being discharged without treatment, identification of any inoperable equipment or subsystems, and the reason for the inoperability,

2. Action(s) taken to restore the inoperable equipment to OPERABLE status, and

3. Summary description of action(s) taken to prevent a recurrence.

SURVEILLANCE REQUIREMENTS

3.2.4.1 Doses due to liquid releases from the site to UNRESTRICTED AREAS shall be projected at least once per 31 days in accordance with the methodology and parameters in the ODCM.

4.2.4.2 The liquid radwaste treatment system shall be demonstrated OPERABLE by meeting Controls 3.2.2 and 3.2.3.

H. P. EKC
Date 12/12/90
Rev. 9

RADIOACTIVE GASEOUS EFFLUENT MONITORING INSTRUMENTATION

CONTROLS

3.3.1 In accordance with LGS TS 3.3.7.12, the radioactive gaseous effluent monitoring instrumentation channels shown in Table I3.3-1 shall be OPERABLE with their alarm/trip setpoints set to ensure that the limits of Control 3.3.2 are not exceeded. The alarm/trip setpoints of the applicable channels shall be determined in accordance with the methodology and parameters in the ODCM.

APPLICABILITY: As shown in Table I3.3-1

ACTION:

a. With a radioactive gaseous effluent monitoring instrumentation channel alarm/trip setpoint less conservative than required by the above Control, immediately suspend the release of radioactive gaseous effluents monitored by the affected channel or declare the channel inoperable.

b. With less than the minimum number of radioactive gaseous effluent monitoring instrumentation channels OPERABLE, take the ACTION shown in Table I3.3-1. Restore the inoperable instrumentation to OPERABLE status within the time specified in the ACTION or explain why this inoperability was not corrected in a timely manner in the next Semiannual Radioactive Effluent Release Report.

SURVEILLANCE REQUIREMENTS

3.3.1.1 Each radioactive gaseous effluent monitoring instrumentation channel shall be demonstrated OPERABLE by performance of the CHANNEL CHECK, SOURCE CHECK, CHANNEL CALIBRATION, and CHANNEL FUNCTIONAL TEST operations at the frequencies shown in Table I3.3-2.

H. P. EKG
Date 12/1/93
Rev. 9

GASEOUS EFFLUENTS

DOSE RATE

CONTROLS

3.3.2 In accordance with LGS TS 3.11.2.1 the dose rate due to radioactive materials released in gaseous effluents from the site to areas at or beyond the SITE BOUNDARY (see Figure I2.2-1a) shall be limited to the following:

a. 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, and

b. For iodine-131, for iodine-133, 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. (Inhalation pathways only.)

APPLICABILITY: At all times.

ACTION:

a. With the dose rate(s) exceeding the above limits, immediately restore the release rate to within the above limits.

SURVEILLANCE REQUIREMENTS

3.3.2.1 The dose rate due to noble gases in gaseous effluents shall be determined to be within the above limits in accordance with the methodology and parameters of the ODCM.

3.3.2.2 The dose rate due to iodine-131, iodine-133, tritium, and all radionuclides in particulate form with half-lives greater than 8 days in gaseous effluents shall be determined to be within the above limits in accordance with the methodology and parameters of the ODCM by obtaining representative samples and performing analyses in accordance with the sampling and analysis program specified in Table I3.3-3.

H. P. RWG
Date 12/6/90
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DOSE - NOBLE GASES

CONTROLS

3.3.3 In accordance with LGS TS 3.11.2.2, the air dose due to noble gases released in gaseous effluents, from the site to areas at and beyond the SITE BOUNDARY (see Figure I2.2-1a) shall be limited to the following:

a. During any calendar quarter: Less than or equal to 10 mrads for gamma radiation and less than or equal to 20 mrads for beta radiation, and

b. During any calendar year: Less than or equal to 20 mrads for gamma radiation and less than or equal to 40 mrads for beta radiation.

APPLICABILITY: At all times.

ACTION:

a. With the calculated air dose from radioactive noble gases in gaseous effluents exceeding any of the above limits, prepare and submit to the Commission within 30 days, pursuant to Technical Specification 6.9.2, a Special Report which identifies the cause(s) for exceeding the limit(s) and defines the corrective actions that have been taken to reduce the releases and the proposed corrective actions to be taken to assure that subsequent releases will be in compliance with the above limits.

SURVEILLANCE REQUIREMENTS

3.3.3.1 Cumulative dose contributions for the current calendar quarter and current calendar year for noble gases shall be determined in accordance with the methodology and parameters in the ODCM at least once per 31 days.

H. P. PRC
Date 12/12/90
Rev. 9

DOSE - IODINE-133, TRITIUM, AND RADIONUCLIDES IN PARTICULATE FORM

CONTROLS

3.3.4 In accordance with LGS TS 3.11.2.3, the dose to a MEMBER OF THE PUBLIC from iodine-131, iodine-133, tritium, and all radionuclides in particulate form with half-lives greater than 8 days in gaseous effluents released, from the site to areas at and beyond the SITE BOUNDARY (see Figure I2.2-1a) shall be limited to the following:

a. During any calendar quarter: Less than or equal to 15 mrems to any organ and,

b. During any calendar year: Less than or equal to 30 mrems to any organ.

APPLICABILITY: At all times.

ACTION:

a. With the calculated dose from the release of iodine-131, iodine-133, tritium, and radionuclides in particulate form with half-lives greater than 8 days, in gaseous effluents exceeding any of the above limits, prepare and submit to the Commission within 30 days, pursuant to Technical Specification 6.9.2, a Special Report which identifies the cause(s) for exceeding the limit and defines the corrective actions that have been taken to reduce the releases and the proposed corrective actions to be taken to assure that subsequent releases will be in compliance with the above limits.

SURVEILLANCE REQUIREMENTS

3.3.4.1 Cumulative dose contributions for the current calendar quarter and current calendar year for iodine-131, iodine-133, tritium, and radionuclides in particulate form with half-lives greater than 8 days shall be determined in accordance with the methodology and parameters in the ODCM at least once per 31 days.

H. P. RLB
Date 12/14/90
Rev. 9

VENTILATION EXHAUST TREATMENT SYSTEM

CONTROLS

3.3.5 In accordance with LGS TS 3.11.2.4, the VENTILATION EXHAUST TREATMENT SYSTEM shall be OPERABLE and appropriate portions of the system shall be used to reduce radioactive materials in gaseous waste prior to their discharge when the projected doses due to gaseous effluent releases, from the site to areas at and beyond the SITE BOUNDARY (see Figure I2.2-1) when averaged over 31 days would exceed 0.6 mrem to any organ in a 31-day period.

APPLICABILITY: At all times.

ACTION:

a. With gaseous waste being discharged without treatment, and in excess of the above limits, prepare and submit to the Commission within 30 days, pursuant to Technical Specification 6.9.2, a Special Report which includes the following information:

1. Explanation of why gaseous radwaste was being discharged without treatment, identification of any inoperable equipment or subsystems, and the reason for the inoperability.

2. Action(s) taken to restore the inoperable equipment to OPERABLE status, and

3. Summary description of action(s) taken to prevent a recurrence.

SURVEILLANCE REQUIREMENTS

3.3.5.1 Doses due to gaseous releases from the site to areas at and beyond the SITE boundary shall be projected at least once per 31 days in accordance with the methodology and parameters in the ODCM.

3.3.5.2 The VENTILATION EXHAUST TREATMENT SYSTEM shall be demonstrated OPERABLE by meeting Controls 3.3.2, 3.3.3 or 3.3.4.

H. P. 2&B
Date 12/12/90
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CONTROLS

3.3.6 In accordance with LGS TS 3.11.2.7, VENTING or PURGING of the Mark II containment shall be through the standby gas treatment system.

APPLICABILITY: Whenever the containment is vented or purged.*

ACTION:

a. With the requirements of the above specification not satisfied, suspend all VENTING and PURGING of the containment.

SURVEILLANCE REQUIREMENTS

3.3.6.1 The containment shall be determined to be aligned for VENTING or PURGING through the standby gas treatment system within 4 hours prior to start of and at least once per 12 hours during VENTING or PURGING of the containment.

3.3.6.2 Prior to use of the purge system through the standby gas treatment system assure that:

a. Both standby gas treatment system trains are OPERABLE whenever the purge system is in use, and

b. Whenever the purge system is in use during OPERATIONAL CONDITION 1 or 2 or 3, only one of the standby gas treatment system trains may be used.

*Except for the one inch/two inch vent valves to the Reactor Enclosure Equipment Compartment Exhaust Filters when used for containment pressure control and nitrogen make-up operations.

H. P. PKB
Date 12/17/90
Rev. 9

RADIOACTIVE EFFLUENTS

TOTAL DOSE

CONTROLS

3.3.7 In accordance with LGS TS 3.11.4, 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.

APPLICABILITY: At all times.

ACTION:

a. With the calculated doses from the release of radioactive materials in liquid or gaseous effluents exceeding twice the limits of Control 3.2.3.a, 3.2.3.b., 3.3.3.a., 3.3.3.b., 3.3.4.a., or 3.3.4.b., calculations shall be made including direct radiation contributions from the reactor units and from outside storage tanks to determine whether the above limits of Control 3.3.7 have been exceeded. If such is the case, prepare and submit to the Commission within 30 days, pursuant to Tech. Specification 6.9.2, a Special Report that defines the corrective action to be taken to reduce subsequent releases to prevent recurrence of exceeding the above limits and includes the schedule for achieving conformance with the above limits. This Special Report, as defined in 10 CFR 20.405c, shall include an analysis that estimates the radiation exposure (dose) to a MEMBER OF THE PUBLIC from the uranium fuel cycle sources, including all effluent pathways and direct radiation, for the calendar year that includes the release(s) covered by this report. It shall also describe levels of radiation and concentrations of radioactive material involved, and the cause of the exposure levels or concentrations. If the estimated dose(s) exceeds the above limits, and if the release condition resulting in violation 40 CFR Part 190 has not already been corrected, the Special Report shall include a request for a variance in accordance with the provisions of 40 CFR Part 190. Submittal of the report is considered a timely request, and a variance is granted until staff action on the request is complete.

SURVEILLANCE REQUIREMENTS

3.3.7.1 Cumulative dose contributions from liquid and gaseous effluents shall be determined in accordance with Controls 3.2.3.1, 3.3.3.1, and 3.3.4.1, and in accordance with the methodology and parameters in the ODCM.

3.3.7.2 If the cumulative dose contributions exceed the limits defined in 3.3.7a, Cumulative dose contributions from direct radiation from unit operation shall be determined in accordance with the methodology and parameters in the ODCM Part II.

H. P. PRB
Date 12/14/90
Rev. 9

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM

CONTROLS

3.4.1 In accordance with LGS TS 3.12.1, the radiological environmental monitoring program shall be conducted as specified in Table I3.4-1.

APPLICABILITY: At all times.

ACTION

a. With the radiological enviornmental monitoring program not being conducted as specified in Table I3.4-1, prepare and submit to the Commission, in the Annual Radiological Environmental Operating Report per Control 3.5, a description of the reasons for not conducting the program as required and the plans for preventing a recurrence.

b. With the level of radioactivity as the result of plant effluents in an environmental sampling medium at a specified location exceeding the reporting levels of Table I3.4-2 when averaged over any calendar quarter, prepare and submit to the Commission within 30 days, pursuant to Technical Specification 6.9.2, a Special Report that identifies the cause(s) for exceeding the limit(s) and defines the corrective actions to be taken to reduce radioactive effluents so that the potential annual dose to a MEMBER OF THE PUBLIC is less than the calendar year limits of Controls 3.2.3, 3.3.3 and 3.3.4. When more than one of the radionuclides in Table I3.4-2 are detected in the sampling medium, this report shall be submitted if:

$$\frac{\text{concentration (1)}}{\text{reporting level (1)}} + \frac{\text{concentration(2)}}{\text{reporting level (2)}} + \ldots \geq 1.0$$

When radionuclides other than those in Table I3.4-2 are detected and are the result of plant effluents, this report shall be submitted if the potential annual dose to a MEMBER OF THE PUBLIC is equal to or greater than the calendar year limits of Controls 3.2.3, 3.3.3, and 3.3.4. This report is not required if the measured level of radioactivity was not the result of plant effluents; however, in such an event, the condition shall be reported and described in the Annual Radiological Environmental Operating Report.

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LAND USE CENSUS

CONTROLS

3.4.2 In accordance with LGS TS 3.1.2.2, a land use census shall be conducted and shall identify within a distance of 8 km (5 miles) the location in each of the 16 meteorological sectors of the nearest milk animal, the nearest residence and the nearest garden* of greater than 50 m^2 (500 ft^2) producing broad leaf vegetation.

APPLICABILITY: At all times.

ACTION

a. With a land use census identifying a location(s) which yields a calculation dose or dose commitment greater than the values currently being calculated in Control 3.3.4.1, identify the new location(s) in the next Semiannual Radioactive Effluent Release Report, pursuant to Control 3.6.

b. With a land use census identifying a location(s) that yields a calculated dose or dose commitment (via the same exposure pathway) 20% greater than at a location from which samples are currently being obtained in accordance with Control 3.4.1, add the new location(s) to the radiological environmental monitoring program within 30 days. The sampling location(s), excluding the control station location, having the lowest calculated dose or dose commitment(s) (via the same exposure pathway) may be deleted from this monitoring program after October 31 of the year in which this land use census was conducted. Pursuant to Technical Specification 6.14, submit as a part of or concurrent with in the next Semiannual Radioactive Effluent Release Report a complete, legible copy of the entire ODCM including a revised figure(s) and table(s) for the ODCM reflecting the new location(s).

SURVEILLANCE REQUIREMENTS

3.4.2.1 The land use census shall be conducted during the growing season at least once per 12 months using that information that will provide the best results, such as by a door-to-door survey, aerial survey, or by consulting local agriculture authorities. The results of the land use census shall be included in the Annual Radiological Environmental Operating Report pursuant to Control 3.5.

* Broad leaf vegetation sampling of at least three different kinds of vegetation may be performed at the SITE BOUNDARY in each of two different direction sectors with the highest predicted D/Qs in lieu of the garden census. Controls for broad leaf vegetation sampling in Table 13.4-1 item 4.c. shall be followed, including analysis of control samples.

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RADIOLOGICAL ENVIRONMENTAL MONITORING

INTERLABORATORY COMPARISON PROGRAM

CONTROLS

3.4.3 In accordance with LGS TS 3.12.3, analyses shall be performed on radioactive materials supplied as part of an Interlaboratory Comparison Program which has been approved by the Commission.

APPLICABILITY: At all times.

ACTION

a. With analyses not being performed as required above, report the corrective actions taken to prevent a recurrence to the Commission in the Annual Radiological Environmental Operating Report pursuant to Control 3.5.

SURVEILLANCE REQUIREMENTS

3.4.3.1 The Interlaboratory Comparison Program shall be described in the ODCM. A summary of the results obtained as part of the above required Interlaboratory Comparison Program shall be included in the Annual Radiological Environmental Operating Report pursuant to Control 3.5.

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1.2.1.1 Setpoint Determination - RISH63-0K604

The setpoint for the liquid radwaste discharge monitor is determined by the following equation:

$$CPM_{(LRD)} \leq \left[1 - \frac{(S)(RR)[\Sigma(C_{i\beta})/MPC_{i\beta})]}{(RR+CTBD)} \right] \left[\frac{(\Sigma C_{igamma})(RR+CTBD)}{(S)(E)(RR)\left[\Sigma(C_{igamma}/MPC_{igamma})\right]} \right] + BKG_{(LRD)} \quad (1\text{-}1)$$

where:

$CPM_{(LRD)}$ = Calculated liquid radwaste discharge monitor (RISH63-OK604) count rate attributable to the gamma emitting radionuclides, cpm,

ΣC_{igamma} = the sum of the concentration of the identified gamma emitting nuclides (μCi/ml),

CTBD = the required minimum cooling tower blowdown rate at time of discharge (gpm),

RR = average liquid radwaste discharge flow (gpm),

$BKG_{(LRD)}$ = background count rate of liquid radwaste discharge monitor (CPM),

E = the gross gamma detection efficiency of the liquid radwaste discharge monitor (μCi/ml/cpm), and

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*NOTE: The concentration mix must include the most recent sample data for H-3, Sr-89, Sr-90, Fe-55, and dissolved and entrained noble gases.

1.2.1.2 Flow Rate Determination

*NOTE: IF the effective MPC ratio for the mixture of radionuclides $\left[\Sigma(C_i/MPC_i)\right]$ is ≤1.0,
THEN a flow rate setpoint determination is not required, AND there is no limit on discharge flow rate.
IF a flow rate determination is required,
THEN the setpoint for the liquid radwaste flow rate is determined for each release by the following equation:

$$FLOW_{(LRD)} \leq \frac{CTBD}{(SF)[\Sigma(C_i/MPC_i)-1]} \qquad (1\text{-}2)$$

where:

$FLOW_{(LRD)}$ = flow limit for radwaste discharge line (gpm)

CTBD = required minimum cooling tower blowdown flow for time of release (gpm),

SF = 5; margin of safety factor to assure that the release does not exceed 10 CFR 20 limits

$\Sigma(C_i/MPC_i)$ = the effective MPC ratio for the mixture of radionuclides in the liquid radwaste discharge line (unitless)

where:

C_i = the concentration of each identified radionuclide i in the liquid effluent (undiluted) (μCi/ml)*

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BIOACCUMULATION FACTORS (pCi/kg/pCi/liter)

ELEMENT	FRESHWATER FISH	SALTWATER FISH
H	9.0E-1	9.0E-1
C	4.6E 3	1.8E 3
Na	1.0E 2	6.7E-2
P	3.0E 3	2.9E 4
Cr	2.0E 2	4.0E 2
Mn	4.0E 2	5.5E 2
Fe	1.0E 2	3.0E 3
Co	5.0E 1	1.0E 2
Ni	1.0E 2	1.0E 2
Cu	5.0E 1	6.7E 2
Zn	2.0E 3	2.0E 3
Br	4.2E 2	1.5E-2
Rb	2.0E 3	8.3E 0
Sr	3.0E 1	2.0E 0
Y	2.5E 1	2.5E 1
Zr	3.3E 0	2.0E 2
Nb	3.0E 4	3.0E 4
Mo	1.0E 1	1.0E 1
Tc	1.5E 1	1.0E 1
Ru	1.0E 1	3.0E 0
Rh	1.0E 1	1.0E 1
Te	4.0E 2	1.0E 1
I	1.5E 1	1.0E 1
Cs	2.0E 3	4.0E 1
Ba	4.0E 0	1.0E 1
La	2.5E 1	2.5E 1
Ce	1.0E 0	1.0E 1
Pr	2.5E 1	2.5E 1
Nd	2.5E 1	2.5E 1
W	1.2E 3	3.0E 1
Np	1.0E 1	1.0E 1

Ref: 1) U.S.N.R.C. Reg. Guide 1.109, Rev. 1, Table A-1
2) Letter LTR 881209L001, from R. J. Clark, U.S.N.R.C., to G. A. Hunger, Philadelphia Electric Co., December 9, 1988, transmitting evaluation of Limerick ODCM.

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TABLE A-1

TECHNICAL SPECIFICATION/ODCM MATRIX

Technical Specification*	ODCM Section I Requirement	ODCM Equation Section II
3.3.7.11	3.2.1	1-1 1-2 1-3 1-4
3.3.7.12	3.3.1	2-1 (or 2-9) 2-2 (or 2-9) 2-4 (or 2-10) 2-5 (or 2-10)
3.11.1.1	3.2.2	1-1 1-2 1-3 1-4
3.11.1.2	3.2.3	1-5 1-6 1-7
3.11.1.3	3.2.4	1-8 1-9
3.11.2.1	3.3.2	2-22 2-23
3.11.2.3	3.3.4	2-26 2-27 2-28
3.11.2.2	3.3.3	2-24 2-25
3.11.2.3	3.3.4	2-26 2-27 2-28
3.11.2.4	3.3.5	2-33
3.11.2.7	3.3.6	2-4 2-5

* Transferred to ODCM via T.S. amendment nos. 48 and 11.

TABLE A-1

Technical Specification*	ODCM Section I Requirement	ODCM Equation Section II
6.9.1.8	3.6	1-5 1-6 1-7 2-24 2-25 2-26 2-27 2-28
3.11.4	3.3.7	3-1
3.12.1	3.4.1	Section II App. B
6.9.1.7	3.5	1-5
3.12.3	3.4.3	1-6 1-7 2-29 2-30 2-31 2-32 3-2

* Transferred to ODCM via T.S. amendment nos. 48 and 11.

TABLE B-1 (continued)

Pathway	Station Code		Location	Collection Method	Analyses
II. Airborne (cont.)					
Particulates (cont.)					Gross beta analysis done >24 hr after sampling to allow for Radon and Thoron daughter decay. Gamma isotopic analysis on monthly composite.
Iodine	10S3 11S1 14S1 13C1 13H4	 C	0.5 miles E of site 0.5 miles ESE of site 0.6 miles SE of site 2.9 miles SE of site 28.8 miles SE of site	A TEDA impregnated flow-through cartridge is connected to air sampler and is collected weekly at filter change.	Iodine 131 analysis performed on each weekly sample.
III. Water					
Surface	24S1 13B1	C 	0.3 miles SSW of site 1.8 miles ESE of site	Sample collected from a continuous water sampler, monthly. In event sampler is inoperable, weekly grab samples will be collected until sampler returned to service.	Gamma isotopic analysis monthly; H-3 on quarterly composite.
Sediment	16C4		Vincent Dam, down-stream of discharge	A sediment sample is taken semi-annually.	Gamma isotopic analysis: semi-annually.

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TABLE B-1 (continued)

Pathway	Station Code		Location	Collection Method	Analyses
IV. Ingestion					
Milk	22F1	C	9.8 miles SW of site	Sample of fresh milk is collected from each farm biweekly when cows are on pasture, monthly at other times.	Gamma isotopic and I-131 analyses on each sample on collection.
	10B1		1.1 miles ESE of site		
	25B1		1.3 miles WSW of site		
	21B1		1.8 miles SSW of site		
Drinking	15F7		5.2 miles SSE of site	Sample collected from a continuous water sampler monthly. In event sampler is inoperable, weekly grab samples will be collected until sampler returned to service.	Gross beta and gamma isotopic monthly; H-3 on quarterly composite.
	28F3	C	5.9 miles WNW of site		
	15F4		7.8 miles SE of site		
	16C2		2.4 miles SSE of site		
Fish	16C5		1.9 miles SSE of site	Two species of recreationally important fish (predator and bottom feeder) sampled in season or semiannually if not seasonal.	Gamma isotopic analyses on edible portions.
	29C1	C	3.2 miles WNW of site		
Food Products	Two offsite locations of highest predicted annual average ground level D/Q and one location 15-30 km distant in the least prevalent wind direction as determined using the results of the most recent annual Landuse Survey.			Samples of three (3) different kinds of broad leaf vegetation monthly when available if milk sampling is not performed.	Gamma isotopic and I-131 analysis.

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FIGURE B-1
ENVIRONMENTAL SAMPLING LOCATIONS ON-SITE OR NEAR THE LIMERICK GENERATING STATION

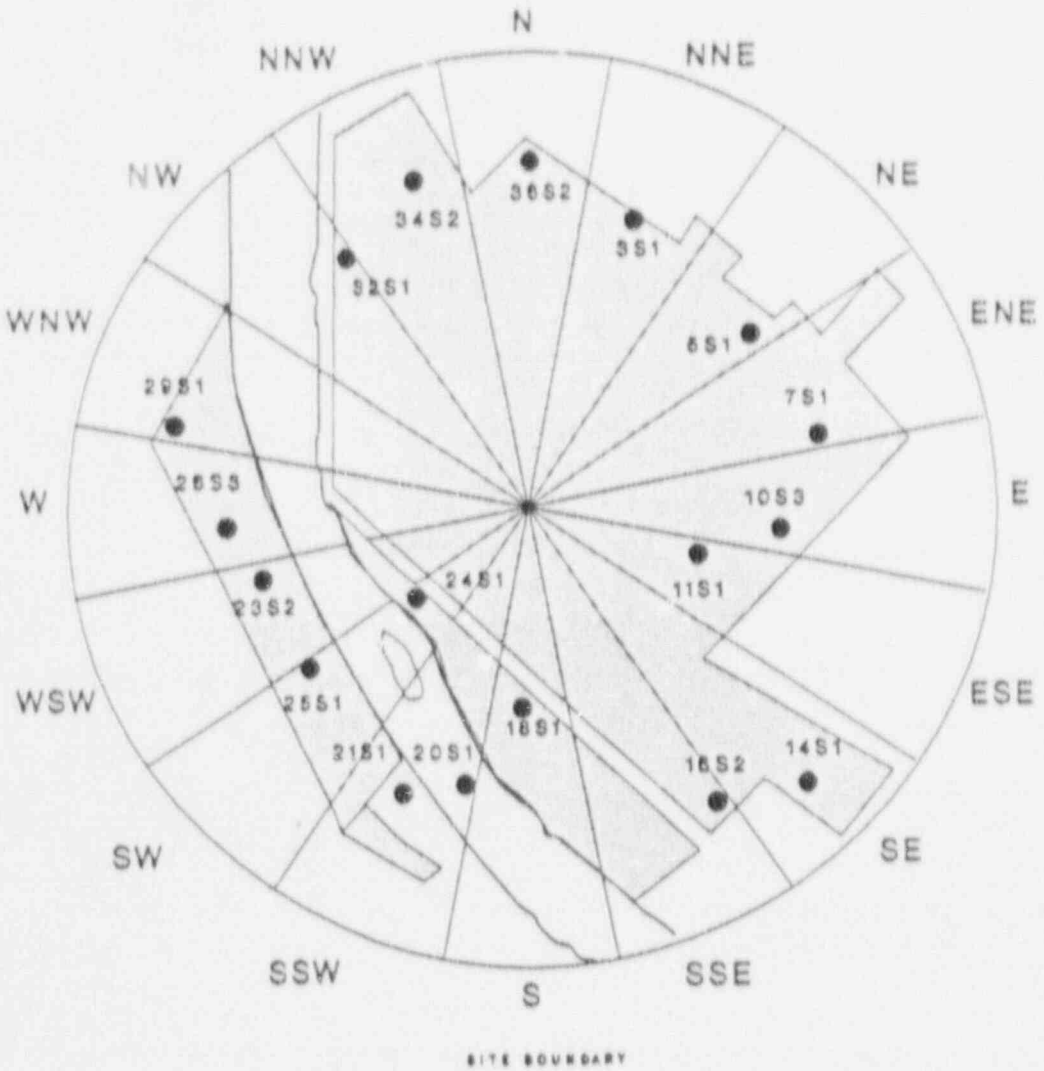

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FIGURE B-2
AIRBORNE AND TLD ENVIRONMENTAL SAMPLING STATIONS AT
INTERMEDIATE DISTANCES FROM LIMERICK GENERATING STATION,

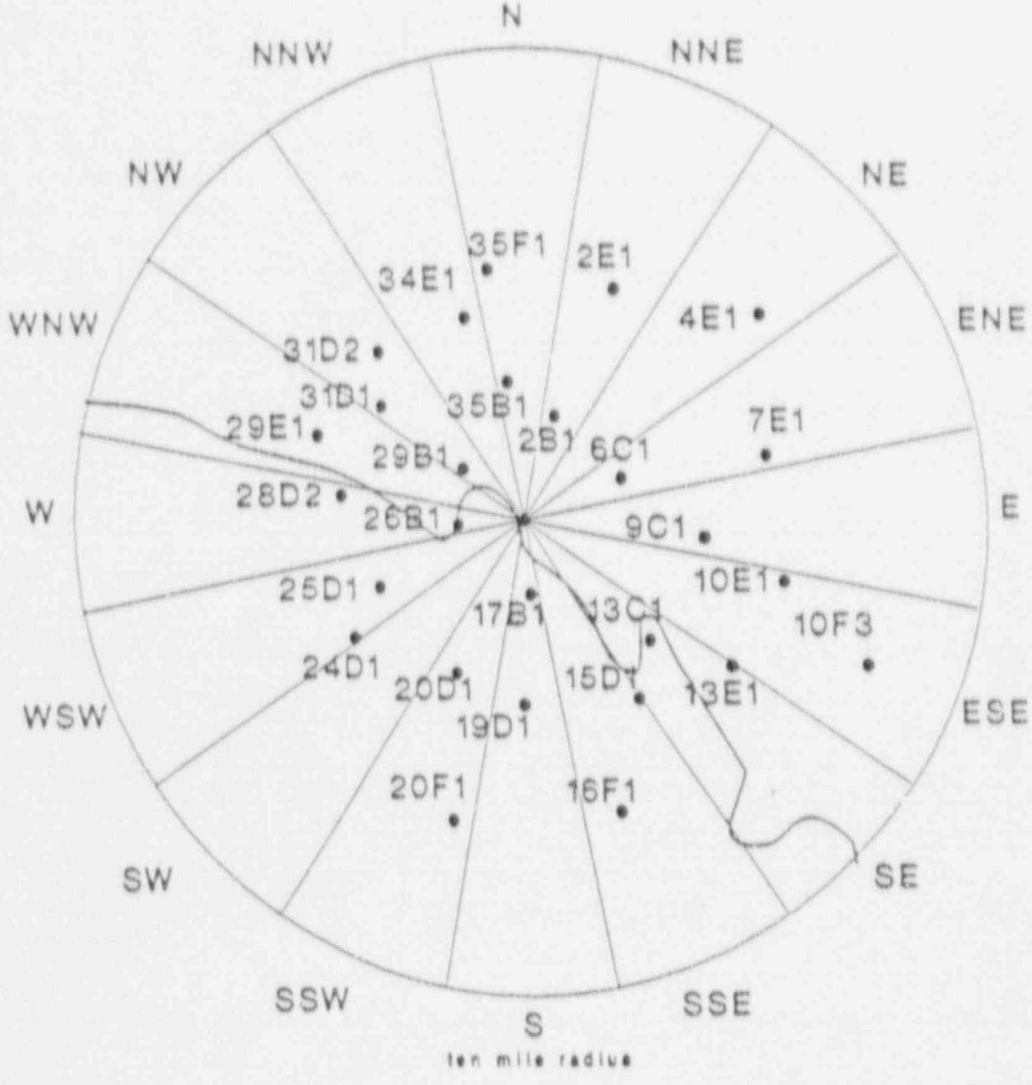

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FIGURE B-3

AQUATIC AND TERRESTRIAL ENVIRONMENTAL SAMPLING STATIONS AT INTERMEDIATE DISTANCES FROM LIMERICK GENERATING STATION.

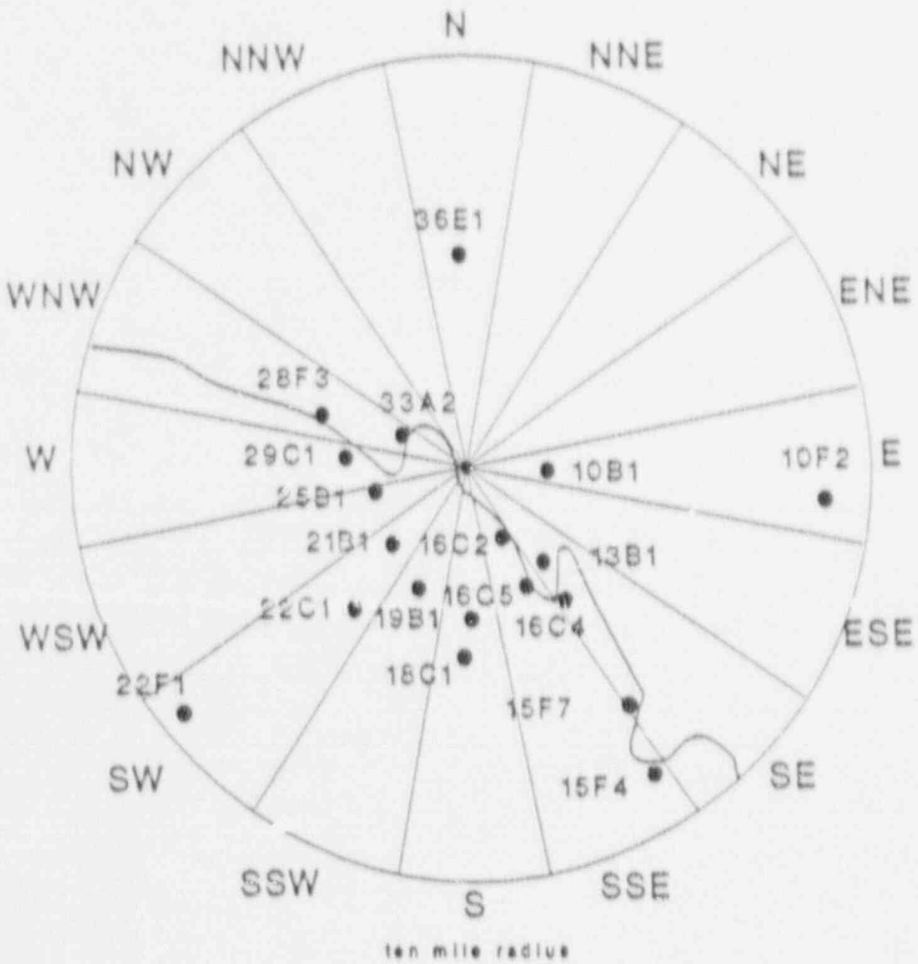

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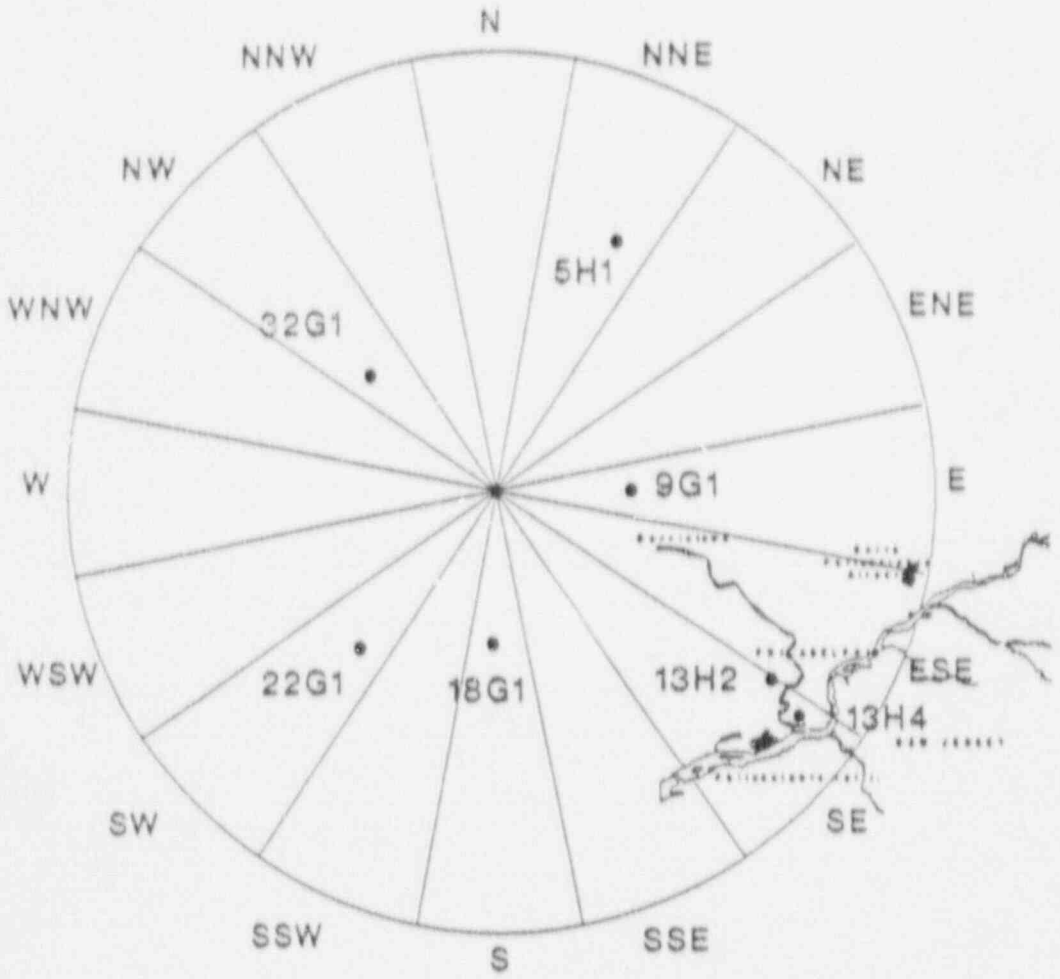
FIGURE B-4
ENVIRONMENTAL SAMPLING STATIONS AT REMOTE
DISTANCES FROM LIMERICK GENERATING STATION



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