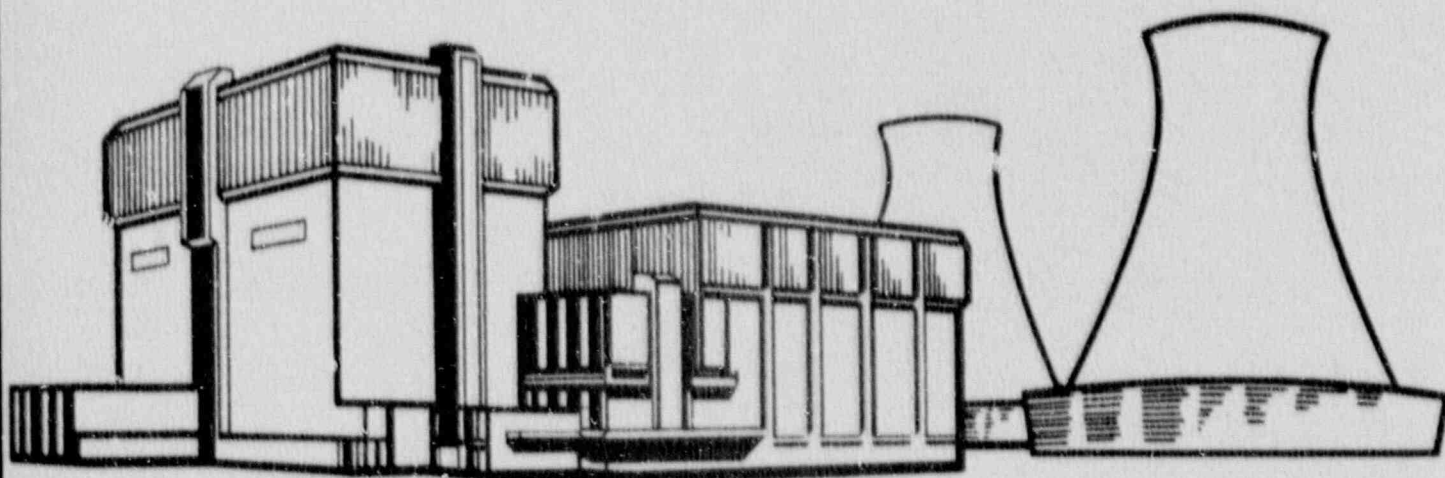


3902095410



LIMERICK GENERATING STATION

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FDR ADOCK 05000352
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3902095410

PHILADELPHIA ELECTRIC COMPANY

LIMERICK GENERATING STATION
UNITS NO. 1 AND 2

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

SEMI-ANNUAL EFFLUENT RELEASE REPORT
NO. 12
JANUARY 1, 1990 THROUGH JUNE 30, 1990

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

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


R. W. Dubiel, Services Superintendent

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- B. Residual Heat Removal (RHR) Service Water Radiation Monitor Out of to Service
- C. Process Control Program, Revision 9
(Submitted Under Separate Cover)
- D. Offsite Dose Calculations Manual, Revision 8
- E. Change in Environmental Monitoring Locations

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.

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 second quarter particulate air samples were not available at the time this report was prepared, it will be necessary to submit an addendum in the future if second quarter particulate air samples results are reported >LLD.
- Since Limerick Technical Specification limits for liquid and gaseous effluent releases are stated in terms of quarterly and annual offsite doses, "percent technical specification limit" is given as 0.00E+00.
- 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.
- An explanation of Residual Heat Removal (RHR) Service Water Radiation Monitor Inoperability.
- A copy of the Process Control Program revision 9 and ODCM revision 8 and an explanation for all changes which were implemented during the report period.
- An explanation of changes to Environmental Monitoring Locations.

II. TABLES

A. SUMMARY OF RADIOACTIVE GASEOUS EFFLUENTS

January 1, 1990 to June 30, 1990

SITE: LIMERICK
 UNIT: J1
 USER: CONV
 DATE: 78/20/90 09:33

EFFLUENT AND WASTE DISPOSAL REPORT

HAZARDOUS EFFLUENTS -- SUMMATION OF ALL RELEASES

	UNITS	QUARTER 1	QUARTER 2	EST. TOTAL ERROR, %
--	-------	--------------	--------------	------------------------

A. FISSION AND ACTIVATION BASES

1. TOTAL RELEASE	CI	0.363E+01	0.776E+01	0.453E+02
2. AVERAGE RELEASE RATE FOR PERIOD	UCI/SEC	0.467E+00	0.937E+00	
3. PERCENT OF TECHNICAL SPECIFICATION LIMIT	%	0.010E+00	0.000E+00	

B. IODINES

1. TOTAL IODINE-131	CI	0.104E-04	0.000E+00	0.453E+02
2. AVERAGE RELEASE RATE FOR PERIOD	UCI/SEC	0.250E-05	0.000E+00	
3. PERCENT OF TECHNICAL SPECIFICATION LIMIT	%	0.000E+00	0.000E+00	

C. PARTICULATES

1. PARTICULATES WITH HALF-LIVES > 2 DAYS	CI	0.547E-04	0.000E+00	0.453E+02
2. AVERAGE RELEASE RATE FOR PERIOD	UCI/SEC	0.703E-05	0.000E+00	
3. PERCENT OF TECHNICAL SPECIFICATION LIMIT	%	0.000E+00	0.000E+00	
4. GROSS ALPHA RADIOACTIVITY	CI	0.000E+00	0.000E+00	

D. 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	

SITE: LIMERICK
 UNIT: U1
 USER: CONB
 DATE: 06/20/90 09:33

EFFLUENT AND WASTE DISPOSAL REPORT

GASEOUS EFFLUENTS FOR RELEASE POINT: NORTH STACK

CONTINUOUS MODE

BATCH MODE

NUCLIDES RELEASED	UNITS	QUARTER 1	QUARTER 2	QUARTER 1	QUARTER 2
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	0.154E-02
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	0.220E+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	1.656E+00	0.717E+01	0.000E+00	0.433E-03
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	0.686E+00	0.717E+01	0.000E+00	0.196E-02

SITE: LIMERICK
 UNIT: J1
 USER: CONB
 DATE: 06/20/90 09:33

EFFLUENT AND WASTE DISPOSAL REPORT

GASEOUS EFFLUENTS FOR RELEASE POINT: 1 NORTH STACK

CONTINUOUS MODE BATCH MODE

NUCLIDES RELEASED	UNITS	QUARTER 1	QUARTER 2	QUARTER 1	QUARTER 2
----------------------	-------	--------------	--------------	--------------	--------------

1. IODINES

I131	CI	0.174E-14	0.000E+00	0.000E+00	0.000E+00
I133	CI	0.119E-02	0.275E-03	0.000E+00	0.000E+00
TOTAL FOR PERIOD (ABOVE)	CI	0.121E-02	0.275E-03	0.000E+00	0.000E+00

2. 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
ZY65	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

SITE: LIMERICK
 UNIT: 01
 USER: CONB
 DATE: 06/20/90 09:33

EFFLUENT AND WASTE DISPOSAL REPORT

BASED ON EFFLUENTS FOR RELEASE POINT: 1 NORTH STACK

CONTINUOUS MODE

BATCH 10.0E

NUCLIDES RELEASED	UNITS	QUARTER 1	QUARTER 2	QUARTER 1	QUARTER 2
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3. PARTICULATES (CONT'D)

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

SITE: LIMERICK
 UNIT: U1
 USER: CONB
 DATE: 08/20/90 09:33

EFFLUENT AND WASTE DISPOSAL REPORT

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

		CONTINUOUS MODE		BATCH MODE	
NUCLIDES RELEASED	UNITS	QUARTER 1	QUARTER 2	QUARTER 1	QUARTER 2
1. FISSION GASES					
AR41	CI	0.000E+00	0.000E+00	0.000E+00	0.112E-03
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	0.335E+00	0.112E+00	0.000E+00	0.000E+00
XE135M	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
XE135	CI	0.101E+01	0.420E+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	0.135E+01	0.539E+00	0.000E+00	0.112E-03

SITE: LIMERICK
 UNIT: U1
 USER: CON8
 DATE: 06/20/90 09:33

PAGE 5 OF 12

EFFLUENT AND WASTE DISPOSAL REPORT

DANGEROUS EFFLUENTS FOR RELEASE POINT: 1 UNIT 1 - SOUTH STACK

		CONTINUOUS MODE		BATCH MODE	
NUCLIDES RELEASED	UNIT	QUARTER 1	QUARTER 2	QUARTER 1	QUARTER 2
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 (AVERAGE)	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	0.547E-04	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
Sr124	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

SITE: LIMERICK
 UNIT: U1
 USER: CONB
 DATE: 08/20/90 09:33

EFFLUENT AND WASTE DISPOSAL REPORT

BASED ON EFFLUENTS FOR RELEASE POINT: 1 UNIT 1 - SOUTH STACK

		CONTINUOUS MODE		BATCH MODE	
NUCLIDES RELEASED	UNITS	QUARTER 1	QUARTER 2	QUARTER 1	QUARTER 2

3. PARTICULATES (CONT'D)

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	0.547E-14	0.000E+00	0.000E+00	0.000E+00

SITE: LIMERICK
 UNIT: U1
 USER: CONB
 DATE: 08/20/90 09:33

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EFFLUENT AND WASTE DISPOSAL REPORT

BASED ON EFFLUENTS FOR RELEASE POINT: 3 UNIT 2 - SOUTH STACK

		CONTINUOUS MODE		BATCH MODE	
NUCLIDES	UNITS	QUARTER 1	QUARTER 2	QUARTER 1	QUARTER 2
RELEASE					
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	0.734E-03
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	0.346E+00	0.124E-01	0.000E+00	0.000E+00
XE135M	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
XE135	CI	0.103E+01	0.376E-01	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 (AEOVE)	CI	0.140E+01	0.500E-01	0.000E+00	0.734E-03

SITE: LIMERICK
 UNIT: J1
 USER: CON8
 DATE: 08/20/90 09:33

EFFLUENT AND WASTE DISPOSAL REPORT

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

		CONTINUOUS MODE		BATCH MODE	
NUCLIDES RELEASED	UNITS	QUARTER 1	QUARTER 2	QUARTER 1	QUARTER 2
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
Z465	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
S3124	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

SITE: LIMERICK
 UNIT: U1
 USER: CGNB
 DATE: 06/20/90 09:33

EFFLUENT AND WASTE DISPOSAL REPORT

SUBSIDIARY EFFLUENTS FOR RELEASE POINT: 2 UNIT 2 - SOUTH STACK

		CONTINUOUS MODE		BATCH MODE	
NUCLIDES RELEASED	UNITS	QUARTER 1	QUARTER 2	QUARTER 1	QUARTER 2

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	0.000E+00	0.000E+00	0.000E+00

SITE: LIMERICK
 UNIT: J1
 USER: CONB
 DATE: 08/20/90 09:33

PAGE 10 OF 12

EFFLUENT AND WASTE DISPOSAL REPORT

GASEOUS EFFLUENTS FOR RELEASE POINT: 4 HOT MAINTENANCE SHOP

CONTINUOUS MODE

BATCH MODE

NUCLIDES RELEASED	UNITS	QUARTER 1	QUARTER 2	QUARTER 1	QUARTER 2
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
XE132M	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

SITE: LIMERICK
 UNIT: 01
 USER: CONB
 DATE: 08/20/90 09:33

EFFLUENT AND WASTE DISPOSAL REPORT

GASEOUS EFFLUENTS FOR RELEASE POINT: 4 HOT MAINTENANCE SHOP

		CONTINUOUS MODE		BATCH MODE	
NUCLIDES RELEASED	UNITS	QUARTER 1	QUARTER 2	QUARTER 1	QUARTER 2
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
CS53	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
CS60	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
ZN63	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

SITE: LIMERICK
 UNIT: J1
 USER: CON8
 DATE: 08/20/90 09:33

EFFLUENT AND WASTE DISPOSAL REPORT

HAZARDOUS EFFLUENTS FOR RELEASE POINT: + HDT MAINTENANCE SHOP

CONTINUOUS MODE

BATCH MODE

NUCLIDES RELEASED	UNITS	QUARTER 1	QUARTER 2	QUARTER 1	QUARTER 2
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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	0.000E+00	0.000E+00	0.000E+00

II. TABLES

B. SUMMARY OF RADIOACTIVE LIQUID EFFLUENTS

January 1, 1990 to June 30, 1990

SITE: LIMERICK
UNIT: 01
USER: CONB
DATE: 08/20/90 09:33

EFFLUENT AND WASTE DISPOSAL REPORT

LIQUID EFFLUENTS -- SUMMATION OF ALL RELEASES

UNITS	QUARTER 1	QUARTER 2	EST. TOTAL ERROR, %
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A. FISSION AND ACTIVATION PRODUCTS

1. TOTAL RELEASE (EXCL. TRIT., GASES, ALPHA)	01	0.156E-01	0.259E-01	0.630E+01
2. AVERAGE DILUTED CONC. DURING PERIOD	UCI/ML	0.571E-07	0.941E-07	
3. PERCENT OF APPLICABLE LIMIT	%	0.000E+00	0.000E+00	

B. TRITIUM

1. TOTAL RELEASE	01	0.113E+02	0.112E+02	0.630E+01
2. AVERAGE DILUTED CONC. DURING PERIOD	UCI/ML	0.457E-04	0.393E-04	
3. PERCENT OF APPLICABLE LIMIT	%	0.000E+00	0.000E+00	

C. DISSOLVED AND ENTRAINED GASES

1. TOTAL RELEASE	01	0.523E-02	0.103E-01	0.630E+01
2. AVERAGE DILUTED CONC. DURING PERIOD	UCI/ML	0.226E-07	0.350E-07	
3. PERCENT OF APPLICABLE LIMIT	%	0.113E-01	0.130E-01	

D. GROSS ALPHA RADIOACTIVITY

1. TOTAL RELEASE	01	0.000E+00	0.000E+00	0.000E+00
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E. VOLUME WASTE RELEASED (PRIOR TO DILUTION)	LITERS	0.753E+07	0.939E+07	0.000E+00
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F. VOLUME DILUTION WATER USED DURING PERIOD	LITERS	0.232E+09	0.286E+09	0.000E+00
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SITE: LIMERICK
 UNIT: U1
 USER: COND
 DATE: 08/20/90 09:33

EFFLUENT AND WASTE DISPOSAL REPORT

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

CONTINUOUS MODE

BATCH MODE

NUCLIDES RELEASED	UNITS	QUARTER 1	QUARTER 2	QUARTER 1	QUARTER 2
FI	CI	0.000E+00	0.000E+00	0.113E+02	0.112E+02
CI14	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
NA24	CI	0.000E+00	0.000E+00	0.299E-04	0.116E-04
PO2	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
CR51	CI	0.000E+00	0.000E+00	0.657E-02	0.181E-01
MN54	CI	0.000E+00	0.000E+00	0.291E-03	0.677E-04
MN55	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
FE55	CI	0.000E+00	0.000E+00	0.000E+00	0.151E-02
FE59	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
CO58	CI	0.000E+00	0.000E+00	0.156E-03	0.129E-03
CO60	CI	0.000E+00	0.000E+00	0.175E-02	0.612E-03
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	0.453E-02	0.559E-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

SITE: LIMERICK
 UNIT: U1
 USER: CONB
 DATE: 08/20/90 09:33

PAGE 2 OF 5

EFFLUENT AND WASTE DISPOSAL REPORT

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

CONTINUOUS MODE

BATCH MODE

NUCLEIDES RELEASED	UNITS	QUARTER 1	QUARTER 2	QUARTER 1	QUARTER 2
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LIQUID EFFLUENTS (CONT'D)

R286	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
R383	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
R389	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	0.768E-04	0.180E-03
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
Z495	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
MD99	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
TC99M	CI	0.000E+00	0.000E+00	0.187E-04	0.110E-04
TC101	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00

SITE: LIMERICK
 UNIT: U1
 USER: CCNB
 DATE: 08/20/90 09:33

EFFLUENT AND WASTE DISPOSAL REPORT

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

CONTINUOUS MODE

BATCH MODE

NUCLIDES RELEASED	UNITS	QUARTER 1	QUARTER 2	QUARTER 1	QUARTER 2
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LIQUID EFFLUENTS (CONT)

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
AS110M	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
TE123M	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

SITE: LIMERICK
 UNIT: J1
 USER: CONB
 DATE: 08/20/90 09:33

EFFLUENT AND WASTE DISPOSAL REPORT

LIQUID EFFLUENTS FOR RELEASE POINT: 1 LIQUID PAD WASTE DISCHARGE TO SCHUYLKILL R

CONTINUOUS MODE

BATCH MODE

NUCLIDES RELEASED	UNITS	QUARTER 1	QUARTER 2	QUARTER 1	QUARTER 2
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LIQUID EFFLUENTS (CONT)

CS134	CI	0.000E+00	0.000E+00	0.771E-03	0.206E-03
CS136	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
CS137	CI	0.000E+00	0.000E+00	0.137E-02	0.372E-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	0.300E-05	0.000E+00
W187	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00

SITE: LIMERICK
UNIT: U1
USER: CONB
DATE: 08/20/90 09:33

PAGE 5 OF 5

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 1	QUARTER 2	QUARTER 1	QUARTER 2
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LIQUID EFFLUENTS (CONT)

NONE	CI	0.000E+00	0.000E+00	0.000E+00	0.000E+00
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TOTAL FOR PERIOD (ABOVE)	CI	0.000E+00	0.000E+00	0.113E+02	0.113E+02
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XE-133	CI	0.000E+00	0.000E+00	0.206E-02	0.573E-02
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XE-135	CI	0.000E+00	0.000E+00	0.317E-02	0.458E-02
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II. TABLES

C. SOLID WASTE DISPOSITION REPORT

January 1, 1990 to June 30, 1990

SOLID WASTE AND IRRADIATED FUEL SHIPMENTS
PERIOD 01/01/90 TO 06/31/90

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	2.99E+02 6.91E+02	25%
*b. DRY COMPRESSIBLE WASTE, CONTAMINATED EQUIPMENT, ETC.	m3 CI	2.10E+01 4.52E+00	25%
c. IRRADIATED COMPONENTS, CONTROL RODS, ETC.	m3 CI	0.00E+00 0.00E+00	
d. OTHER (DESCRIBE)	m3 CI	0.00E+00 0.00E+00	

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

ACTIVITY IS ESTIMATED.

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

CATEGORY A - SPENT RESINS, FILTER SLUDGES, EVAPORATOR BOTTOMS, ETC.					CATEGORY B - DRY COMPRESSIBLE WASTE, CONTAMINATED EQUIPMENT, ETC.	
ISOTOPE	WASTE CLASS B		WASTE CLASS A		WASTE CLASS A	
	ACTIVITY CI	% ABUNDANCE	ACTIVITY CI	% ABUNDANCE	ACTIVITY CI	% ABUNDANCE
Zn-65	6.17E+01	13.14%	9.49E+01	43.53%	2.27E+00	48.37%
Cr-51	3.16E+02	67.31%	4.54E+01	20.82%	5.23E-01	11.14%
Cs-137	2.71E+01	5.77%	3.73E+01	17.11%	7.02E-01	14.94%
Cs-134	1.65E+01	3.51%	2.67E+01	12.25%	4.32E-01	9.19%
I-131	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
Co-60	1.61E+01	3.43%	5.96E+00	2.73%	3.51E-01	7.48%
Co-58	2.12E+01	4.52%	3.09E+00	1.42%	1.54E-01	3.28%
Fe-55	5.12E+00	1.09%	4.03E+00	1.85%	1.30E-01	2.76%
Sr-89	0.00E+00	0.00%	0.00E+00	0.00%	2.09E-02	0.44%
C-14	2.09E-03	0.00%	4.88E-01	0.22%	9.28E-03	0.20%
Mn-54	5.50E+00	1.17%	0.00E+00	0.00%	8.74E-02	1.86%
Nb-95	0.00E+00	0.00%	0.00E+00	0.00%	2.14E-03	0.05%
H-3	6.00E-03	0.00%	1.30E-01	0.06%	2.01E-03	0.04%
Ba/La-140	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
Ni-63	1.82E-01	0.04%	0.00E+00	0.00%	6.47E-03	0.14%
Ag-110m	0.00E+00	0.00%	0.00E+00	0.00%	2.00E-05	0.00%
Zr-95	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%
Sr-90	9.13E-02	0.02%	2.99E-02	0.01%	2.05E-03	0.04%
Cm-242	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
Pu-241	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
I-129	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
Tc-99	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%
Ni-59	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%	5.00E-05	0.00%
Ce-141	0.00E+00	0.00%	0.00E+00	0.00%	3.78E-03	0.08%
TOTALS	4.70E+02	100.00%	2.18E+02	100.00%	4.70E+00	100.00%

ACTIVITY IS ESTIMATED.

CATEGORY A (41 TYPE A LSA, 04 TYPE A LSA); CATEGORY B (30 TYPE A LSA),
(1 TYPE A LSA); CATEGORY C (NO SHIPMENTS MADE). NOTE CATEGORY C IS
IRRADIATED COMPONENTS, CONTROL RODS, ETC.

3. SOLID WASTE DISPOSITION

NUMBER OF SHIPMENTS	MODE OF TRANSPORTATION	DESTINATION
46	TRUCK	LIMERICK TO BARNWELL
13	TRUCK	QUADREX TO BARNWELL
17	TRUCK	SEG TO BARNWELL

PAGE 4 OF 4

B. IRRADIATED FUEL SHIPMENTS (DISPOSITION)

NUMBER OF SHIPMENTS

MODE OF TRANSPORTATION

DESTINATION

N/A (NO SHIPMENTS MADE)

COMMENTS:

05 SHIPMENTS WERE MADE FROM LIMERICK TO QUADREX FOR PROCESSING.

04 SHIPMENTS WERE MADE FROM LIMERICK TO SEG FOR PROCESSING.

NO SOLIDIFICATIONS WERE USED.

COMPLETED BY

Deirdre A. Faust

05/14/90

DATE

REVIEWED BY

George Webb

8/15/90

DATE

III. ATTACHMENTS

A. SUPPLEMENTAL INFORMATION

Facility: Limerick Generating Station - Units 1 and 2

License: NPF-39 (Unit 1) and NPF-85 (Unit 2)

1. Regulatory Limits (Technical Specification Limits)

A. Noble Gases:

- | | |
|-------------------------------------|-----------------------------|
| 1. \leq 500 mRems/Yr - total body | - "instantaneous" limits |
| \leq 3000 mRems/yr - skin | per Tech Spec 3.11.2.1 |
| 2. \leq 10 mRads - air gamma | - quarterly air dose limits |
| \leq 20 mRads - air beta | per Tech Spec. 3.11.2.2 |
| 3. \leq 20 mRads - air gamma | - yearly air dose limits |
| \leq 40 mRads - air beta | per Tech Spec. 3.11.2.2 |

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

- | | |
|--|---|
| 1. \leq 1500 mRems/yr - any organ
(inhalation path) | - "instantaneous" limits
per Tech Spec. 3.11.2.1 |
| 2. \leq 15 mRems - any organ | - quarterly dose limits
per Tech. Spec. 3.11.2.3 |
| 3. \leq 30 mRems - any organ | - yearly dose limits
per Tech. Spec. 3.11.2.3 |

C. Liquid Effluents:

- | | |
|---|--|
| 1. Concentration \leq 10CFR20
Appendix B, Table II, Col. 2 | - "instantaneous" limits per
Tech. Spec. 3.11.1.1 |
| 2. \leq 3 mRems - total body
\leq 10 mRems - any organ | - quarterly dose limits per
Tech. Spec. 3.11.1.2 |
| 3. \leq 6 mRems - total body
\leq 20 mRems - any organ | - yearly dose limits per
Tech. Spec. 3.11.1.2 |

2. Maximum Permissible Concentrations

Per LGS Technical Specification 3.11.1.1, 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 0.285 MeV and average gamma energy is 0.225 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

	<u>Q1</u>	<u>Q2</u>
# of Batch Releases:	125	174
Total Time period for batch releases, *	8350	10301
Maximum time period for a batch release, *	92	95
Average time period for batch release, *	66.8	65.3
Minimum time period for a batch release, *	30	58
Average stream flow (Schuylkill River) during periods of release of effluents into a flowing stream, gpm	1.16E6	1.05E6

* = Minutes

B. <u>Gaseous</u>	<u>Q1</u>	<u>Q2</u>
# of Batch Releases:	0	9
Total Time period for batch releases, *	0	1800
Maximum time period for a batch release, *	0	780
Average time period for batch release, *	0	200
Minimum time period for a batch release, *	0	60

* = 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

III. ATTACHMENTS

B. RESIDUAL HEAT REMOVAL (RHR) SERVICE WATER RADIATION MONITOR INOPERABILITY

Since February 1990 the 'C' RHRSW radiation monitor has been inoperable. This monitor has been incapable of performing its design function because temporary circuit alterations (TCAs) have been applied to valve HV-51-1F068A. The TCAs have prevented isolations of the valve.

During 1A RHR Shutdown Cooling Operation, degradation of the HV-51-1F068A valve was noticed. After investigation, it was determined that the valve was binding at approximately one inch off its closed seat. The valve was able to be fully stroked while RHRSW flow was present, however, with no flow the valve would not seat properly. Valve binding seems due to disc/skirt guide interference. This interference does not occur with flow since the flow tends to center the disc in the valve body.

Currently the valve is maintained in the throttled open position to ensure at least 6000 GPM through the "1A" RHR heat exchanger while both heat exchangers are in service with both "A" loop RHRSW pumps running. This configuration does not cause any significant operationally difficulties but will force added duty on the "1B" heat exchanger and associated loop components will be used in emergency operations only to limit any further valve degradation. RHRSW Heat Exchanger isolation on the "1B" heat exchanger and associated loop components will be used in emergency operations only to limit any further valve degradation. RHRSW Heat Exchanger isolation capability will also be affected if the valve is unable to fully close. The plant's ability to isolate the primary side along with interim valve closure mechanisms reduces the risk of a postulated contaminated release.

Valve repair is planned to take place during the upcoming Unit 1 Refuel Outage beginning September, 1990.

III. ATTACHMENTS

C. PROCESS CONTROL PROGRAM (PCP), REVISION 9

Section 4.0 of the PCP was added to accommodate the contingency for processing that fails to meet disposal site, shipping and transportation requirements. Extra steps have been added to the PCP to ensure appropriate processing to meet disposal site and shipping transportation requirements. Section 5.4 of the PCP was added to address surveillance requirements for solidification. This section describes batch sampling tests of solidified waste. If waste batch test specimen fail to verify solidification, guidance for alternative solidification parameters is provided. If initial test specimens fail to verify solidification, at least three consecutive batches shall be tested until specimens demonstrate solidification. The Process Control Program shall be modified as required to assure solidification of subsequent batches. These surveillance requirements were not addressed in previous revisions.

3904052080

LGS - PCP

REV. 199

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TJG/KJC/BWS/dsl

LIMERICK GENERATING STATION
UNITS 1 AND 2
PHILADELPHIA ELECTRIC COMPANY

SOLID RADWASTE SYSTEM
PROCESS CONTROL PROGRAM

CONTROLLED COPY

VALID COPY

When used

APPROVAL:


PLANT MANAGER

PORC MEETING: 90-026 DATE: 3/16/90

1.0 PURPOSE

This program provides guidance and boundary conditions for preparation of specific procedures for processing, sampling, analysis, packaging and shipment of solid radwaste in accordance with State and Federal Regulatory requirements.

2.0 SCOPE

This program is applicable to the Limerick Generating Station solid radwaste processing system.

3.0 REFERENCES

- 3.1 49 CFR Parts 170 through 178
- 3.2 10 CFR Parts 20, 50, 61 and 71
- 3.3 Standard Review Plan 11.4, Rev. 2, including Branch Technical Position ETSB 11-3, Rev. 2
- 3.4 Low Level Waste Licensing Branch Technical Position on Radioactive Waste Classification
- 3.5 Low Level Waste Licensing Branch Technical Position on Waste Form
- 3.6 Limerick Generating Station Technical Specification 3/4.11.3
- 3.7 South Carolina Department of Health and Environmental Control Radioactive Material License No. 097
- 3.8 Barnwell Waste Management Facility Site Disposal Criteria
- 3.9 State of Washington Radioactive Materials License No. WN-1019-2
- 3.10 Chem Nuclear Systems Inc. Topical Report RDS-1000
Radioactive Waste Dewatering System RDS-25506-01-NP-A
- 3.11 Stock Equipment Co. Topical Report Quick Dry Process for
Dewatering Bead Resin and Filter Sludge, SRS-003-P Rev. 0.
- 3.12 Nuclear Pacific Inc. Topical Report for Dewatering System
TP-02-P-A Rev. 1.

3.13 Westinghouse-Hittman Nuclear, Inc. Topical Report STD-R-05-011P-A, Mobile Incontainer Dewatering and Solidification System.

4.0 GENERAL

Plant Technical Specification 3/4.11.3 requires the Solid Radwaste Processing System to be used in accordance with a Process Control Program to meet transportation and disposal site requirements.

It is the intent of the Process Control Program to provide reasonable assurance of meeting the regulations and to demonstrate compliance with 10CFR61 by:

- Defining the various waste streams
- Establishing a set of process parameters that affect solidification and developing operational controls for those parameters.
- Implementing a Waste Classification System in accordance with 10CFR61 and applicable Regulatory Guidance.
- Providing an appropriate Quality Control Program as required by 10CFR20.311

When processing does not meet disposal site and shipping and transportation requirements, shipment shall be suspended and the Process Control Program, the implementing procedures and/or the solid waste system shall be corrected as necessary to prevent recurrence.

When processing is not performed in accordance with the Process Control Program, the improperly processed waste in each container shall be tested to ensure that it meets burial site and shipping requirements and appropriate administrative action will be taken to prevent recurrence.

4.1 REVIEW, APPROVAL, CHANGES

4.1.1 Changes to the Process Control Program shall be reviewed and approved by the Plant Operations Review Committee in accordance with Technical Specifications 6.5.1 and 6.13.

4.1.2 Changes shall be submitted to the Nuclear Regulatory Commission in the Semi-Annual Radioactive Effluent Release Report for the period in which the change was made in accordance with Off-site Dose Calculation Manual Section I3.6.

4.1.3 Changes to resin dewatering implementing procedures or systems shall require verification that the free standing water content of the packaged product is within the limits established by regulatory limits via ST-0-RRR-733-0.

4.2 USE OF VENDOR SERVICES

4.2.2 For Vendor dewatering described in Section 5.2 and 5.3 the Chem Nuclear Rapid Dewatering System RDS-1000 may be utilized. A description of the Chem Nuclear equipment and process method may be found in Topical Report RDS-25506-01-NP-A previously submitted to the NRC.

4.2.3 For Vendor dewatering described in Section 5.2 and 5.3 the LN Technologies/Stock Equipment Co. Quick Dry Process may be utilized. A description of the LN Technologies/Stock Equipment Co. equipment and process method may be found in Topical Report SRS-003-P Rev. 0, previously submitted to the NRC.

4.2.4 For Vendor dewatering described in Sections 5.2 and 5.3, the Pacific Nuclear Systems dewatering equipment may be utilized. A description of the Pacific Nuclear equipment and process method may be found in Topical Report TP-02-P-A Rev. 1, previously submitted to the NRC.

4.2.5 For Vendor dewatering described in Sections 5.2 and 5.3, the Westinghouse-Hittman Nuclear dewatering equipment may be utilized. A description of the Westinghouse-Hittman equipment and process method may be found in Topical Report, STD-R-05-011P-A, previously submitted to the NRC.

5.0 IMPLEMENTATION

The Process Control Program shall be implemented by the use of approved plant procedures which provide the step-by-step direction for the operation of the process systems and shipment of waste to a licensed burial site. A list of plant procedures which implement the Process Control Program is given in Table 6.1.

5.1 WASTE STREAMS

5.1.1 CONDENSATE FILTER/DEMINERALIZER SLUDGE

The contaminated waste product generated by the backwash of the condensate filter demineralizers consisting of contaminated powdered ion exchange resins at varying degrees of exhaustion, fibrous filter media, carbon overlay material, and small concentrations of various solids, activated and non-activated corrosion products.

5.1.2 WASTE SLUDGE

The contaminated waste product generated by the backwash of the liquid radwaste and fuel pool filters and demineralizers consisting of contaminated powdered ion exchange resins and bead resins at varying degrees of exhaustion, fibrous filter media, carbon overlay material and small concentrations of various solids and corrosion products.

5.1.3 REACTOR WATER CLEANUP FILTER/DEMINERALIZER SLUDGE

A contaminated waste product generated by the backwash of the Reactor Water Cleanup filter demineralizers consisting of contaminated powdered ion exchange resins at varying degrees of exhaustion, fibrous filter media, and small concentrations of various solids and corrosion products.

5.1.4 DRY ACTIVE WASTE

Dry wastes consists of air filters, miscellaneous paper, rags, etc., from contaminated areas; contaminated clothing, tools, and equipment parts that cannot be effectively decontaminated; and solid laboratory wastes.

5.1.5 OILS/SLUDGES-WET RADIOACTIVE WASTES

Oils consist of non-reclaimable contaminated oils and grease of various grades both synthetic or otherwise in free form or containing various amounts of solid material. Sludge consists of sump dewatering sludges, filter solids, strainer solids and other wet solids too large to be handled by conventional dewatering techniques.

5.2 PROCESS DESCRIPTION

5.2.1 CONDENSATE FILTER/DEMINERALIZER SLUDGE

- a. Each condensate filter/demineralizer backwash consists of approximately 9,000 gallons of slurry with approximately 350 lbs (dry wt.) spent resins and crud.
- b. Successive backwashes are collected and allowed to settle in a Condensate Phase Separator. As the sludge settles, clarified liquid is decanted.
- c. For centrifuge dewatering of the settled sludge, the phase separator is isolated when approximately 240 cubic feet of sludge has accumulated.
- d. For vendor dewatering of the settled sludge, the phase separator is isolated when approximately 360 cubic feet of sludge has accumulated.
- e. The settled sludge is allowed to decay in preparation for dewatering while further backwashes are routed to alternate phase separators.
- f. The phase separator contents are recirculated for a minimum of 30 minutes to mix contents of the vessel, resulting in a homogenous resin slurry. (For centrifuge dewatering the mixture is approximately 5% dry wt. concentration. For Vendor dewatering the mixture is approximately 7% dry wt. concentration).
- g. The solids slurry is then fed to a centrifuge or the External Processing Station for dewatering as appropriate.

5.2.2 WASTE SLUDGE

- a. Each backwash from a radwaste or fuel pool filter demineralizer consists of approximately 1,500 gallons of slurry, with approximately 60 lbs. (dry wt.) spent resins and crud (may contain charcoal overlay).
- b. Each backwash from a radwaste demineralizer consists of approximately 1,500 gallons of slurry, with an average of 2,125 lbs. (dry wt.) spent resins (may contain charcoal overlay).
- c. Successive backwashes from radwaste filter demineralizers, radwaste demineralizers, and fuel pool filter/demineralizers are collected in the Waste Sludge Tank until approximately 12,000 gallons of liquid is accumulated.
- d. The Waste Sludge Tank contents are recirculated for a minimum of 45 minutes to mix contents of the vessel, resulting in a homogeneous resin slurry ranging from 0.5 to 6% (dry wt.) total solids.

During normal operation the Waste Sludge Tank contains only the radwaste and fuel pool filter demineralizer backwashes which result in a 0.5% (dry wt.) total solids concentration. Periodic radwaste demineralizer backwashes will increase the solids level to approximately 3% (dry wt.) for one bed or 6% (dry wt.) for two beds.

- e. The solids slurry is fed to a centrifuge for dewatering or to the External Processing Station for vendor services processing.
- f. Waste Sludge Tank contents may also be sent to a condensate phase separator for processing in accordance with Section 5.2.1.

5.2.3 REACTOR WATER CLEANUP FILTER/DEMINERALIZER SLUDGE

- a. Each RWCU filter/demineralizer backwash consists of approximately 1,100 gallons of slurry with approximately 48 lb. (dry wt.) spent resins and crud.
- b. Successive backwashes are collected and allowed to settle in a phase separator. As the sludge settles the clarified liquid is decanted.

- c. For centrifuge dewatering of the settled sludge, the phase separator is isolated when approximately 140 cubic feet of sludge has accumulated.
- d. For vendor dewatering of the settled sludge, the phase separator is isolated when approximately 190 cubic feet of sludge has accumulated.
- e. The settled sludge is allowed to decay in preparation for dewatering while further backwashes are routed to alternate phase separators.
- f. The phase separator contents are recirculated for a minimum of 30 minutes to mix contents of the vessel, resulting in a homogenous resin slurry. (For centrifuge dewatering the mixture is approximately 5% dry wt. concentration. For Vendor dewatering the mixture is approximately 7% dry wt. concentration).
- g. The solids slurry is then fed to a centrifuge or the External Processing Station for dewatering as appropriate.

5.2.4 Resin sludges from different waste streams may be mixed to optimize packaging.

5.2.5 OILS/SLUDGES

- a. Sludges and oils generated during operation and maintenance are collected in containers in appropriate approved areas throughout the plant. The filled and labeled containers are sealed and moved to a controlled-access enclosed area for temporary storage.
- b. Oils and sludges can be solidified in appropriate containers by vendor supplied equipment in accordance with approved vendor process control procedures.
- c. Certain wet wastes may be allowed to dry and be treated as dry active waste.

5.3 DEWATERING PROCESS CONTROL

5.3.1 Centrifuge Resin Sludge Dewatering

- a. The 0.5-6% solids slurries discussed in Section 5.2 are fed to a centrifuge at a controlled flow rate for dewatering.
- b. Operating variables such as centrifuge pond setting, bearing temperatures, equipment vibration, and differential torque are monitored to ensure optimum centrifuge operation and compliance with the free standing water criteria.
- c. The centrifuged resin is packaged in appropriately selected liners or High Integrity Containers (HIC). Process system level probes extending into the liners or HICs ensure that void spaces within the container are minimized to the extent practical.

5.3.2 Vendor Resin Sludge Dewatering

- a. The 7% solids slurries discussed in Section 5.2 are fed unthrottled to Vendor dewatering systems at approximately 30 gpm.
- b. Vendor dewatering operating variables such as waste type, process time, pump suction pressure, blower inlet pressure, ambient temperature and percent relative humidity are monitored to ensure optimum operation and compliance with the free standing water criteria for burial.
- c. Vendor dewatered resin is packaged in appropriately selected liners or High Integrity Containers (HIC). Process system level probes and/or video cameras mounted within the fill head ensure the liner or HIC is filled without undue void spaces to the maximum extent practical.

5.4 SURVEILLANCE REQUIREMENTS FOR SOLIDIFICATION

- 5.4.1 At least one representative test specimen from at least every tenth batch of waste shall be solidified.
- 5.4.2 If any test specimen fails to verify solidification, the solidification of the batch under test shall be suspended until additional test specimens can be obtained, alternative solidification parameters can be determined and a subsequent test verifies solidification.
- 5.4.3 If the initial test specimen from a batch of waste fails to verify solidification, representative test specimens from consecutive batches shall be tested until at least three consecutive test specimens demonstrate solidification. The Process Control Program shall be modified as required to assure solidification of subsequent batches.

5.5 10CFR61 IMPLEMENTATION

5.5.1 WASTE CLASSIFICATION

- a. For dewatered resin, waste classification shall be based upon dose-to-curie calculation and the use of scaling factors for hard to measure isotopes. After each container fill, appropriate dose rates are obtained and inputted into Radman. A detailed analysis is performed on an annual basis by an independent commercial laboratory to identify isotopic abundances and scaling factors via ST-0-RRR-731-0, ST-0-RRR-732-0.
- b. For dry active waste (DAW), waste classification shall be based upon isotopic analysis and the use of scaling factors for Reactor Water along with DAW dose-to-curie conversion. WASTE SLUDGE
- c. For oils/sludges, waste classification shall be based upon isotopic analysis and the use of scaling factors for hard to measure isotopes. A detailed analysis is performed on each batch to be processed and packaged.
- d. A computerized waste classification and shipping program, RADMAN, is used to determine waste classification from the isotopic analysis and scaling factors. Manual methods may be used if the computer system is not available.

5.5.2 WASTE STABILITY

a. MINIMUM STABILITY REQUIREMENTS

1. Waste at Limerick Generating Station is packaged in metal containers (drums, boxes, liners) or High Integrity Containers. In no case shall radioactive waste be packaged in cardboard or fiberboard boxes for burial.
2. Dewatered resin is sampled as a minimum annually to verify that the free standing water content of the packaged product is within the limits established by applicable regulatory limits via ST-0-RRR-733-0. In addition to the annual verification, the free standing water is determined whenever process changes occur that may significantly alter system dewatering performance.
3. To prevent accumulation of radiolytically generated combustible gas in greater than Type A radioactive waste packages containing water and/or organic substances, one or more of the following measures are taken:
 - The container is equipped with a vent to prevent accumulation of such gas.
 - A determination by calculation, test, or measurement is performed to ensure that hydrogen generation is limited to a molar quantity that would be no more than 5% by volume of the secondary container gas void at STP over a period of time that is twice the expected shipment time.
 - The cask cavity will be inerted.
4. Experience has demonstrated that utility waste streams do not contain or generate toxic gas, vapors, or fumes and do not contain hazardous, biological, pathogenic, or infectious materials.

b. WASTE STABILITY

1. Dewatered resin required to be stabilized is packaged in High Integrity Containers (HIC) that have been certified to meet the stability requirements of 10CFR61.56(b). The HICs are handled and stored in a manner such that their ability to provide stabilization is not compromised. The chemical and physical properties of the resin in no way compromises the integrity of the container.
2. All reasonable efforts are made to eliminate unnecessary void spaces within the waste packages.

5.5.3 LABELLING

Each package of waste shall be clearly labelled to identify waste classification.

5.5.4 SHIPMENT MANIFESTS

Each waste shipment shall be accompanied by a shipping manifest giving a physical description of the waste, the volume, the radionuclide identity and quantity, the total radioactivity, the principal chemical form, and waste class.

5.5.5 QUALITY CONTROL PROGRAM

- a. The quality control program consists of required use of plant procedures which implement the Process Control Program and requirements of the Corporate Quality Assurance Program. Audits by personnel independent of the activities are performed and reviewed by appropriate management personnel.
- b. In addition, the Process Control Program and implementing procedures are audited once per 24 months by the Nuclear Review Board in accordance with Plant Technical Specification 6.5.2.

5.6 ADMINISTRATIVE CONTROL

- 5.6.1 Processing of solid radioactive waste shall be performed by properly trained and qualified operating personnel.

- 5.6.2 Processing of radioactive waste shall be performed in accordance with approved Operating and/or Radwaste procedures.
- 5.6.3 Procedures for processing, containerization, and transport of waste shall ensure that specific DOT, NRC, and burial site requirements are satisfied.
- 5.6.4 Changes to implementing procedures are reviewed to ensure continued compliance with the Process Control Program.
- 5.6.5 Records of all data, tests, analysis results, and records of training, inspection, and audits are maintained in accordance with plant QA procedures for record retention.

6.0 ATTACHMENTS, TABLES, FIGURES

- 6.1 Table 6.1 Process Control Program Implementing Procedures.
- 6.2 Figure 6.1 Solid Radwaste Management System Process Flow Diagram.

ATTACHMENT 6.1

Process Control Program

Implementing Procedures

A-99 Control of the Radwaste Process Control Program

RW-100 Administration of the Radioactive Material and Radwaste Packaging and Transportation Program

RW-101 Administration of Packaged Radioactive Waste

RW-103 Isotopic Determination of Packaged Radioactive Material

RW-106 Review of Vendor Topical Report for Waste Processing

RW-130 Administrative Controls for RADMAN

RW-132 User's Guide to RADMAN

RW-222 Shipment of Radioactive Waste to Barnwell

RW-223 Shipment of Radioactive Waste to Richland

RW-230 Core Sample of Liners and HIC's

RW-420 External Processing Station Resin Transfer and Dewatering Using Pacific Nuclear Containers and Equipment

S66.8.B RWCU Phase Separator Decanting

S66.8.C Centrifuging RWCU Phase Separators

S66.8.F Centrifuging Waste Sludge Tank

S67.8.A Operating the Resin Fill Stations

S67.8.A Equipment Alignment for Operation of a Solid Radwaste Centrifuge (COL)

S67.8.B Condensate Phase Separator Decanting

S67.8.G Centrifuging Condensate Phase Separators

S67.0.A External Processing of RWCU Phase Separators

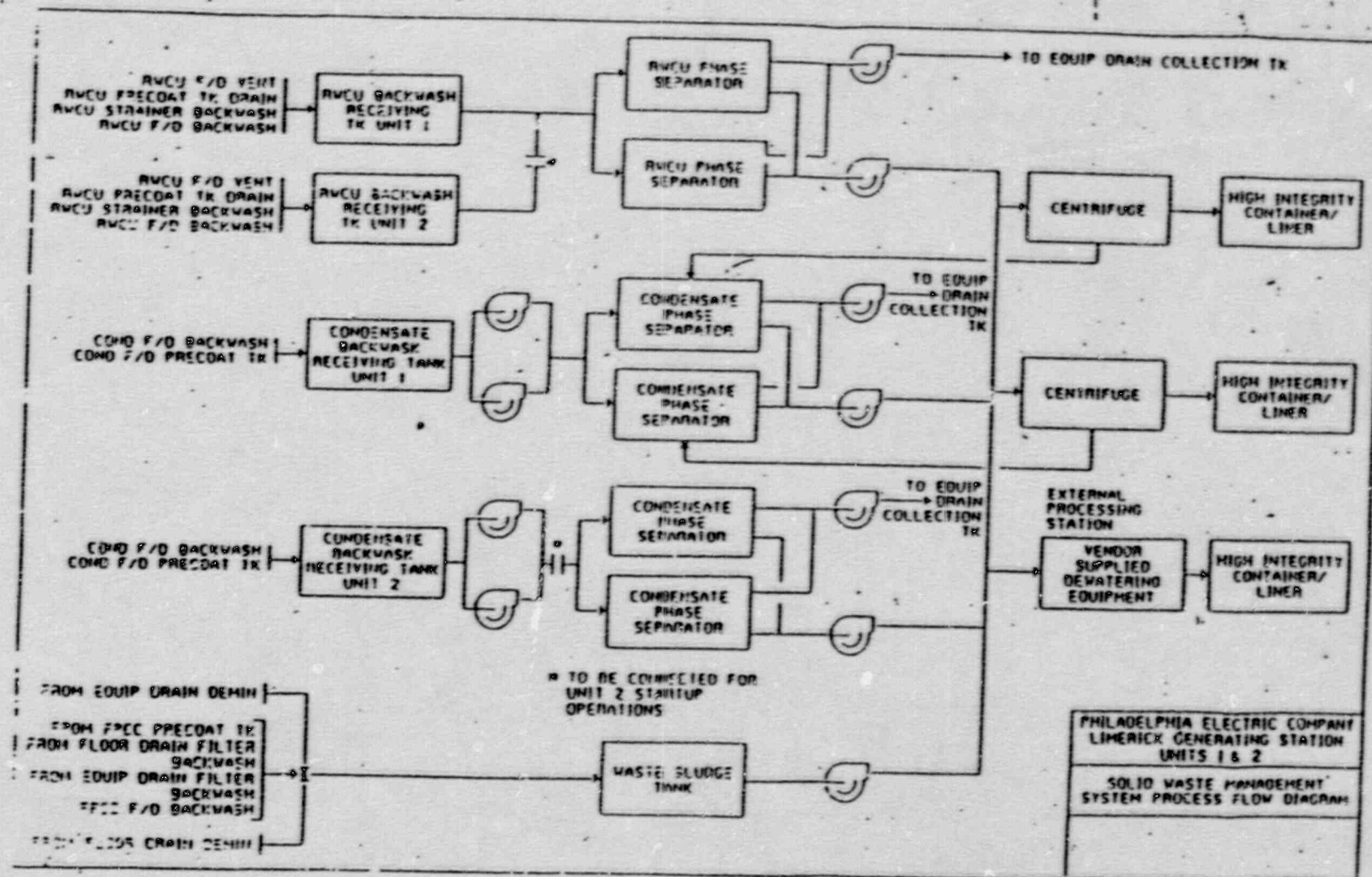
S67.0.B External Processing of Condensate Phase Separators

S67.0.C External Processing of Waste Sludge Tank

- ST-0-RRR-731-0 Periodic Sampling and Analysis Program for the
Determination of Abundance Factors
- ST-0-RRR-732-0 Periodic Determination and Update of Abundance
Factors for Gamma Emitting Isotopes
- ST-0-RRR-733-0 Sampling and Analysis of Dewatered Resins for the
Determination of Free Standing Liquid

ATTACHMENT 6.2

Figure 6.1



III. ATTACHMENTS

D. O.D.C.M. Revision 8

NRC Generic Letter (GL) 89-01 recommended that licensees relocate certain procedural details of Radiological Effluent Technical Specifications (RETS) into the ODCM. Per GL89-01, procedural details of Technical Specification sections regarding Radioactive Gaseous and Liquid Effluent Monitoring Instrumentation have been relocated to Revision 8 of the ODCM. The following have been relocated to the ODCM:

- Dose limits for gaseous and liquid effluents;
- Technical Specification for liquid effluent concentration and liquid radwaste treatment system;
- Technical Specification for ventilation exhaust treatment system, venting and purging;
- Procedural details of Technical Specifications for the Radiological Environmental Monitoring Program (REMP);
- Meteorological monitoring instrumentation Technical Specifications;
- Site maps defining unrestricted areas and site boundary for radioactive gaseous and liquid effluents;
- Programmatic controls concerning the reporting requirements for the Annual Environmental Operating Report and the Semi annual Effluent Release Report.

Revisions were also made to the ODCM according to the suggestions offered by the N.R.C. after reviewing revision 4, in their letter of December 8, 1988. These changes include:

- Specification of minimum cooling tower blowdown;
- Correction of transcription errors for bioaccumulation factors;
- Inclusion of an engineering diagram for the hot maintenance shop;
- Repositioning of subscripts for clarity;
- Inclusion of Frick's Lock and Limerick Information Centers as locations within site boundary accessible to members of public.

Changes have also been made to Chemistry-related setpoints. These revisions include:

- Wide Range Accident Monitor setpoints: The high setpoint is set at 10 times the alert setpoint, not to exceed 2.1 uCi/cc equivalent using 2-unit maximum north stack flow rate;
- Routine operations alert setpoints shall not to exceed 1.1E-4 uCi/cc per FSAR table 11.5-2;
- Revision of containment purge setpoints for 2-unit maximum north stack flow rate;
- Specification of "non-gamma emitters" for the liquid radwaste discharge monitor;
- Specification of a maximum background count rate of 300 CPM for Service Water and RHR Service Water monitors;
- Guidance to establish the alert setpoint for containment purges through 1 or 2 inch vent lines, with the setpoint not to exceed 3.4E-6 uCi/cc per LGS FSAR table 11.5-2.

Miscellaneous revisions have been made to the ODCM to serve 2-unit operation and other purposes. These revisions include:

- Correction of formula 2.23 to reflect the proper location of the tissue-air ratio (1.11) factor;
- Reprinting of tables 2-2 for clarity;
- Revision of table B-1 and figure B-1.