June 5, 1973

Mr. B. J. Youngblood
Chief, Environmental Projects
Branch No. 3
Directorate of Licensing
U.S. Atomic Energy Commission
Washington, D.C. 20545

Dear Mr. Youngblood:

CONTROL OF POTENTIAL RADIOIODINE RELEASES
NEWBOLD ISLAND GENERATING STATION
DOCKET NOS. 50-354 AND 50-355

The Newbold Island Environmental Statement discussed the control of radioiodine releases to the environment such that the staff's projected annual exposure to the 2-gram thyroid organ of a child will not exceed 5 millirems. Public Service Electric and Gas Company provided a detailed discussion of the staff's concern on this subject in our Additional Responses to Comments, etc. transmitted to you by letter dated May 2, 1973. Recent discussions with the staff indicate that clarification of that discussion would be helpful. To that end we provide the following information.

The control of releases of radioiodines to the environment such that the calculated potential annual exposure to the 2-gram thyroid organ of a child will not exceed 5 millirems is a design objective of Newbold Island Generating Station. To meet this objective, the potentially radioactive portion of the turbine building ventilation system exhaust will be treated by charcoal filters before release to the environment. In addition, the design will provide for minimizing steam leakage from valves 2-1/2 inches and larger installed in systems which are potentially radioactive. The detailed design of these systems (or an equally effective alternative) will be provided to the staff for review when it is developed.

Our previous submittal included a description of a possible alternate system as well as a discussion of the assumptions used by the staff in their exposure calculation. In view of the ultraconservative nature of those assumptions and the fact that on-site meteorological data is not yet available, all or parts of these systems will be deleted from the final design if it is demonstrated that they are unnecessary to meet the limits of future regulations.

Very truly yours,

F. W. Schneider
Manager of Engineering
Electric Engineering Department

JCR:jcm

PSE&G

The Energy People

DBL/PSB

RESPONSE TO REQUIREMENTS OF
APPENDIX I TO 10CFR50
FOR HOPE CREEK GENERATING
STATION Rev 1
DOCKET NOS. 50-354
50-355

ENCLOSURE ONE

8-3076

Food & ~~[illegible]~~ data

Gaspar & Lodhop outputs

HOPE CREEK NUCLEAR GENERATING STATION

50 - 354

50 - 355

INFORMATION SUPPLIED
IN RESPONSE TO ENCLOSURE
1 OF NRC LETTER DATED
FEBRUARY 19, 1976 (GUIDANCE
FOR MEETING THE REQUIREMENTS
OF APPENDIX I TO 10 CFR 50)

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ENCLOSURE 1 OF FEBRUARY LETTER

GUIDANCE TO MEET THE REQUIREMENTS
OF APPENDIX I TO 10 CFR 50

1. PROVIDE AN EVALUATION SHOWING CAPABILITY TO MEET SECTIONS II.A B, C AND D.

2. RADIOACTIVE SOURCE TERMS-CONSISTENT WITH THE METHODOLOGY IN REGULATORY GUIDE 1.112 (DRAFT REGULATORY GUIDES 1.BB AND 1.CC)

3. METEOROLOGY/HYDROLOGY-CONSISTENT WITH MENTODOLOGY IN REGULATORY GUIDES 1.111 AND 1.113 (DRAFT REGULATORY GUIDES 1.DD AND 1.EE)

4. DOSE CALCULATIONS-CONSISTENT WITH METHODOLOGY IN REGULATORY GUIDE 1.109 (DRAFT REGULATORY GUIDE 1.AA)

5. EFFLUENT RELEASE DATA-

   A. EXCLUDE FIRST YEAR OF OPERATION

   B. TABULATE BY EFFLUENT RELEASE POINT, MONTH, MODE OF OPERATION (E.G., FULL POWER OPERATION, REFUELING, SHUTDOWN)

6. COST-BENEFIT ANALYSIS (IF USED)-CONSISTENT WITH METHODOLOGY IN REGULATORY GUIDE 1.110 (DRAFT REGULATORY GUIDE 1.FF)

Item 1

Provide an evaluation showing capability to meet Section II.A, B, C and D.

Response

A summation showing the capability of the Hope Creek Generating Station ability to meet 10CFR50 Appendix I, section II A,II B, II C, and II D is provided in table 1.1.

Supporting information and an explanation of the values are given as responses to questions 2,3,4 and 6.

TABLE 1.1

SUMMARY SHOWING THE HOPE CREEK GENERATING STATION'S

ABILITY TO MEET SECTION II. OF APPENDIX I

			REGULATORY LIMIT	CALCULATED EXPOSURE
SEC II.A	LIQUID EFFLUENTS	(TOTAL BODY)	3 MREM/REACTOR	5.35E-2 mrem/reactor
		(ANY ORGAN)	10 MREM/REACTOR	4.35E-1 mrem/reactor
SEC II.B.1	GASEOUS EFFLUENTS	(AIR DOSE-GAMMA)	10 MRAD/REACTOR	9.30E-1 mrad/reactor(3)
		(AIR DOSE-BETA)	20 MRAD/REACTOR	6.25E-1 mrad/reactor(3)
OR				
SEC II.B.2	GASEOUS EFFLUENTS(2)	(TOTAL BODY)	5 MREM/REACTOR	3.71E-2 mrem/reactor(4)
		(SKIN)	15 MREM/REACTOR	5.74E-2 mrem/reactor(4)
SEC II.C	IODINE AND PARTICULATES	(ANY ORGAN)	15 MREM/REACTOR	1.67E-1 mrem/reactor(5)
SEC II.D	50 MILE RADIUS INTEGRATED POPULATION EXPOSURE	(TOTAL BODY)	$1000/MAN-REM total man-rem	2.46 man-rem (1)
		(THYROID)	$1000/MAN-REM total man-thyroid-rem	6.36 man-thyroid-rem(1)

(1) SEE PAGE 6.0

(2) HIGHER QUANTITIES MAY BE PERMITTED IF ASSURED THAT DOSES TO ANY INDIVIDUAL IN AN UNRESTRICTED AREA WILL BE LESS THAN THESE VALUES.

(3) EVALUATED AT SITE BOUNDARY OF 800 METERS NORTH OF THE HOPE CREEK UNIT 2 REACTOR BUILDING.

(4) EVALUATED AT LOCATION OF RESIDENCE 3.5 MILES ENE OF SITE.

(5) EVALUATED AT LOCATION OF NEAREST MILK COW, 4.8 MILES NNE OF SITE.

Item 2

Radioactive source term - consistent with the methodology in Regulatory 1.CC.

Response

Radioactive source terms were calculated using the BWR-GALE Code. This is consistent with the recommendations of USNRC Regulatory Guide 1.112.

Source terms were calculated for four cases. These are as follows:

Case 1	Base Case - Table 2.1
Case 2	Base Case with Augment to include leakoff collection for valves 2.5 inches and larger - Table 2.2
Case 3	Base Case with Augment to include charcoal and HEPA Filters in potentially radioactive areas of the Turbine Building Ventilation system - Table 2.3
Case 4	Base Case with Augment to include both the leakoff collection system and charcoal and HEPA filters in the Turbine Building (combination of Cases 2 and 3).

A thorough discussion of these equipment deletions is provided in response to Item 6 (Cost Benefit) of this report.

HOPE CREEK GENERATING STATION — BWR

CASE 1

THERMAL POWER LEVEL (MWT)	3440.00000
PLANT CAPACITY FACTOR	0.80
TOTAL STEAM FLOW (10**6 LBS/HR)	14.00000
MASS OF COOLANT IN REACTOR(M-LB)	0.60000
CLEAN-UP DEMIN FLOW(MIL-LBS/HR)	0.13000
COND DEMIN REGENERATION TIME(D)	42.00000
FRAC FEEDWATER THRU COND DEMIN	1.00000
RADWASTE DILUT FLOW (THOU GPM)	24.00000

LIQUID WASTE INPUTS

STREAM	FLOW RATE (GAL/DAY)	FRACTION OF PCA	FRACTION DISCHARGED	COLLECTION TIME (DAYS)	DECAY TIME (DAYS)	DECONTAMINATION FACTORS I	CS	OTHERS
HIGH PURITY WASTE	1.21E+05	0.090	0.0	0.148	0.177	1.00E+02	1.00E+01	1.00E+02
LOW PURITY WASTE	2.01E+04	0.0001	0.500	0.500	0.177	1.00E+02	2.00E+00	1.00E+02
CHEMICAL WASTES	5.04E+02	0.160	1.000	8.000	0.555	1.00E+02	1.00E+02	1.00E+02
REGENERANT SOLS	1.00E+04		0.0	0.167	0.433	1.00E+03	1.00E+04	1.00E+04

GASEOUS WASTE INPUTS

GLAND SEAL STEAM FLOW(THOU-LB/H)		0.0
MASS OF STEAM IN REACTOR(MI-LB)		0.02000
GLAND SEAL HOLD-UP TIME (HRS)		0.0
AIR-EJECTOR OFF-GAS HOLD-UP(HR)		0.50000
CONTAINMENT BLDG	IODINE RELEASE FRACTION	1.00000
	PARTICULATE RELEASE FRACTION	0.01000
TURBINE BUILDING	IODINE RELEASE FRACTION	1.00000
	PARTICULATE RELEASE FRACTION	1.00000
	RELEASE FRACT.-SPECIAL DES. FEATURES	1.00000
GLAND SEAL VENT IODINE PF		1.00000
AIR-EJECTOR OFF-GAS IODINE PF		0.10000
AUXILLARY BLDG	IODINE RELEASE FRACTION	0.10000
	PARTICULATE RELEASE FRACTION	0.01000
RADWASTE BLDG	IODINE RELEASE FRACTION	0.10000
	PARTICULATE RELEASE FRACTION	0.01000
THERE IS A CRYOGENIC DISTILLATION COLUMN		
IODINE AND XENON DECONTAMINATION FACTOR		10000.
KRYPTON DECONTAMINATION FACTOR		4000.
KRYPTON AND XENON HOLDUP TIME (DAYS)		90.

AIRBORNE PARTICULATE RELEASE RATE

(CURIES PER YEAR)

NUCLIDE	CONTAINMENT BLDG.	TURBINE BLDG.	AUXILIARY BLDG.	RADWASTE BLDG.	MECH VAC. PUMP	TOTAL
Cr-51	3.0E-06	1.3E-02	3.0E-06	9.0E-05	0.0	1.3E-02
Mn-54	3.0E-05	6.0E-04	3.0E-05	3.0E-04	0.0	9.6E-04
Fe-59	4.0E-06	5.0E-04	4.0E-05	1.5E-04	0.0	6.6E-04
Co-58	6.0E-06	6.0E-04	6.0E-06	4.5E-05	0.0	6.6E-04
Co-60	1.0E-04	2.0E-03	1.0E-04	9.0E-04	0.0	3.1E-03
Zn-65	2.0E-05	2.0E-04	2.0E-05	1.5E-05	0.0	2.5E-04
Sr-89	9.0E-07	6.0E-03	9.0E-07	4.5E-06	0.0	6.0E-03
Sr-90	5.0E-08	2.0E-05	5.0E-08	3.0E-06	0.0	2.3E-05
Zr-95	4.0E-06	1.0E-04	4.0E-06	5.0E-07	0.0	1.1E-04
Sb-124	2.0E-06	3.0E-04	2.0E-06	5.0E-07	0.0	3.0E-04
Cs-134	4.0E-05	3.0E-04	4.0E-05	4.5E-05	3.0E-06	4.3E-04
Cs-136	3.0E-06	5.0E-05	3.0E-06	4.5E-06	2.0E-06	6.2E-05
Cs-137	5.5E-05	6.0E-04	5.5E-05	9.0E-05	1.0E-05	8.1E-04
Ba-140	4.0E-06	1.1E-02	4.0E-06	1.0E-06	1.1E-05	1.1E-02
Ce-141	1.0E-06	6.0E-04	1.0E-06	2.6E-05	0.0	6.3E-04

GASEOUS RELEASE RATE

(CURIES PER YEAR)

NUCLIDE	COOLANT CONC. (MICROCURIES/G)	CONTAINMENT BLDG.	TURBINE BLDG.	AUXILIARY BLDG.	RADWASTE BLDG.	GLAND SEAL	AIR EJECTOR	MECH VAC PUMP	TOTAL
KR-83M	1.100E-03	0.0	0.0	0.0	0.0	0.0	1.0E+01	0.0	1.0E+01
KR-85M	1.900E-03	3.0E+00	6.8E+01	3.0E+00	0.0	0.0	2.0E+01	0.0	9.4E+01
KR-85	6.000E-06	0.0	0.0	0.0	0.0	0.0	2.6E+02	0.0	2.6E+02
KR-87	6.600E-03	3.0E+00	1.3E+02	3.0E+00	0.0	0.0	5.6E+01	0.0	1.9E+02
KR-88	6.600E-03	3.0E+00	2.3E+02	3.0E+00	0.0	0.0	6.5E+01	0.0	3.0E+02
KR-89	4.100E-02	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XE-133M	4.700E-06	0.0	0.0	0.0	0.0	0.0	1.0E+00	0.0	1.0E+00
XE-133M	9.000E-05	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XE-133	2.600E-03	6.6E+01	2.5E+02	6.6E+01	1.0E+01	0.0	1.2E+01	2.3E+03	2.7E+03
XE-135M	8.400E-04	4.6E+01	6.5E+02	4.6E+01	0.0	0.0	0.0	0.0	7.4E+02
XE-135	7.200E-03	3.4E+01	6.3E+02	3.4E+01	4.5E+01	0.0	3.1E+01	3.5E+02	1.1E+03
XE-137	4.700E-02	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XE-138	2.800E-02	7.0E+00	1.4E+03	7.0E+00	0.0	0.0	3.7E+01	0.0	1.5E+03
TOTAL NOBLE GASES									6.9E+03
I-131	3.292E-03	1.7E-01	1.9E-01	1.7E-02	5.0E-03	0.0	2.6E-04	3.0E-02	4.1E-01
I-133	1.410E-02	6.8E-01	7.6E-01	6.8E-02	1.8E-02	0.0	2.1E-04	0.0	1.5E+00
TRITIUM GASEOUS RELEASE		43 CURIES/YR							

0.0 APPEARING IN THE TABLE INDICATES RELEASE IS LESS THAN 1.0 CI/YR FOR NOBLE GAS, 0.0001 CI/YR FOR I

HOPE CREEK GENERATING STATIO LIQUID EFFLUENTS

CASE 1

NUCLIDE	HALF-LIFE (DAYS)	CONCENTRATION IN PRIMARY COOLANT (MICRO CI/ML)	ANNUAL RELEASES TO DISCHARGE CA HIGH PURITY (CURIES)	LOW PURITY (CURIES)	CHEMICAL (CURIES)	TOTAL LWS (CURIES)	ADJUSTED TOTAL (CI/YR)	DETERGENT WASTES (CI/YR)	TOTAL (CI/YR)
CORROSION AND ACTIVATION PRODUCTS									
NA 24	6.25E-01	8.57E-03	0.0	0.00008	0.00058	0.00066	0.00486	0.0	0.00490
P 32	1.43E+01	2.03E-04	0.0	0.00000	0.00018	0.00019	0.00137	0.0	0.00140
CR 51	2.78E+01	5.08E-03	0.0	0.00007	0.00507	0.00514	0.03803	0.0	0.03800
MN 54	3.03E+02	6.11E-05	0.0	0.00000	0.00007	0.00007	0.00051	0.00100	0.00150
MN 56	1.07E-01	4.05E-02	0.0	0.00005	0.00002	0.00008	0.00058	0.0	0.00058
FE 55	9.50E+02	1.02E-03	0.0	0.00001	0.00113	0.00115	0.00848	0.0	0.00850
FE 59	4.50E+01	3.05E-05	0.0	0.00000	0.00003	0.00003	0.00024	0.0	0.00024
CO 58	7.13E+01	2.04E-04	0.0	0.00000	0.00022	0.00022	0.00163	0.00400	0.00560
CO 60	1.92E+03	4.07E-04	0.0	0.00001	0.00045	0.00046	0.00340	0.00870	0.01200
CU 64	5.33E-01	2.83E-02	0.0	0.00023	0.00147	0.00170	0.01261	0.0	0.01300
ZN 65	2.45E+02	2.04E-04	0.0	0.00000	0.00022	0.00023	0.00168	0.0	0.00170
ZN 69M	5.75E-01	1.89E-03	0.0	0.00002	0.00011	0.00013	0.00095	0.0	0.00095
ZN 69	3.96E-02	0.0	0.0	0.00002	0.00012	0.00014	0.00102	0.0	0.00100
W187	9.96E-01	2.92E-04	0.0	0.00000	0.00004	0.00004	0.00032	0.0	0.00032
NP239	2.35E+00	6.99E-03	0.0	0.00009	0.00254	0.00262	0.01942	0.0	0.01900
FISSION PRODUCTS									
BR 83	1.00E-01	2.26E-03	0.0	0.00000	0.00000	0.00000	0.00003	0.0	0.00003
SR 89	5.20E+01	1.02E-04	0.0	0.00000	0.00011	0.00011	0.00081	0.0	0.00081
SR 90	1.03E+04	6.11E-06	0.0	0.00000	0.00001	0.00001	0.00005	0.0	0.00005
Y 90	2.67E+00	0.0	0.0	0.00000	0.00000	0.00000	0.00003	0.0	0.00003
SR 91	4.03E-01	3.70E-03	0.0	0.00003	0.00012	0.00014	0.00104	0.0	0.00100
Y 91M	3.47E-02	0.0	0.0	0.00002	0.00007	0.00009	0.00067	0.0	0.00067
Y 91	5.88E+01	4.07E-05	0.0	0.00000	0.00007	0.00007	0.00052	0.0	0.00052
SR 92	1.13E-01	8.14E-03	0.0	0.00001	0.00001	0.00002	0.00013	0.0	0.00013
Y 92	1.47E-01	5.03E-03	0.0	0.00003	0.00005	0.00008	0.00062	0.0	0.00062
Y 93	4.25E-01	3.71E-03	0.0	0.00003	0.00013	0.00015	0.00114	0.0	0.00110
ZR 95	6.50E+01	7.13E-06	0.0	0.00000	0.00001	0.00001	0.00006	0.0	0.00006
NB 95	3.50E+01	7.12E-06	0.0	0.00000	0.00001	0.00001	0.00006	0.0	0.00006
MO 99	2.79E+00	2.00E-03	0.0	0.00003	0.00084	0.00087	0.00644	0.0	0.00640
TC 99M	2.50E-01	1.77E-02	0.0	0.00010	0.00098	0.00108	0.00798	0.0	0.00800
RU103	3.96E+01	2.03E-05	0.0	0.00000	0.00002	0.00002	0.00016	0.00014	0.00030
RH103M	3.96E-02	0.0	0.0	0.00000	0.00002	0.00002	0.00016	0.0	0.00016
RU105	1.85E-01	1.72E-03	0.0	0.00001	0.00001	0.00001	0.00010	0.0	0.00010
RH105M	5.21E-04	0.0	0.0	0.00001	0.00001	0.00001	0.00010	0.0	0.00010
RH105	1.53E+00	0.0	0.0	0.00000	0.00005	0.00005	0.00040	0.0	0.00040
RU106	3.67E+02	3.06E-06	0.0	0.00000	0.00000	0.00000	0.00003	0.00240	0.00240
RH106	3.47E-04	0.0	0.0	0.00000	0.00000	0.00000	0.00003	0.0	0.00002
TE129M	3.43E+01	4.07E-05	0.0	0.00000	0.00004	0.00004	0.00031	0.0	0.00031
TE129	4.79E-02	0.0	0.0	0.00000	0.00003	0.00003	0.00020	0.0	0.00020
TE131M	1.25E+00	9.82E-05	0.0	0.00000	0.00002	0.00002	0.00014	0.0	0.00014
TE131	1.74E-02	0.0	0.0	0.00000	0.00000	0.00000	0.00003	0.0	0.00003
I131	8.05E+00	5.04E-03	0.0	0.00007	0.00388	0.00395	0.02923	0.00006	0.02900
TE132	3.25E+03	1.03E-05	0.0	0.00000	0.00000	0.00000	0.00004	0.0	0.00004
I132	9.58E-02	2.25E-02	0.0	0.00002	0.00001	0.00004	0.00027	0.0	0.00027
I133	8.75E-01	1.87E-02	0.0	0.00019	0.00212	0.00231	0.01708	0.0	0.01700
I134	3.67E-02	4.84E-02	0.0	0.00000	0.00000	0.00000	0.00002	0.0	0.00002
CS134	7.49E+02	3.06E-05	0.0	0.00002	0.00003	0.00006	0.00041	0.01300	0.01300
I135	2.79E-01	1.69E-02	0.0	0.00009	0.00024	0.00032	0.00241	0.0	0.00240
CS136	1.30E+01	2.02E-05	0.0	0.00001	0.00002	0.00003	0.00023	0.0	0.00023
CS137	1.10E+04	7.13E-05	0.0	0.00005	0.00008	0.00013	0.00095	0.02400	0.02500

HOPE CREEK GENERATING STATIO LIQUID EFFLUENTS (CONTINUED)

CASE

NUCLIDE	HALF-LIFE (DAYS)	CONCENTRATION IN PRIMARY COOLANT (MICRO CI/ML)	ANNUAL RELEASES TO DISCHARGE CANA HIGH PURITY (CURIES)	LOW PURITY (CURIES)	CHEMICAL (CURIES)	TOTAL LWS (CURIES)	ADJUSTED TOTAL (CI/YR)	DETERGENT WASTES (CI/YR)	TOTAL (CI/YR)
BA137M	1.77E-03	0.0	0.0	0.00005	0.00007	0.00012	0.00089	0.0	0.00089
BA139	5.76E-02	7.55E-03	0.0	0.00000	0.00000	0.00000	0.00002	0.0	0.00002
BA140	1.28E+01	4.06E-04	0.0	0.00001	0.00036	0.00036	0.00268	0.0	0.00270
LA140	1.67E+00	0.0	0.0	0.00030	0.00029	0.00029	0.00215	0.0	0.00220
LA141	1.62E-01	0.0	0.0	0.00000	0.00000	0.00000	0.00002	0.0	0.00002
CE141	3.24E+01	3.05E-05	0.0	0.00000	0.00003	0.00003	0.00025	0.0	0.00025
LA142	6.39E-02	3.81E-03	0.0	0.00000	0.00000	0.00000	0.00001	0.0	0.00001
CE143	1.38E+00	2.96E-05	0.0	0.00000	0.00001	0.00001	0.00005	0.0	0.00005
PR143	1.37E+01	4.06E-05	0.0	0.00000	0.00004	0.00004	0.00029	0.0	0.00029
CE144	2.84E+02	3.06E-06	0.0	0.00000	0.00000	0.00000	0.00003	0.00520	0.00520
PR144	1.20E-02	0.0	0.0	0.00000	0.00000	0.00000	0.00003	0.0	0.00002
ND147	1.11E+01	3.04E-06	0.0	0.00000	0.00000	0.00000	0.00002	0.0	0.00002
ALL OTHERS		1.43E-01	0.0	0.00000	0.00000	0.00001	0.00004	0.0	0.00004
TOTAL (EXCEPT TRITIUM)		4.05E-01	0.0	0.00135	0.02207	0.02342	0.17342	0.06234	0.23000

TRITIUM RELEASE 43 CURIES PER YEAR

HOPE CREEK GENERATING STATIO — BWR

CASE 2

THERMAL POWER LEVEL (MWT)	3440.0000
PLANT CAPACITY FACTOR	0.80
TOTAL STEAM FLOW (10**6 LBS/HR)	14.3333
MASS OF COOLANT IN REACTOR(M-LB)	0.0000
FISSION PRODUCT CARRY-OVER FRACTION	0.0010
HALOGEN CARRY-OVER FRACTION	0.0200
CLEAN-UP DEMIN FLOW(MIL-LBS/HR)	0.1300
COND DEMIN REGENERATION TIME(D)	42.0000
FRAC FEEDWATER THRU COND DEMIN	1.0000
RADWASTE DILUT FLOW (THOU GPM)	24.0000

LIQUID WASTE INPUTS

STREAM	FLOW RATE (GAL/DAY)	FRACTION OF PCA	FRACTION DISCHARGED	COLLECTION TIME (DAYS)	DECAY TIME (DAYS)	DECONTAMINATION FACTORS I	CS	OTHERS
HIGH PURITY WASTE	1.21E+05	0.090	0.0	0.148	0.177	1.00E+02	1.00E+01	1.00E+02
LOW PURITY WASTE	2.01E+04	0.0001	0.500	0.500	0.177	1.00E+02	2.00E+00	1.00E+02
CHEMICAL WASTES	5.04E+02	0.160	1.000	8.000	0.555	1.00E+02	1.00E+02	1.00E+02
REGENERANT SOLS	1.00E+04		0.0	0.167	0.431	1.00E+01	1.00E+04	1.00E+04

GASEOUS WASTE INPUTS

GLAND SEAL STEAM FLOW(THOU-LB/H)		0.0
MASS OF STEAM IN REACTOR(MI-LB)		0.0200
GLAND SEAL HOLD-UP TIME (HRS)		0.0
AIR-EJECTOR OFF-GAS HOLD-UP(HR)		0.5000
CONTAINMENT BLDG	IODINE RELEASE FRACTION	1.00000
	PARTICULATE RELEASE FRACTION	0.01000
TURBINE BUILDING	IODINE RELEASE FRACTION	1.00000
	PARTICULATE RELEASE FRACTION	1.00000
	RELEASE FRACT.-SPECIAL DES. FEATURES	0.20000
GLAND SEAL VENT IODINE PF		1.0000
AIR-EJECTOR OFF-GAS IODINE PF		0.1000
AUXILLARY BLDG	IODINE RELEASE FRACTION	0.10000
	PARTICULATE RELEASE FRACTION	0.01000
RADWASTE BLDG	IODINE RELEASE FRACTION	0.10000
	PARTICULATE RELEASE FRACTION	0.01000
THERE IS A CRYOGENIC DISTILLATION COLUMN		
IODINE AND XENON DECONTAMINATION FACTOR		10000.
KRYPTON DECONTAMINATION FACTOR		4000.
KRYPTON AND XENON HOLDUP TIME (DAYS)		90.

TABLE 2.2
1 of 5

GASEOUS RELEASE RATE

(CURIES PER YEAR)

NUCLIDE	COOLANT CONC. (MICROCURIES/G)	CONTAINMENT BLDG.	TURBINE BLDG.	AUXILIARY BLDG.	RADWASTE BLDG.	GLAND SEAL	AIR EJECTOR	MECH VAC PUMP	TOTAL
KR-83M	1.100E-03	0.0	0.0	0.0	0.0	0.0	1.0E+01	0.0	1.0E+01
KR-85M	1.900E-03	3.0E+00	1.4E+01	3.0E+00	0.0	0.0	2.0E+01	0.0	4.0E+01
KR-85	6.000E-06	0.0	0.0	0.0	0.0	0.0	2.6E+02	0.0	2.6E+02
KR-87	6.600E-03	3.0E+00	2.6E+01	3.0E+00	0.0	0.0	5.6E+01	0.0	8.8E+01
KR-88	6.600E-03	3.0E+00	4.6E+01	3.0E+00	0.0	0.0	6.5E+01	0.0	1.2E+02
KR-89	4.100E-02	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XE-131M	4.700E-06	0.0	0.0	0.0	0.0	0.0	1.0E+00	0.0	1.0E+00
XE-133M	9.000E-05	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XE-133	2.600E-03	6.6E+01	5.0E+01	6.6E+01	1.0E+01	0.0	1.2E+01	2.3E+03	2.5E+03
XE-135M	8.400E-04	4.6E+01	1.3E+02	4.6E+01	0.0	0.0	0.0	0.0	2.2E+02
XE-135	7.200E-03	3.4E+01	1.3E+02	3.4E+01	4.5E+01	0.0	3.1E+01	3.5E+02	6.2E+02
XE-137	4.700E-02	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XE-138	2.800E-02	7.0E+00	2.9E+02	7.0E+00	0.0	0.0	3.7E+01	0.0	3.4E+02
TOTAL NOBLE GASES									4.1E+03
I-131	3.252E-03	1.7E-01	3.8E-02	1.7E-02	5.0E-03	0.0	2.6E-04	3.0E-02	2.6E-01
I-133	1.416E-02	6.8E-01	1.5E-01	6.8E-02	1.8E-02	0.0	2.1E-04	0.0	9.2E-01
TRITIUM GASEOUS RELEASE			43 CURIES/YR						

0.0 APPEARING IN THE TABLE INDICATES RELEASE IS LESS THAN 1.0 CI/YR FOR NOBLE GAS, 0.0001 CI/YR FOR I

TABLE 2.2

AIRBORNE PARTICULATE RELEASE RATE

(CURIES PER YEAR)

NUCLIDE	CONTAINMENT BLDG.	TURBINE BLDG.	AUXILIARY BLDG.	RADWASTE BLDG.	MECH VAC. PUMP	TOTAL
CR-51	3.0E-06	2.6E-03	3.0E-06	9.0E-05	0.0	2.7E-03
MN-54	3.0E-05	1.2E-04	3.0E-05	3.0E-04	0.0	4.8E-04
FE-59	4.0E-06	1.0E-04	4.0E-06	1.5E-04	0.0	2.6E-04
CO-58	6.0E-06	1.2E-04	6.0E-06	4.5E-05	0.0	1.8E-04
CO-60	1.0E-04	4.0E-04	1.0E-04	9.0E-04	0.0	1.5E-03
ZN-65	2.0E-05	4.0E-05	2.0E-05	1.5E-05	0.0	9.5E-05
SR-89	9.0E-07	1.2E-03	9.0E-07	4.5E-06	0.0	1.2E-03
SR-90	5.0E-08	4.0E-06	5.0E-08	3.0E-06	0.0	7.1E-06
ZR-95	4.0E-06	2.0E-05	4.0E-06	5.0E-07	0.0	2.8E-05
SB-124	2.0E-06	6.0E-05	2.0E-06	5.0E-07	0.0	6.4E-05
CS-134	4.0E-05	6.0E-05	4.0E-05	4.5E-05	3.0E-06	1.9E-04
CS-136	3.0E-06	1.0E-05	3.0E-06	4.5E-06	2.0E-06	2.2E-05
CS-137	5.5E-05	1.2E-04	5.5E-05	9.0E-05	1.0E-05	3.3E-04
BA-140	4.0E-06	2.2E-03	4.0E-06	1.0E-06	1.1E-05	2.2E-03
CE-141	1.0E-06	1.2E-04	1.0E-06	2.6E-05	0.0	1.5E-04

HOPE CREEK GENERATING STATIO LIQUID EFFLUENTS

CASE 2

NUCLIDE	HALF-LIFE (DAYS)	CONCENTRATION IN PRIMARY COOLANT (MICRO CI/ML)	ANNUAL RELEASES TO DISCHARGE CANAL HIGH PURITY (CURIES)	LOW PURITY (CURIES)	CHEMICAL (CURIES)	TOTAL (CURIES)	ADJUSTED TOTAL (CI/YR)	DETERGENT WASTES (CI/YR)	TOTAL (CI/YR)
CORROSION AND ACTIVATION PRODUCTS									
NA 24	6.25E-01	8.57E-03	0.0	0.03008	0.00058	0.00066	0.00486	0.0	0.00490
P 32	1.43E+01	2.03E-04	0.0	0.00000	0.00014	0.00014	0.00137	0.0	0.00140
CR 51	2.78E+01	5.08E-03	0.0	0.00007	0.00507	0.00514	0.03803	0.0	0.03800
MN 54	3.13E+02	6.11E-05	0.0	0.00000	0.00000	0.00000	0.00001	0.00100	0.00150
MN 56	1.07E-01	4.05E-02	0.0	0.03005	0.00002	0.00006	0.00058	0.0	0.00058
FE 55	9.50E+02	1.02E-03	0.0	0.00001	0.00113	0.00115	0.00848	0.0	0.00850
FE 59	4.50E+01	3.05E-05	0.0	0.00000	0.00003	0.00003	0.00024	0.0	0.00024
CO 58	7.13E+01	2.09E-04	0.0	0.00000	0.00022	0.00022	0.00163	0.00400	0.00560
CO 60	1.92E+03	4.37E-04	0.0	0.00001	0.00345	0.00346	0.00340	0.00870	0.01200
ZN 65	2.45E+02	2.04E-04	0.0	0.00000	0.00022	0.00023	0.00168	0.0	0.00170
ZN 69M	3.75E-01	1.89E-03	0.0	0.00002	0.00011	0.00013	0.00095	0.0	0.00095
ZN 69	3.96E-02	0.0	0.0	0.00002	0.00012	0.00014	0.00102	0.0	0.00100
W187	9.96E-01	2.92E-04	0.0	0.00000	0.00004	0.00004	0.00032	0.0	0.00032
NP239	2.35E+00	6.99E-03	0.0	0.00009	0.00254	0.00262	0.01942	0.0	0.01900
FISSION PRODUCTS									
BR 83	1.00E-01	2.26E-03	0.0	0.00000	0.00000	0.00000	0.00003	0.0	0.00003
SR 89	5.20E+01	1.02E-04	0.0	0.00000	0.00011	0.00011	0.00081	0.0	0.00081
SR 90	1.03E+04	6.11E-06	0.0	0.00000	0.00001	0.00001	0.00005	0.0	0.00005
Y 90	2.67E+00	0.0	0.0	0.00000	0.00000	0.00000	0.00003	0.0	0.00003
SR 91	4.23E-01	3.73E-03	0.0	0.00003	0.00012	0.00014	0.00104	0.0	0.00100
Y 91M	3.47E-02	0.0	0.0	0.00002	0.00007	0.00009	0.00067	0.0	0.00067
Y 91	5.88E+01	4.37E-05	0.0	0.00000	0.00007	0.00007	0.00052	0.0	0.00052
SR 92	1.13E-01	8.14E-03	0.0	0.00001	0.00001	0.00002	0.00013	0.0	0.00013
Y 92	1.47E-01	5.03E-03	0.0	0.00003	0.00005	0.00008	0.00062	0.0	0.00062
Y 93	4.25E-01	3.71E-03	0.0	0.00003	0.00013	0.00015	0.00114	0.0	0.00110
ZR 95	6.50E+01	7.13E-06	0.0	0.00000	0.00001	0.00001	0.00006	0.0	0.00006
NB 95	3.50E+01	7.12E-06	0.0	0.00000	0.00001	0.00001	0.00006	0.0	0.00006
MO 99	2.79E+00	2.00E-03	0.0	0.00003	0.00084	0.00087	0.00644	0.0	0.00640
TC 99M	2.50E-01	1.77E-02	0.0	0.00010	0.00098	0.00108	0.00798	0.0	0.00800
RU103	3.95E+01	2.03E-05	0.0	0.00000	0.00002	0.00002	0.00016	0.00014	0.00030
RH103M	3.76E-02	0.0	0.0	0.00000	0.00002	0.00002	0.00016	0.0	0.00016
RU105	1.05E-01	1.72E-03	0.0	0.00001	0.00001	0.00001	0.00010	0.0	0.00010
RH105M	5.21E-04	0.0	0.0	0.00001	0.00001	0.00001	0.00010	0.0	0.00010
RH105	1.50E+00	0.0	0.0	0.00000	0.00000	0.00000	0.00003	0.0	0.00003
RU106	3.67E+02	3.02E-06	0.0	0.00000	0.00000	0.00000	0.00003	0.00240	0.00240
RH106	3.47E-04	0.0	0.0	0.00000	0.00000	0.00000	0.00003	0.0	0.00032
TE129M	3.49E+01	4.37E-05	0.0	0.00000	0.00004	0.00004	0.00031	0.0	0.00031
TE129	4.77E-02	0.0	0.0	0.00000	0.00003	0.00003	0.00020	0.0	0.00020
TE131M	1.25E+00	9.82E-05	0.0	0.00000	0.00002	0.00002	0.00014	0.0	0.00014
TE131	1.74E-02	0.0	0.0	0.00000	0.00000	0.00000	0.00003	0.0	0.00003
I131	8.05E+00	5.04E-03	0.0	0.00007	0.00388	0.00395	0.02923	0.00006	0.02900
TE132	3.25E+00	1.33E-05	0.0	0.00000	0.00000	0.00000	0.00004	0.0	0.00004
I132	9.58E-02	2.25E-02	0.0	0.00002	0.00001	0.00004	0.00027	0.0	0.00027
I133	8.75E-01	4.87E-02	0.0	0.00019	0.00212	0.00231	0.01708	0.0	0.01700
I134	3.67E-02	4.84E-02	0.0	0.00000	0.00000	0.00000	0.00002	0.0	0.00002
CS134	7.49E+02	3.06E-05	0.0	0.00002	0.00004	0.00006	0.00041	0.00300	0.00300
I135	2.75E-01	1.69E-02	0.0	0.00009	0.00324	0.00332	0.00241	0.0	0.00240
CS136	1.30E+01	2.02E-05	0.0	0.00001	0.00002	0.00003	0.00023	0.0	0.00023
CS137	1.10E+04	7.13E-05	0.0	0.00005	0.00008	0.00013	0.00095	0.02400	0.02500

HOPE CREEK GENERATING STATIO LIQUID EFFLUENTS (CONTINUED)

CASE 2

NUCLIDE	HALF-LIFE (DAYS)	CONCENTRATION IN PRIMARY COOLANT (MICRO CI/ML)	ANNUAL RELEASES TO DISCHARGE CANAL HIGH PURITY (CURIES)	LOW PURITY (CURIES)	CHEMICAL (CURIES)	TOTAL LAS (CURIES)	ADJUSTED TOTAL (CI/YR)	DETERGENT WASTES (CI/YR)	TOTAL (CI/YR)
BA137M	1.77E-03	0.0	0.0	0.00005	0.00007	0.00012	0.00089	0.0	0.00089
BA139	5.76E-02	6.55E-03	0.0	0.00003	0.00000	0.00000	0.00002	0.0	0.00002
BA140	1.28E+01	4.06E-04	0.0	0.00001	0.00036	0.00036	0.00268	0.0	0.00270
LA140	1.67E+00	0.0	0.0	0.00003	0.00029	0.00029	0.00215	0.0	0.00223
LA141	1.62E-01	0.0	0.0	0.00000	0.00000	0.00000	0.00002	0.0	0.00002
CE141	3.3[illegible]E+01	3.05E-05	0.0	0.00000	0.00003	0.00003	0.00025	0.0	0.00025
LA142	6.59E-02	3.81E-03	0.0	0.00000	0.00000	0.00000	0.00001	0.0	0.00001
CE143	1.38E+00	2.96E-05	0.0	0.00000	0.00001	0.00001	0.00005	0.0	0.00005
PR143	1.37E+01	4.30E-05	0.0	0.00003	0.00004	0.00004	0.00029	0.0	0.00029
CE144	2.84E+02	3.06E-06	0.0	0.00000	0.00000	0.00000	0.00003	0.00520	0.00520
PR144	1.20E-02	0.0	0.0	0.00000	0.00000	0.00000	0.00003	0.0	0.00003
ND147	1.11E+01	3.34E-06	0.0	0.00000	0.00000	0.00000	0.00002	0.0	0.00002
ALL OTHERS		1.43E-01	0.0	0.00000	0.00000	0.00001	0.00004	0.0	0.00004
TOTAL (EXCEPT TRITIUM)		4.05E-01	0.0	0.00135	0.02237	0.02342	0.17342	0.06234	0.23333

TRITIUM RELEASE [illegible] CURIES PER YEAR

TABLE 2.2
5 of 5

HOPE CREEK GENERATING STATIO — BWR

CASE 3

THERMAL POWER LEVEL (MWT)	3440.0000
PLANT CAPACITY FACTOR	0.80
TOTAL STEAM FLOW (10**6 LBS/HR)	14.3333
MASS OF COOLANT IN REACTOR(M-LB)	0.6000
FISSION PRODUCT CARRY-OVER FRACTION	0.0010
HALOGEN CARRY-OVER FRACTION	0.0200
CLEAN-UP DEMIN FLOW(MIL-LBS/HR)	0.1300
COND DEMIN REGENERATION TIME(D)	42.3333
FRAC F.W. WATER THRU COND DEMIN	1.0000
RADWASTE DILUT FLOW (THOU GPM)	24.0000

LIQUID WASTE INPUTS

STREAM	FLOW RATE (GAL/DAY)	FRACTION OF PCA	FRACTION DISCHARGED	COLLECTION TIME (DAYS)	DECAY TIME (DAYS)	DECONTAMINATION FACTORS I	CS	OTHERS
HIGH PURITY WASTE	1.21E+05	0.333	0.0	0.148	0.177	1.00E+02	1.00E+01	1.00E+02
LOW PURITY WASTE	2.01E+04	0.0001	0.500	0.500	0.177	1.00E+02	2.00E+00	1.00E+02
CHEMICAL WASTES	5.04E+02	0.160	1.000	0.333	0.555	1.00E+02	1.00E+02	1.00E+02
REGENERANT SOLS	1.00E+04		0.0	0.167	0.433	1.00E+03	1.00E+04	1.00E+04

GASEOUS WASTE INPUTS

GLAND SEAL STEAM FLOW(THOU-LB/H)		0.0
MASS OF STEAM IN REACTOR(MI-LB)		0.0200
GLAND SEAL HOLD-UP TIME (HRS)		0.0
AIR-EJECTOR OFF-GAS HOLD-UP(HR)		0.5000
CONTAINMENT BLDG	IODINE RELEASE FRACTION	1.00000
	PARTICULATE RELEASE FRACTION	0.01000
TURBINE BUILDING	IODINE RELEASE FRACTION	0.10000
	PARTICULATE RELEASE FRACTION	0.01000
	RELEASE FRACT.-SPECIAL DES. FEATURES	1.00000
GLAND SEAL VENT IODINE PF		1.0000
AIR-EJECTOR OFF-GAS IODINE PF		0.1000
AUXILLARY BLDG	IODINE RELEASE FRACTION	0.10000
	PARTICULATE RELEASE FRACTION	0.01000
RADWASTE BLDG	IODINE RELEASE FRACTION	0.10000
	PARTICULATE RELEASE FRACTION	0.01000
THERE IS A CRYOGENIC DISTILLATION COLUMN		
IODINE AND XENON DECONTAMINATION FACTOR		10000.
KRYPTON DECONTAMINATION FACTOR		4000.
KRYPTON AND XENON HOLDUP TIME (DAYS)		90.

TABLE 2.3
1 of 5

GASEOUS RELEASE RATE

(CURIES PER YEAR)

NUCLIDE	COOLANT CONC. (MICROCURIES/G)	CONTAINMENT BLDG.	TURBINE BLDG.	AUXILIARY BLDG.	RADWASTE BLDG.	GLAND SEAL	AIR EJECTOR	MECH VAC PUMP	TOTAL
KR-83M	1.100E-03	0.0	0.0	0.0	0.0	0.0	1.0E+01	0.0	1.0E+01
KR-85M	1.900E-03	3.0E+00	6.8E+01	3.0E+00	0.0	0.0	2.0E+01	0.0	9.5E+01
KR-85	6.000E-06	0.0	0.0	0.0	0.0	0.0	2.6E+02	0.0	2.6E+02
KR-87	1.600E-03	3.0E+00	1.3E+02	3.0E+00	0.0	0.0	5.6E+01	0.0	1.9E+02
KR-88	6.600E-03	3.0E+00	2.3E+0	3.0E+00	0.0	0.0	6.5E+01	0.0	3.0E+02
KR-89	4.100E-02	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XE-131M	4.700E-06	0.0	0.0	0.0	0.0	0.0	1.0E+00	0.0	1.0E+00
XE-133M	9.000E-05	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XE-133	2.600E-03	6.6E+01	2.5E+02	6.6E+01	1.0E+01	0.0	1.2E+01	2.3E+03	2.7E+03
XE-135M	8.400E-04	4.6E+01	6.5E+02	4.6E+01	0.0	0.0	0.0	0.0	7.4E+02
XE-135	7.200E-03	3.4E+01	6.3E+02	3.4E+01	4.5E+01	0.0	3.1E+01	3.5E+02	1.1E+03
XE-137	4.700E-02	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XE-138	2.800E-02	7.0E+00	1.4E+03	7.0E+00	0.0	0.0	3.7E+01	0.0	1.5E+03
TOTAL NOBLE GASES									6.5E+03
I-131	3.292E-03	1.7E-01	1.9E-02	1.7E-02	5.0E-03	0.0	2.6E-04	3.0E-02	2.4E-01
I-133	1.416E-02	6.8E-01	7.6E-02	6.8E-02	1.8E-02	0.0	2.1E-04	0.0	8.-E-01

TRITIUM GASEOUS RELEASE 43 CURIES/YR

0.0 APPEARING IN THE TABLE INDICATES RELEASE IS LESS THAN 1.0 CI/YR FOR NOBLE GAS, 0.0001 CI/YR FOR I

AIRBORNE PARTICULATE RELEASE RATE

(CURIES PER YEAR)

NUCLIDE	CONTAINMENT BLDG.	TURBINE BLDG.	AUXILIARY BLDG.	RADWASTE BLDG.	MECH VAC. PUMP	TOTAL
CR-51	3.0E-06	1.3E-04	3.0E-06	9.0E-05	0.0	2.5E-04
MN-54	3.0E-05	6.0E-05	3.0E-05	3.0E-04	0.0	3.7E-04
FE-59	4.0E-06	5.0E-06	4.0E-06	1.5E-04	0.0	1.6E-04
CO-58	6.0E-06	6.0E-06	6.0E-06	4.5E-05	0.0	6.3E-05
CO-60	1.0E-04	2.0E-05	1.0E-04	9.0E-04	0.0	1.1E-03
ZN-65	2.0E-05	2.0E-06	2.0E-05	1.5E-05	0.0	5.7E-05
SR-89	9.0E-07	6.0E-05	9.0E-07	4.5E-06	0.0	6.6E-05
SR-90	5.0E-08	2.0E-07	5.0E-08	3.0E-06	0.0	3.3E-06
ZR-95	4.0E-06	1.0E-06	4.0E-06	5.0E-07	0.0	9.5E-06
SB-124	2.0E-06	3.0E-06	2.0E-06	5.0E-07	0.0	7.5E-06
CS-134	4.0E-05	3.0E-06	4.0E-05	4.5E-05	3.0E-06	1.3E-04
CS-136	3.0E-06	5.0E-07	3.0E-06	4.5E-06	2.0E-06	1.3E-05
CS-137	5.5E-05	6.0E-06	5.5E-05	9.0E-05	1.0E-05	2.2E-04
BA-140	4.0E-06	1.1E-04	4.0E-06	1.0E-06	1.1E-05	1.3E-04
CE-141	1.0E-06	6.0E-06	1.0E-06	2.6E-05	0.0	3.4E-05

HOPE CREEK GENERATING STATIO LIQUID EFFLUENTS

CASE

NUCLIDE	HALF-LIFE (DAYS)	CONCENTRATION IN PRIMARY COOLANT (MICRO CI/ML)	ANNUAL RELEASES TO DISCHARGE CANAL HIGH PURITY (CURIES)	LOW PURITY (CURIES)	CHEMICAL (CURIES)	TOTAL LBS (CURIES)	ADJUSTED TOTAL (CI/YR)	DETERGENT WASTES (CI/YR)	TOTAL (CI/YR)
CORROSION AND ACTIVATION PRODUCTS									
NA 24	6.25E-01	8.57E-03	0.0	0.00008	0.00058	0.00066	0.00486	0.0	0.00490
P 32	1.43E+01	2.03E-04	0.0	0.00000	0.00014	0.00019	0.00137	0.0	0.00140
C	2.78E+01	5.08E-03	0.0	0.00007	0.00507	0.00514	0.03803	0.0	0.03803
MO	3.33E+02	6.11E-05	0.0	0.00000	0.00007	0.00007	0.00051	0.00100	0.00150
MN	1.07E-01	4.05E-02	0.0	0.00005	0.00002	0.00008	0.00058	0.0	0.00058
FE 55	9.50E+02	1.32E-03	0.0	0.00001	0.00113	0.00115	0.00848	0.0	0.00850
FE 59	4.50E+01	3.05E-05	0.0	0.00000	0.00003	0.00003	0.00024	0.0	0.00024
CO 58	7.13E+01	2.09E-04	0.0	0.00000	0.00022	0.00022	0.00163	0.00433	0.00563
CO 60	1.92E+03	4.37E-04	0.0	0.00001	0.00045	0.00046	0.00340	0.00870	0.01200
CU 64	5.13E-01	2.83E-02	0.0	0.00023	0.00147	0.00170	0.01261	0.0	0.01300
ZN 65	2.45E+02	2.34E-04	0.0	0.00003	0.00022	0.00023	0.00168	0.0	0.00170
ZN 69M	5.75E-01	1.85E-03	0.0	0.00002	0.00011	0.00013	0.00095	0.0	0.00095
ZN 69	3.96E-02	0.0	0.0	0.00002	0.00012	0.00014	0.00102	0.0	0.00133
W187	9.96E-01	2.92E-04	0.0	0.00000	0.00004	0.00004	0.00032	0.0	0.00032
NP239	2.35E+00	6.99E-03	0.0	0.00009	0.00254	0.00262	0.01942	0.0	0.01900
FISSION PRODUCTS									
BR 83	1.00E-01	2.26E-03	0.0	0.00000	0.00000	0.00000	0.00003	0.0	0.00003
SR 89	5.20E+01	1.02E-04	0.0	0.00003	0.00011	0.00011	0.00081	0.0	0.00081
SR 90	1.03E+04	6.11E-06	0.0	0.00000	0.00001	0.00001	0.00005	0.0	0.00005
Y 90	2.67E+00	0.0	0.0	0.00000	0.00000	0.00000	0.00003	0.0	0.00003
SR 91	4.33E-01	3.73E-03	0.0	0.00003	0.00012	0.00014	0.00104	0.0	0.00100
Y 91M	3.47E-02	0.0	0.0	0.00002	0.00007	0.00009	0.00067	0.0	0.00067
Y 91	5.88E+01	4.07E-05	0.0	0.00003	0.00037	0.00037	0.00352	0.0	0.00352
SR 92	1.13E-01	8.14E-03	0.0	0.00001	0.00001	0.00002	0.00013	0.0	0.00013
Y 92	1.47E-01	5.03E-03	0.0	0.00003	0.00005	0.00008	0.00062	0.0	0.00062
Y 93	4.25E-01	3.71E-03	0.0	0.00003	0.00013	0.00015	0.00114	0.0	0.00110
ZR 95	6.50E+01	7.13E-06	0.0	0.00000	0.00001	0.00001	0.00006	0.0	0.00006
NB 95	3.50E+01	7.12E-06	0.0	0.00003	0.00003	0.00006	0.00036	0.0	0.00036
MO 99	2.79E+00	2.00E-03	0.0	0.00003	0.00084	0.00087	0.00644	0.0	0.00640
TC 99M	2.50E-01	1.77E-02	0.0	0.00010	0.00098	0.00108	0.00798	0.0	0.00833
RU103	3.96E+01	2.33E-05	0.0	0.00000	0.00002	0.00002	0.00016	0.00014	0.00030
RH103M	3.96E-02	0.0	0.0	0.00000	0.00002	0.00002	0.00016	0.0	0.00016
RU105	1.85E-01	1.72E-03	0.0	0.00001	0.00001	0.00001	0.00010	0.0	0.00010
RH105M	5.21E-04	0.0	0.0	0.00000	0.00001	0.00001	0.00010	0.0	0.00010
RH105	1.50E+00	0.0	0.0	0.00000	0.00005	0.00005	0.00043	0.0	0.00043
RU106	3.67E+02	3.06E-06	0.0	0.00000	0.00000	0.00000	0.00003	0.00240	0.00240
RH106	3.47E-04	0.0	0.0	0.00000	0.00000	0.00000	0.00003	0.0	0.00002
TE129M	3.43E+01	4.37E-05	0.0	0.00003	0.00004	0.00004	0.00031	0.0	0.00031
TE129	4.79E-02	0.0	0.0	0.00000	0.00003	0.00003	0.00020	0.0	0.00020
TE131M	1.25E+00	9.82E-05	0.0	0.00000	0.00002	0.00002	0.00014	0.0	0.00014
TE131	1.74E-02	0.0	0.0	0.00000	0.00000	0.00000	0.00003	0.0	0.00003
I131	8.05E+00	5.04E-03	0.0	0.00007	0.00388	0.00395	0.02923	0.0	0.02900
TE132	3.25E+00	1.33E-05	0.0	0.00003	0.00003	0.00006	0.00004	0.0	0.00004
I132	9.58E-02	2.25E-02	0.0	0.00002	0.00001	0.00004	0.00027	0.0	0.00027
I133	8.75E-01	1.87E-02	0.0	0.00019	0.00216	0.00231	0.01738	0.0	0.01700
I134	3.67E-02	4.84E-02	0.0	0.00000	0.00000	0.00000	0.00002	0.0	0.00002
CS134	7.49E+02	3.06E-05	0.0	0.00002	0.00003	0.00006	0.00041	0.01300	0.01300
I135	2.79E-01	1.69E-02	0.0	0.00009	0.00024	0.00032	0.00241	0.0	0.00240
CS136	1.30E+01	2.02E-05	0.0	0.00001	0.00002	0.00003	0.00023	0.0	0.00023
CS137	1.10E+04	7.13E-05	0.0	0.00005	0.00008	0.00013	0.00095	0.02433	0.02500

TABLE 2.3
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HOPE CREEK GENERATING STATIO LIQUID EFFLUENTS (CONTINUED)

NUCLIDE	HALF-LIFE (DAYS)	CONCENTRATION IN PRIMARY COOLANT (MICRO CI/ML)	ANNUAL RELEASES TO DISCHARGE CANAL HIGH PURITY (CURIES)	LOW PURITY (CURIES)	CHEMICAL (CURIES)	TOTAL LWS (CURIES)	ADJUSTED TOTAL (CI/YR)	DETERGENT WASTES (CI/YR)	TOTAL (CI/YR)
BA137M	1.77E-03	0.0	0.0	0.00005	0.00007	0.00012	0.00089	0.0	0.00089
BA139	5.76E-02	7.55E-33	0.0	0.00000	0.00000	0.00000	0.00002	0.0	0.00002
BA140	1.28E+01	4.06E-09	0.0	0.00001	0.00036	0.00036	0.00268	0.0	0.00270
LA140	1.67E+00	0.0	0.0	0.00000	0.00029	0.00029	0.00215	0.0	0.00220
LA141	1.62E-01	0.0	0.0	0.00000	0.00000	0.00000	0.00002	0.0	0.00002
CE141	3.24E+01	3.05E-05	0.0	0.00000	0.00003	0.00003	0.00025	0.0	0.00025
LA142	6.39E-02	3.81E-33	0.0	0.00000	0.00000	0.00000	0.00001	0.0	0.00001
CE143	1.38E+00	2.96E-05	0.0	0.00000	0.00001	0.00001	0.00005	0.0	0.00005
PR143	1.37E+01	4.06E-05	0.0	0.00000	0.00004	0.00004	0.00029	0.0	0.00029
CE144	2.84E+02	3.06E-06	0.0	0.00000	0.00000	0.00000	0.00003	0.00520	0.00520
PR144	1.20E-02	0.0	0.0	0.00000	0.00000	0.00000	0.00003	0.0	0.00002
ND147	1.11E+01	3.34E-06	0.0	0.00000	0.00000	0.00000	0.00002	0.0	0.00002
ALL OTHERS		1.93E-01	0.0	0.00000	0.00000	0.00001	0.00004	0.0	0.00004
TOTAL (EXCEPT TRITIUM)		4.05E-01	0.0	0.00135	0.02207	0.02342	0.17342	0.06234	0.23000

TRITIUM RELEASE 43 CURIES PER YEAR

TABLE 2.3
5 of 5

HOPE CREEK GENERATING STATIO	BWR
THERMAL POWER LEVEL (MWT)	3440.0000
PLANT CAPACITY FACTOR	0.80
TOTAL STEAM FLOW (10**6 LBS/HR)	14.0000
MASS OF COOLANT IN REACTOR(M-LB)	0.6000
FISSION PRODUCT CARRY-OVER FRACTION	0.0010
HALOGEN CARRY-OVER FRACTION	0.0200
CLEAN-UP DEMIN FLOW(MIL-LBS/HR)	0.1200
COND DEMIN REGENERATION TIME(D)	42.0000
FRAC FEEDWATER THRU COND DEMIN	1.0000
RADWASTE DILUT FLOW (THOU GPM)	24.0000

CASE 4

LIQUID WASTE INPUTS

STREAM	FLOW RATE (GAL/DAY)	FRACTION OF PCA	FRACTION DISCHARGED	COLLECTION TIME (DAYS)	DECAY TIME (DAYS)	DECONTAMINATION FACTORS I	CS	OTHERS
HIGH PURITY WASTE	1.21E+05	0.090	0.0	0.146	0.177	1.00E+02	1.00E+01	1.00E+02
LOW PURITY WASTE	2.01E+04	0.0001	0.500	0.500	0.177	1.00E+02	2.00E+00	1.00E+02
CHEMICAL WASTES	5.04E+02	0.160	1.000	8.000	0.555	1.00E+02	1.00E+02	1.00E+02
REGENERANT SOLS	1.00E+04		0.0	0.167	0.433	1.00E+03	1.00E+04	1.00E+04

GASEOUS WASTE INPUTS

GLAND SEAL STEAM FLOW(THOU-LB/H)		0.0
MASS OF STEAM IN REACTOR(MI-LB)		0.0200
GLAND SEAL HOLD-UP TIME (HRS)		0.0
AIR-EJECTOR OFF-GAS HOLD-UP(HR)		0.5000
CONTAINMENT BLDG	IODINE RELEASE FRACTION	1.00000
	PARTICULATE RELEASE FRACTION	0.01000
TURBINE BUILDING	IODINE RELEASE FRACTION	0.10000
	PARTICULATE RELEASE FRACTION	0.01000
	RELEASE FRACT.-SPECIAL DES. FEATURES	0.20000
GLAND SEAL VENT IODINE PF		1.0000
AIR-EJECTOR OFF-GAS IODINE PF		0.1000
AUXILLARY BLDG	IODINE RELEASE FRACTION	0.10000
	PARTICULATE RELEASE FRACTION	0.01000
RADWASTE BLDG	IODINE RELEASE FRACTION	0.10000
	PARTICULATE RELEASE FRACTION	0.01000
THERE IS A CRYOGENIC DISTILLATION COLUMN		
IODINE AND XENON DECONTAMINATION FACTOR		10000.
KRYPTON DECONTAMINATION FACTOR		4000.
KRYPTON AND XENON HOLDUP TIME (DAYS)		90.

TABLE 2.4
1 of 5

HOPE CREEK GENERATING STATION

CASE 4

GASEOUS RELEASE RATE

(CURIES PER YEAR)

NUCLIDE	COOLANT CONC. (MICROCURIES/G)	CONTAINMENT BLDG.	TURBINE BLDG.	AUXILIARY BLDG.	RADWASTE BLDG.	GLAND SEAL	AIR EJECTOR	MECH VAC PUMP	TOTAL
KR-83M	1.100E-03	0.0	0.0	0.0	0.0	0.0	1.0E+01	0.0	1.0E+01
KR-85M	1.900E-03	3.0E+00	1.4E+01	3.0E+00	0.0	0.0	2.0E+01	0.0	4.0E+01
KR-85	6.000E-06	0.0	0.0	0.0	0.0	0.0	2.6E+02	0.0	2.6E+02
KR-87	6.600E-03	3.0E+00	2.6E+01	3.0E+00	0.0	0.0	5.6E+01	0.0	8.8E+01
KR-88	6.600E-03	3.0E+00	4.6E+01	3.0E+00	0.0	0.0	6.5E+01	0.0	1.2E+02
KR-89	4.100E-02	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XE-131M	4.700E-06	0.0	0.0	0.0	0.0	0.0	1.0E+00	0.0	1.0E+00
XE-133M	9.000E-05	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XE-133	2.600E-03	6.6E+01	5.0E+01	6.6E+01	1.0E+01	0.0	1.2E+01	2.3E+03	2.5E+03
XE-135M	8.400E-04	4.6E+01	1.3E+02	4.6E+01	0.0	0.0	0.0	0.0	2.2E+02
XE-135	7.200E-03	3.4E+01	1.3E+02	3.4E+01	4.5E+01	0.0	3.1E+01	3.5E+02	6.2E+02
XE-137	4.700E-02	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XE-138	2.800E-02	7.0E+00	2.9E+02	7.0E+00	0.0	0.0	3.7E+01	0.0	3.4E+02
TOTAL NOBLE GASES									4.2E+03
I-131	3.292E-03	1.7E-01	3.8E-03	1.7E-02	5.0E-03	0.0	2.6E-04	3.0E-02	2.3E-01
I-133	1.416E-02	6.8E-01	1.5E-02	6.8E-02	1.8E-02	0.0	2.1E-04	0.0	7.5E-01

TRITIUM GASEOUS RELEASE 43 CURIES/YR

0.0 APPEARING IN THE TABLE INDICATES RELEASE IS LESS THAN 1.0 CI/YR FOR NOBLE GAS, 0.0001 CI/YR FOR I

HOPE CREEK GENERATING STATION

CASE 4

AIRBORNE PARTICULATE RELEASE RATE

(CURIES PER YEAR)

NUCLIDE	CONTAINMENT BLDG.	TURBINE BLDG.	AUXILIARY BLDG.	RADWASTE BLDG.	MECH VAC. PUMP	TOTAL
CR-51	3.0E-06	2.6E-05	3.0E-06	9.0E-05	0.0	1.2E-04
MN-54	3.0E-05	1.2E-06	3.0E-05	3.0E-04	0.0	3.6E-04
FE-59	4.0E-06	1.0E-06	4.0E-06	1.5E-04	0.0	1.6E-04
CO-58	6.0E-06	1.2E-06	6.0E-06	4.5E-05	0.0	5.8E-05
CO-60	1.0E-04	4.0E-06	1.0E-04	9.0E-04	0.0	1.1E-03
ZN-65	2.0E-05	4.0E-07	2.0E-05	1.5E-05	0.0	5.5E-05
SR-89	9.0E-07	1.2E-05	9.0E-07	4.5E-06	0.0	1.8E-05
SR-90	5.0E-08	4.0E-08	5.0E-08	3.0E-06	0.0	3.1E-06
ZR-95	4.0E-06	2.0E-07	4.0E-06	5.0E-07	0.0	8.7E-06
SB-124	2.0E-06	6.0E-07	2.0E-06	5.0E-07	0.0	5.1E-06
CS-134	4.0E-05	6.0E-07	4.0E-05	4.5E-05	3.0E-06	1.3E-04
CS-136	3.0E-06	1.0E-07	3.0E-06	4.5E-06	2.0E-06	1.3E-05
CS-137	5.5E-05	1.2E-06	5.5E-05	9.0E-05	1.0E-05	2.1E-04
BA-140	4.0E-06	2.2E-05	4.0E-06	1.0E-06	1.1E-05	4.2E-05
CE-141	1.0E-06	1.2E-06	1.0E-06	2.6E-05	0.0	2.9E-05

TABLE 2.4
3 of 5

HOPE CREEK GENERATING STATIO LIQUID EFFLUENTS

CASE

NUCLIDE	HALF-LIFE (DAYS)	CONCENTRATION IN PRIMARY COOLANT (MICRO CI/ML)	ANNUAL RELEASES TO DISCHARGE C... HIGH PURITY (CURIES)	LOW PURITY (CURIES)	CHEMICAL (CURIES)	TOTAL LWS (CURIES)	ADJUSTED TOTAL (CI/YR)	DETERGENT WASTES (CI/YR)	TOTAL (CI/YR)
CORROSION AND ACTIVATION PRODUCTS									
NA 24	6.25E-01	8.57E-03	0.0	0.00008	0.00058	0.00066	0.00486	0.0	0.00490
P 32	1.43E+01	2.03E-04	0.0	0.00000	0.00018	0.00019	0.00137	0.0	0.00140
CR 51	2.78E+01	5.08E-03	0.0	0.00007	0.00507	0.00514	0.03803	0.0	0.03800
MN 54	3.03E+02	6.11E-05	0.0	0.00000	0.00007	0.00007	0.00051	0.00100	0.00150
MN 56	1.07E-01	4.05E-02	0.0	0.00005	0.00002	0.00008	0.00058	0.0	0.00058
FE 55	9.50E+02	1.02E-03	0.0	0.00001	0.00113	0.00115	0.00848	0.0	0.00850
FE 59	4.50E+01	3.05E-05	0.0	0.00000	0.00003	0.00003	0.00024	0.0	0.00024
CO 58	7.13E+01	2.04E-04	0.0	0.00000	0.00022	0.00022	0.00163	0.00400	0.00560
CO 60	1.92E+03	4.07E-04	0.0	0.00001	0.00045	0.00046	0.00340	0.00870	0.01200
CU 64	5.33E-01	2.83E-02	0.0	0.00023	0.00147	0.00170	0.01261	0.0	0.01300
ZN 65	2.45E+02	2.04E-04	0.0	0.00000	0.00022	0.00023	0.00168	0.0	0.00170
ZN 69M	5.75E-01	1.89E-03	0.0	0.00002	0.00011	0.00013	0.00095	0.0	0.00095
ZN 69	3.96E-02	0.0	0.0	0.00002	0.00012	0.00014	0.00102	0.0	0.00100
W187	9.96E-01	2.92E-04	0.0	0.00000	0.00004	0.00004	0.00032	0.0	0.00032
NP239	2.35E+00	6.99E-03	0.0	0.00009	0.00254	0.00262	0.01942	0.0	0.01900
FISSION PRODUCTS									
BR 83	1.00E-01	2.26E-03	0.0	0.00000	0.00000	0.00000	0.00003	0.0	0.00003
SR 89	5.20E+01	1.02E-04	0.0	0.00000	0.00011	0.00011	0.00081	0.0	0.00081
SR 90	1.03E+04	6.11E-06	0.0	0.00000	0.00001	0.00001	0.00005	0.0	0.00005
Y 90	2.67E+00	0.0	0.0	0.00000	0.00000	0.00000	0.00003	0.0	0.00003
SR 91	4.03E-01	3.70E-03	0.0	0.00003	0.00012	0.00014	0.00104	0.0	0.00100
Y 91M	3.47E-02	0.0	0.0	0.00002	0.00007	0.00009	0.00067	0.0	0.00067
Y 91	5.88E+01	4.07E-05	0.0	0.00000	0.00007	0.00007	0.00052	0.0	0.00052
SR 92	1.13E-01	8.14E-03	0.0	0.00001	0.00001	0.00002	0.00013	0.0	0.00013
Y 92	1.47E-01	5.03E-03	0.0	0.00003	0.00005	0.00008	0.00062	0.0	0.00062
Y 93	4.25E-01	3.71E-03	0.0	0.00003	0.00013	0.00015	0.00114	0.0	0.00110
ZR 95	6.50E+01	7.13E-06	0.0	0.00000	0.00001	0.00001	0.00006	0.0	0.00006
NB 95	3.50E+01	7.12E-06	0.0	0.00000	0.00001	0.00001	0.00006	0.0	0.00006
MO 99	2.79E+00	2.00E-03	0.0	0.00003	0.00084	0.00087	0.00644	0.0	0.00640
TC 99M	2.50E-01	1.77E-02	0.0	0.00010	0.00098	0.00108	0.00798	0.0	0.00800
RU103	3.96E+01	2.03E-05	0.0	0.00000	0.00002	0.00002	0.00016	0.00014	0.00030
RH103M	3.96E-02	0.0	0.0	0.00000	0.00002	0.00002	0.00016	0.0	0.00016
RU105	1.85E-01	1.72E-03	0.0	0.00001	0.00001	0.00001	0.00010	0.0	0.00010
RH105M	5.21E-04	0.0	0.0	0.00001	0.00001	0.00001	0.00010	0.0	0.00010
RH105	1.50E+00	0.0	0.0	0.00000	0.00005	0.00005	0.00040	0.0	0.00040
RU106	3.67E+02	3.06E-06	0.0	0.00000	0.00000	0.00000	0.00003	0.00240	0.00240
RH106	3.47E-04	0.0	0.0	0.00000	0.00000	0.00000	0.00003	0.0	0.00002
TE129M	3.40E+01	4.07E-05	0.0	0.00000	0.00004	0.00004	0.00031	0.0	0.00031
TE129	4.79E-02	0.0	0.0	0.00000	0.00003	0.00003	0.00020	0.0	0.00020
TE131M	1.25E+00	9.82E-05	0.0	0.00000	0.00002	0.00002	0.00014	0.0	0.00014
TE131	1.74E-02	0.0	0.0	0.00000	0.00000	0.00000	0.00003	0.0	0.00003
I131	8.05E+00	5.04E-03	0.0	0.00007	0.00388	0.00395	0.02923	0.00006	0.02900
TE132	3.25E+00	1.00E-05	0.0	0.00000	0.00000	0.00000	0.00004	0.0	0.00004
I132	9.58E-02	2.25E-02	0.0	0.00002	0.00001	0.00004	0.00027	0.0	0.00027
I133	8.75E-01	1.87E-02	0.0	0.00019	0.00212	0.00231	0.01708	0.0	0.01700
I134	3.67E-02	4.84E-02	0.0	0.00000	0.00000	0.00000	0.00002	0.0	0.00002
CS134	7.49E+02	3.06E-05	0.0	0.00002	0.00003	0.00006	0.00041	0.01300	0.01300
I135	2.79E-01	1.69E-02	0.0	0.00009	0.00024	0.00032	0.00241	0.0	0.00240
CS136	1.30E+01	2.02E-05	0.0	0.00001	0.00002	0.00003	0.00023	0.0	0.00023
CS137	1.10E+04	7.13E-05	0.0	0.00005	0.00008	0.00013	0.00095	0.02400	0.02500

TABLE 2.4

HOPE CREEK GENERATING STATIO LIQUID EFFLUENTS (CONTINUED)

CASE 4

UCLIDE	HALF-LIFE (DAYS)	CONCENTRATION IN PRIMARY COOLANT (MICRO CI/ML)	ANNUAL RELEASES TO DISCHARGE CANAL HIGH PURITY (CURIES)	LOW PURITY (CURIES)	CHEMICAL (CURIES)	TOTAL (CURIES)	ADJUSTED TOTAL (CI/YR)	DETERGENT WASTES (CI/YR)	TOTAL (CI/YR)
A137M	1.77E-03	0.0	0.0	0.00005	0.00007	0.00012	0.00089	0.0	0.00089
A139	5.76E-02	7.55E-03	0.0	0.00000	0.00000	0.00000	0.00002	0.0	0.00002
A140	1.28E+01	4.06E-04	0.0	0.00001	0.00036	0.00036	0.00268	0.0	0.00270
A140	1.67E+00	0.0	0.0	0.00030	0.00029	0.00029	0.00215	0.0	0.00220
A141	1.62E-01	0.0	0.0	0.00000	0.00000	0.00000	0.00002	0.0	0.00002
E141	3.24E+01	3.05E-05	0.0	0.00000	0.00003	0.00003	0.00025	0.0	0.00025
A142	6.39E-02	3.81E-03	0.0	0.00000	0.00000	0.00000	0.00001	0.0	0.00001
E143	1.38E+00	2.96E-05	0.0	0.00000	0.00001	0.00001	0.00005	0.0	0.00005
R143	1.37E+01	4.06E-05	0.0	0.00000	0.00004	0.00004	0.00029	0.0	0.00029
E144	2.84E+02	3.06E-06	0.0	0.00000	0.00000	0.00000	0.00003	0.00520	0.00520
R144	1.20E-02	0.0	0.0	0.00000	0.00000	0.00000	0.00003	0.0	0.00002
D147	1.11E+01	3.04E-06	0.0	0.00000	0.00000	0.00000	0.00002	0.0	0.00002
LL OTHERS		1.43E-01	0.0	0.00000	0.00000	0.00001	0.00004	0.0	0.00004
OTAL (EXCEPT TRITIUM)		4.05E-01	0.0	0.00135	0.02207	0.02342	0.17342	0.06234	0.23000

TRITIUM RELEASE 43 CURIES PER YEAR

Item 3

Meteorology/hydrology - consistent with methodology in Regulatory Guide 1.111 and 1.113 (Draft Regulatory Guides 1.DD and 1.EE).

Response

The meteorological and hydrological models used in this evaluation differ somewhat from those recommended by Regulatory Guide (R.G.) 1.111 and 1.113.

An explanation of the methodology used in developing X/Q's and D/Q's was provided in response to questions in the Enclosure 2 submittal (NRC February 19 letter). Furthermore, it is stated in Section C of R.G. 1.111 "Models proposed by the applicant and accepted by the NRC Staff will be used by the staff in determining Environmental Technical Specifications."

The hydrology model was based upon Regulatory Guide 1.EE since Regulatory Guide 1.113 was not available at the time calculations were performed.

Item 4

Dose calculations consistent with methodology in Regulatory Guide 1.109 (Draft Regulatory Guide 1.AA.

Response

A minor variation of the GASPAR dose code, as explained below, was used to calculate doses from gaseous effluents. Calculational models used to calculate doses from gaseous effluents conforms to those referenced in Regulatory Guide 1.109. Site specific data was used as recommended by the guide. To obtain more realistic doses, noble gases were corrected for decay during transit. Each isotope's respective half life was used instead of applying a single conservative half life. For the vegetation pathway, 54 days was used for the average decay time after harvest. The source terms for the dose calculations were generated by the GALE code.

In order to demonstrate the impact of the entire station the computer printout sheets are based upon a two unit site. This was done by simply using the multiplier factor of two which is provided as part of the GALE code. Any value produced in the computer printout sheets is actually based upon the source term which would be produced by two units. However any value referenced in this report, other than the computer printout sheets, was adjusted to reflect a single unit contribution to the radiation dose in the environs.

RESULTS OF THE COMPUTER CALCULATIONS

I. Liquid Effluents - Aquatic Dose

The total body dose to an individual was calculated to be 5.35E-2[(1)] mrem/yr to an adult (The adult is the critical age group for liquid effluents). This value is well below the 10CFR50'limit'of 3 mrem/year/unit to the total body of any individual. Contributions to the dose from fish, invertebrate ingestion, shoreline buildup, swimming and boating were included in the calculations. The relative contributions of the different pathways are tabulated and presented in this report. The two units shall share common discharge pipes. The dilution flow of 24,000 GPM is a minimun value which is independent of the number of units in operation. Since the computer printout sheets are based upon a two unit site, it is necessary to divide the values presented in the computer printout sheets by a factor of two to reflect a single unit contribution to the radiation dose in the environs.

The maximun organ dose is calculated to be 4.35E-1[(1)] mrem/year to the bones of an adult. The calculated dose is well below the 10 mrem/year/reactor to any organ specified in Appendix I to 10CFR50.

II. Gaseous Effluents - Air Dose

The air dose calculated at the nearest land site boundary of 800 meters North of the Hope Creek Unit No. 2 Reactor Building is 9.30E-1 mrad/year/reactor (gamma rays) and 6.25E-1 mrad/year/reactor (beta rays). These values are well below the respective Appendix I limits of 10mrad/year/reactor (gamma rays) and 20 mrad/yr/reactor (beta rays). Doses indicated in the computer printouts should be divided by two to relect a single unit source term.

1. See table 4.9e

Gaseous Effluents - Individual

In calculating the maximum expected exposures to an individual both nearby residences and nearby dairy farms were considered.

Table 4.1 is a tabulation of the total body exposures to different age group categories at the two locations.

Table 4.2 is a tabulation of the total body exposures to different age group categories at the closest dairy farm located within five miles of the site.

The maximum calculated total body dose to an individual is 3.71E-2 mrem/year/reactor to a child at the residence 3.5 miles ENE of the site. This is well below the 5 mrem/year/reactor total body dose in Appendix I.

Table 4.3 and 4.4 present similar tabulations for the skin dose at the locations of nearby residences and dairy farms, respectively. The maximum calculated skin dose to an individual is 5.74E-2 mrem/year/reactor to a child at the residence 3.5 miles ENE of the site. This is well below the 15 mrem/year/reactor skin dose in Appendix I.

Iodine and Particulates - Individual

If it is conservatively assumed that the calculated doses to an individual (any organ) are only due to iodines and particulates, then the computer dose tabulations at the nearby residences and dairy farms may be referred to in order to demonstrate compliance with the 15 mrem/year/reactor limit of Appendix I.

Based on the tabulation of doses to the various organs, the thyroid is the most critical. Tables 4.5 and 4.6 tabulates the thyroid exposures at the nearby residences and dairy farms, respectively. As tabulated in these tables, the maximum thyroid dose is 1.67E-1 mrem/year/reactor (at dairy farm 4.8 miles NNE) to an infant. This is well below the 15 mrem/year/reactor value set forth in Appendix I.

TABLE 4.1

Total Body DOSE(mrem/yr/unit) at Nearby Residences

LOCATION: 3.5 miles ENE

	ADULT	TEENAGER	CHILD	INFANT
PLUME	2.13E-2	2.13E-2	2.13E-2	2.13E-2
GROUND	5.05E-4	5.05E-4	5.05E-4	5.05E-4
VEGETABLES	2.24E-3	3.28E-3	7.75E-3	(b)
MEAT	1.21E-3	9.30E-4	1.75E-3	(b)
MILK(cow)	1.44E-3	2.39E-3	5.75E-3	1.21E-2
MILK(goat)	a	a	a	a
INHALATION	9.35E-5	5.85E-5	6.60E-5	7.70E-5
TOTAL	2.68E-2	2.85E-2	3.71E-2	3.40E-2

a) No goat milk at this location
b) Not considered a feasible pathway for this age catagory

TABLE 4.2

Total Body DOSE(mrem/yr/unit) at Nearby Dairy Farms

LOCATION: 4.8 miles NNE

	ADULT	TEENAGER	CHILD	INFANT
PLUME	9.30E-3	9.30E-3	9.30E-3	9.30E-3
GROUND	2.78E-4	2.78E-4	2.78E-4	2.78E-4
VEGETABLES	1.15E-3	.169E-3	3.98E-3	(b)
MEAT	6.15E-4	4.78E-4	8.95E-4	(b)
MILK(cow)	7.40E-4	1.23E-3	2.96E-3	6.20E-3
MILK(goat)	(a)	(a)	(a)	(a)
INHALATION	4.82E-5	3.02E-5	3.41E-5	3.97E-5
TOTAL	1.21E-2	1.30E-2	1.74E-2	1.58E-2

LOCATION: 5.0 miles W

	ADULT	TEENAGER	CHILD	INFANT
PLUME	7.10E-3	7.10E-3	7.10E-3	7.10E-3
GROUND	1.55E-4	1.55E-4	1.55E-4	1.55E-4
VEGETABLES	9.30E-4	1.37E-3	3.24E-3	(b)
MEAT	5.05E-4	3.91E-4	7.30E-4	(b)
MILK (cow)	5.95E-4	9.90E-4	2.39E-3	5.00E-3
MILK (goat)	(a)	(a)	(a)	(a)
INHALATION	3.88E-5	2.42E-5	2.71E-5	3.14E-5
TOTAL	9.32E-3	1.00E-2	1.36E-2	1.23E-2

a) No milk animals of this type at this location
b) Not considered a feasible pathway for this age catagory

TABLE 4.3

Skin DOSE(mrem/yr/unit) at Nearby Residence

LOCATION: 3.50 miles ENE

	ADULT	TEENAGER	CHILD	INFANT
PLUME	4.20E-2	4.20E-2	4.20E-2	4.20E-2
GROUND	5.90E-4	5.90E-4	5.90E-4	5.90E-4
VEGETABLES	2.14E-3	3.18E-3	7.60E-4	(b)
MEAT	1.20E-3	9.25E-4	1.74E-3	(b)
MILK(cow)	1.35E-3	2.25E-3	5.50E-3	1.16E-2
MILK(goat)	(a)	(a)	(a)	(a)
INHALATION	7.65E-5	4.23E-5	4.29E-5	4.56E-5
TOTAL	4.73E-2	4.89E-2	5.74E-2	5.42E-2

a) No milk animals of this type at this location
b) Not considered a feasible pathway for this age catagory

TABLE 4.4

Skin DOSE(mrem/yr/unit) at Nearby Dairy Farms

LOCATION: 4.8 miles NNE

	ADULT	TEENAGER	CHILD	INFANT
PLUME	1.86E-2	1.86E-2	1.86E-2	1.86E-2
GROUND	3.28E-4	3.28E-4	3.28E-4	3.28E-4
VEGETABLES	1.10E-4	1.63E-3	3.90E-3	(b)
MEAT	6.15E-4	4.75E-4	8.90E-4	(b)
MILK(cow)	6.90E-4	1.16E-3	2.81E-3	5.95E-3
MILK(goat)	(a)	(a)	(a)	(a)
INHALATION	3.92E-5	2.17E-5	2.20E-5	2.34E-5
TOTAL	2.14E-2	2.22E-2	2.65E-2	2.49E-2

LOCATION: 5.0 miles W

	ADULT	TEENAGER	CHILD	INFANT
PLUME	1.43E-2	1.43E-2	1.43E-2	1.43E-2
GROUND	1.82E-4	1.82E-4	1.82E-4	1.82E-4
VEGETABLES	8.95E-4	1.33E-3	3.19E-3	(b)
MEAT	5.00E-4	3.89E-4	7.30E-4	(b)
MILK (cow)	5.65E-4	9.45E-4	2.31E-3	4.87E-3
MILK (goat)	(a)	(a)	(a)	(a)
INHALATION	3.21E-5	1.78E-5	1.80E-5	1.92E-5
TOTAL	1.64E-2	1.71E-2	2.07E-2	1.93E-2

a) No milk animals of this type at this location
b) Not considered a feasible pathway for this age catagory

TABLE 4.5

Thyroid DOSE(mrem/yr/unit) at Nearest Residence

LOCATION: 3.5 miles ENE

	ADULT	TEENAGER	CHILD	INFANT
PLUME	2.13E-2	2.13E-2	2.13E-2	2.13E-2
GROUND	5.05E-4	5.05E-4	5.05E-4	5.05E-4
VEGETABLES	2.67E-2	2.28E-2	3.78E-2	(b)
MEAT	2.43E-3	1.78E-3	3.02E-3	(b)
MILK(cow)	3.65E-2	5.05E-2	1.11E-1	2.66E-1
MILK(goat)	(a)	(a)	(a)	(a)
INHALATION	1.03E-2	8.80E-3	1.22E-2	2.09E-2
TOTAL	9.76E-2	1.10E-1	1.85E-1	3.08E-1

a) No milk animals of this type at this location
b) Not considered a feasible pathway for this age catagory

TABLE 4.6

Thyroid DOSE(mrem/yr/unit) at Nearby Dairy Farms

LOCATION: 4.8 miles NNE

	ADULT	TEENAGER	CHILD	INFANT
PLUME	9.30E-3	9.30E-3	9.30E-3	9.30E-3
GROUND	2.78E-4	2.78E-4	2.78E-4	2.78E-4
VEGETABLES	1.47E-2	1.25E-2	2.06E-2	(b)
MEAT	1.30E-2	9.45E-4	1.60E-3	(b)
MILK(cow)	2.01E-2	3.04E-2	6.10E-2	1.47E-1
MILK(goat)	(a)	(a)	(a)	(a)
INHALATION	5.35E-3	4.61E-3	6.35E-3	1.09E-2
TOTAL	5.10E-2	5.80E-2	9.91E-2	1.67E-1

LOCATION: 5.0 miles W

	ADULT	TEENAGER	CHILD	INFANT
PLUME	7.10E-3	7.10E-3	1.10E-3	7.10E-3
GROUND	1.55E-4	1.55E-4	1.55E-4	1.55E-4
VEGETABLES	8.45E-3	7.35E-3	1.25E-2	(b)
MEAT	8.80E-4	6.50E-4	1.13E-3	(b)
MILK (cow)	1.14E-2	1.72E-2	3.47E-2	8.30E-2
MILK (goat)	(a)	(a)	(a)	(a)
INHALATION	4.03E-3	3.47E-3	4.79E-3	8.20E-3
TOTAL	3.20E-2	3.59E-2	6.03E-2	9.85E-2

a) No milk animals of this type at this location
b) Not considered a feasible pathway for this age catagory

POPULATION AND INDIVIDUAL DOSE CALCULATIONS FOR HOPE CREEK GENERATING STATION

JC= 0 1 0 0 0 0 0 0 0 0
FV=0.50 FP=0.66 FG=0.50 FPF=0.33 HUMIDITY=8.00
HCGS TWO UNIT SOURCE TERM GALE RUN 7 (NO,NO,NO)
UML = 2.00E+00 JC1 = 0 JC2 = 0

NUCLIDE	CI/YR
36KR 83M	2.00E+01
36KR 85M	1.88E+02
36KR 85	5.20E+02
36KR 87	3.80E+02
36KR 88	6.00E+02
54XE131M	2.00E+00
54XE133	5.40E+03
54XE133M	1.48E+03
54XE135	2.20E+03
54XE138	3.00E+03
53I 131	8.20E-01
53I 133	3.00E+00
6C 14	1.90E+01
18AR 41	5.00E+01
1H 3	8.60E+01
24CR 51	2.60E-02
25MN 54	1.92E-03
26FE 59	1.32E-03
27CO 58	1.32E-03
27CO 60	6.20E-03
30ZN 65	5.00E-04
38SR 89	1.20E-02
38SR 90	4.60E-05
40ZR 95	2.20E-04
51SB124	6.00E-04
55CS134	8.60E-04
55CS136	1.24E-04
55CS137	1.62E-03
56BA140	2.20E-02
58CE141	1.20E-03

30 6.97442969E+03

GASPAR

CASE 1

POPULATION AND INDIVIDUAL DOSE CALCULATIONS FOR HOPE CREEK GENERATING STATION
SPECIAL LOCATION # 1 DAIRY FARM #1
AT 4.80 MILES 2

ANNUAL BETA AIR DOSE = 2.19E-02 MILLRADS
ANNUAL GAMMA AIR DOSE = 2.80E-02 MILLRADS

PATHWAY	T.BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
PLUME	1.86E-02	1.86E-02	1.86E-02	1.86E-02	1.86E-02	1.86E-02	1.88E-02	3.72E-02
GROUND	5.56E-04	5.56E-04	5.56E-04	5.56E-04	5.56E-04	5.56E-04	5.56E-04	6.55E-04
VEGET								
ADULT	2.30E-03	2.32E-03	1.06E-02	2.33E-03	2.36E-03	2.93E-02	2.20E-03	2.19E-03
TEEN	3.37E-03	3.37E-03	3.70E-03	3.41E-03	2.64E-03	2.49E-02	3.20E-03	3.25E-03
CHILD	7.96E-03	7.88E-03	8.85E-03	8.03E-03	2.13E-03	4.12E-02	7.80E-03	7.79E-03
MEAT								
ADULT	1.23E-03	1.25E-03	5.96E-03	1.24E-03	1.23E-03	2.59E-03	1.23E-03	1.23E-03
TEEN	9.56E-04	9.60E-04	9.43E-04	9.59E-04	7.30E-04	1.89E-03	9.51E-04	9.50E-04
CHILD	1.79E-03	1.79E-03	1.78E-03	1.79E-03	4.60E-04	3.20E-03	1.78E-03	1.78E-03
COW MILK								
ADULT	1.48E-03	1.43E-03	6.62E-03	1.55E-03	1.60E-03	4.02E-02	1.38E-03	1.38E-03
TEEN	2.46E-03	2.36E-03	2.45E-03	2.59E-03	2.07E-03	6.08E-02	2.32E-03	2.31E-03
CHILD	5.92E-03	5.67E-03	6.04E-03	6.11E-03	1.71E-03	1.22E-01	5.64E-03	5.62E-03
INFANT	1.24E-02	1.19E-02	1.28E-02	1.31E-02	1.71E-03	2.93E-01	1.19E-02	1.19E-02
GOATMILK								
ADULT	1.85E-03	1.61E-03	7.00E-03	2.10E-03	2.28E-03	1.42E-01	1.48E-03	1.46E-03
TEEN	2.97E-03	2.58E-03	3.12E-03	3.48E-03	2.94E-03	2.15E-01	2.43E-03	2.39E-03
CHILD	6.84E-03	5.91E-03	7.64E-03	7.63E-03	2.43E-03	4.29E-01	5.82E-03	5.76E-03
INFANT	1.40E-02	1.23E-02	1.62E-02	1.66E-02	2.43E-03	1.03E+00	1.22E-02	1.21E-02
INHAL								
ADULT	9.64E-05	9.98E-05	2.97E-05	1.32E-04	1.52E-04	1.07E-02	1.05E-04	7.84E-05
TEEN	6.04E-05	5.88E-05	2.64E-05	9.17E-05	1.06E-04	9.21E-03	7.18E-05	4.33E-05
CHILD	6.82E-05	5.33E-05	4.10E-05	9.39E-05	5.63E-05	1.27E-02	7.09E-05	4.39E-05
INFANT	7.93E-05	5.39E-05	6.08E-05	1.30E-04	3.96E-05	2.18E-02	9.17E-05	4.67E-05

POPULAT[illegible] AND INDIVIDUAL DOSE CALCULATIONS FOR HOPE CREEK GEN[illegible]TING STATION
SPECIAL LOCATION # 2 DAIRY FARM #2
AT 5.00 MILES 13

ANNUAL BETA AIR DOSE = 1.72E-02 MILLRADS
ANNUAL GAMMA AIR DOSE = 2.14E-02 MILLRADS

PATHWAY	T.BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
PLUME	1.42E-02	1.42E-02	1.42E-02	1.42E-02	1.42E-02	1.42E-02	1.44E-02	2.85E-02
GROUND	3.09E-04	3.09E-04	3.09E-04	3.09E-04	3.09E-04	3.09E-04	3.09E-04	3.64E-04
VEGET								
ADULT	1.86E-03	1.87E-03	8.57E-03	1.87E-03	1.89E-03	1.69E-02	1.80E-03	1.79E-03
TEEN	2.73E-03	2.73E-03	2.88E-03	2.75E-03	2.13E-03	1.47E-02	2.67E-03	2.66E-03
CHILD	6.48E-03	6.43E-03	6.92E-03	6.51E-03	1.72E-03	2.50E-02	6.39E-03	6.38E-03
MEAT								
ADULT	1.01E-03	1.02E-03	4.88E-03	1.01E-03	1.01E-03	1.76E-03	1.00E-03	1.00E-03
TEEN	7.81E-04	7.84E-04	7.71E-04	7.83E-04	5.96E-04	1.30E-03	7.79E-04	7.78E-04
CHILD	1.46E-03	1.46E-03	1.45E-03	1.47E-03	3.76E-04	2.25E-03	1.46E-03	1.46E-03
COW MILK								
ADULT	1.19E-03	1.16E-03	5.39E-03	1.22E-03	1.25E-03	2.27E-02	1.13E-03	1.13E-03
TEEN	1.98E-03	1.92E-03	1.95E-03	2.05E-03	1.62E-03	3.44E-02	1.89E-03	1.89E-03
CHILD	4.77E-03	4.63E-03	4.81E-03	4.88E-03	1.34E-03	6.93E-02	4.62E-03	4.61E-03
INFANT	1.00E-02	9.77E-03	1.02E-02	1.04E-02	1.34E-03	1.66E-01	9.76E-03	9.74E-03
GOATMILK								
ADULT	1.41E-03	1.28E-03	5.60E-03	1.55E-03	1.65E-03	7.96E-02	1.21E-03	1.20E-03
TEEN	2.28E-03	2.06E-03	2.32E-03	2.56E-03	2.13E-03	1.20E-01	1.98E-03	1.96E-03
CHILD	5.32E-03	4.80E-03	5.70E-03	5.76E-03	1.76E-03	2.40E-01	4.75E-03	4.72E-03
INFANT	1.10E-02	1.00E-02	1.21E-02	1.24E-02	1.76E-03	5.77E-01	9.99E-03	9.91E-03
INHAL								
ADULT	7.76E-05	7.97E-05	2.17E-05	1.02E-04	1.20E-04	8.05E-03	7.92E-05	6.42E-05
TEEN	4.83E-05	4.68E-05	1.97E-05	7.02E-05	8.35E-05	6.93E-03	5.13E-05	3.55E-05
CHILD	5.42E-05	4.29E-05	3.06E-05	7.27E-05	4.42E-05	9.58E-03	5.10E-05	3.60E-05
INFANT	6.28E-05	4.36E-05	4.54E-05	9.99E-05	3.11E-05	1.64E-02	6.33E-05	3.83E-05

POPULATION AND INDIVIDUAL DOSE CALCULATIONS FOR HOPE CREEK GE[illegible]TING STATION
SPECIAL LOCATION # 3 VEG PLOT #1
AT 4.40 MILES 16

ANNUAL BETA AIR DOSE = 3.72E-02 MILLRADS
ANNUAL GAMMA AIR DOSE = 4.85E-02 MILLRADS

PATHWAY	T.BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
PLUME	3.22E-02	3.22E-02	3.22E-02	3.22E-02	3.22E-02	3.22E-02	3.26E-02	6.40E-02
GROUND	9.07E-04	9.07E-04	9.07E-04	9.07E-04	9.07E-04	9.07E-04	9.07E-04	1.07E-03
VEGET								
ADULT	3.78E-03	3.81E-03	1.74E-02	3.83E-03	3.87E-03	4.78E-02	3.61E-03	3.60E-03
TEEN	5.54E-03	5.54E-03	6.08E-03	5.61E-03	4.34E-03	4.07E-02	5.36E-03	5.35E-03
CHILD	1.31E-02	1.30E-02	1.45E-02	1.32E-02	3.50E-03	6.72E-02	1.28E-02	1.28E-02
MEAT								
ADULT	2.03E-03	2.05E-03	9.80E-03	2.03E-03	2.03E-03	4.24E-03	2.02E-03	2.01E-03
TEEN	1.57E-03	1.58E-03	1.55E-03	1.58E-03	1.20E-03	3.09E-03	1.56E-03	1.56E-03
CHILD	2.94E-03	2.94E-03	2.93E-03	2.95E-03	7.57E-04	5.24E-03	2.93E-03	2.93E-03
COW MILK								
ADULT	2.43E-03	2.34E-03	1.09E-02	2.54E-03	2.63E-03	6.55E-02	2.27E-03	2.27E-03
TEEN	4.04E-03	3.89E-03	4.03E-03	4.25E-03	3.40E-03	9.92E-02	3.81E-03	3.79E-03
CHILD	9.73E-03	9.32E-03	9.92E-03	1.06E-02	2.80E-03	1.99E-01	9.27E-03	9.25E-03
INFANT	2.04E-02	1.96E-02	2.11E-02	2.15E-02	2.80E-03	4.77E-01	1.96E-02	1.96E-02
GOATMILK								
ADULT	3.04E-03	2.64E-03	1.15E-02	3.44E-03	3.74E-03	2.32E-01	2.44E-03	2.40E-03
TEEN	4.87E-03	4.24E-03	5.12E-03	5.70E-03	4.83E-03	3.51E-01	4.00E-03	3.93E-03
CHILD	1.12E-02	9.72E-03	1.25E-02	1.25E-02	3.98E-03	6.99E-01	9.57E-03	9.46E-03
INFANT	2.31E-02	2.02E-02	2.65E-02	2.72E-02	3.98E-03	1.68E+00	2.01E-02	1.99E-02
INHAL								
ADULT	1.58E-04	1.64E-04	4.87E-05	2.17E-04	2.50E-04	1.76E-02	1.73E-04	1.29E-04
TEEN	9.92E-05	9.66E-05	4.33E-05	1.50E-04	1.75E-04	1.51E-02	1.18E-04	7.12E-05
CHILD	1.12E-04	8.76E-05	6.72E-05	1.54E-04	9.24E-05	2.09E-02	1.16E-04	7.22E-05
INFANT	1.30E-04	8.86E-05	9.97E-05	2.13E-04	6.50E-05	3.58E-02	1.50E-04	7.68E-05

POPULATION AND INDIVIDUAL DOSE CALCULATIONS FOR HOPE CREEK GENERATING STATION
SPECIAL LOCATION # 4 HC FENCE POST
AT 0.50 MILES 1

ANNUAL BETA AIR DOSE = 1.25E+00 MILLRADS
ANNUAL GAMMA AIR DOSE = 1.86E+00 MILLRADS

PATHWAY	T.BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
PLUME	1.24E+00	1.24E+00	1.24E+00	1.24E+00	1.24E+00	1.24E+00	1.25E+00	2.38E+00
GROUND	4.13E-02	4.13E-02	4.13E-02	4.13E-02	4.13E-02	4.13E-02	4.13E-02	4.86E-02
VEGET								
ADULT	9.96E-02	1.01E-01	4.54E-01	1.02E-01	1.04E-01	2.11E+00	9.18E-02	9.13E-02
TEEN	1.44E-01	1.44E-01	1.74E-01	1.48E-01	1.14E-01	1.75E+00	1.36E-01	1.36E-01
CHILD	3.38E-01	3.32E-01	4.10E-01	3.43E-01	9.14E-02	2.80E+00	3.26E-01	3.25E-01
MEAT								
ADULT	5.18E-02	5.26E-02	2.49E-01	5.20E-02	5.18E-02	1.52E-01	5.12E-02	5.11E-02
TEEN	4.00E-02	4.04E-02	3.96E-02	4.03E-02	3.06E-02	1.09E-01	3.97E-02	3.96E-02
CHILD	7.49E-02	7.48E-02	7.48E-02	7.52E-02	1.93E-02	1.79E-01	7.44E-02	7.44E-02
COW MILK								
ADULT	6.50E-02	6.10E-02	2.80E-01	6.99E-02	7.42E-02	2.94E+00	5.79E-02	5.75E-02
TEEN	1.08E-01	1.00E-01	1.13E-01	1.17E-01	9.57E-02	4.44E+00	9.69E-02	9.62E-02
CHILD	2.56E-01	2.38E-01	2.70E-01	2.71E-01	7.90E-02	8.87E+00	2.36E-01	2.35E-01
INFANT	5.36E-01	5.00E-01	5.72E-01	5.83E-01	7.90E-02	2.13E+01	4.99E-01	4.96E-01
GOATMILK								
ADULT	9.00E-02	7.20E-02	3.09E-01	1.08E-01	1.22E-01	1.05E+01	6.25E-02	6.09E-02
TEEN	1.43E-01	1.14E-01	1.59E-01	1.80E-01	1.57E-01	1.59E+01	1.03E-01	9.97E-02
CHILD	3.20E-01	2.52E-01	3.88E-01	3.79E-01	1.30E-01	3.16E+01	2.45E-01	2.40E-01
INFANT	6.49E-01	5.17E-01	8.21E-01	8.40E-01	1.30E-01	7.63E+01	5.16E-01	5.04E-01
INHAL								
ADULT	4.18E-03	4.43E-03	1.56E-03	6.24E-03	6.97E-03	5.36E-01	5.26E-03	3.27E-03
TEEN	2.67E-03	2.62E-03	1.34E-03	4.42E-03	4.87E-03	4.61E-01	3.92E-03	1.81E-03
CHILD	3.05E-03	2.32E-03	2.07E-03	4.45E-03	2.58E-03	6.38E-01	3.84E-03	1.83E-03
INFANT	3.59E-03	2.32E-03	3.07E-03	6.19E-03	1.81E-03	1.09E+00	5.29E-03	1.95E-03

POPULATION AND INDIVIDUAL DOSE CALCULATIONS FOR HOPE CREEK GENERATING STATION — CASE 1
SPECIAL LOCATION # 5 HC NEAR RESID
AT 3.50 MILES 4

ANNUAL BETA AIR DOSE = 4.74E-02 MILLRADS
ANNUAL GAMMA AIR DOSE = 6.41E-02 MILLRADS

PATHWAY	T.BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
PLUME	4.26E-02	4.26E-02	4.26E-02	4.26E-02	4.26E-02	4.26E-02	4.31E-02	8.39E-02
GROUND	1.01E-03	1.01E-03	1.01E-03	1.01E-03	1.01E-03	1.01E-03	1.01E-03	1.18E-03
VEGET								
ADULT	4.47E-03	4.51E-03	2.06E-02	4.53E-03	4.57E-03	5.34E-02	4.28E-03	4.27E-03
TEEN	6.56E-03	6.56E-03	7.15E-03	6.64E-03	5.14E-03	4.56E-02	6.36E-03	6.35E-03
CHILD	1.55E-02	1.54E-02	1.71E-02	1.56E-02	4.14E-03	7.56E-02	1.52E-02	1.52E-02
MEAT								
ADULT	2.41E-03	2.43E-03	1.16E-02	2.41E-03	2.41E-03	4.86E-03	2.39E-03	2.39E-03
TEEN	1.86E-03	1.87E-03	1.84E-03	1.87E-03	1.42E-03	3.55E-03	1.86E-03	1.85E-03
CHILD	3.49E-03	3.49E-03	3.47E-03	3.50E-03	8.98E-04	6.04E-03	3.48E-03	3.48E-03
COW MILK								
ADULT	2.87E-03	2.78E-03	1.29E-02	2.99E-03	3.10E-03	7.29E-02	2.70E-03	2.69E-03
TEEN	4.78E-03	4.61E-03	4.76E-03	5.01E-03	4.00E-03	1.10E-01	4.52E-03	4.50E-03
CHILD	1.15E-02	1.11E-02	1.17E-02	1.19E-02	3.30E-03	2.21E-01	1.10E-02	1.10E-02
INFANT	2.42E-02	2.33E-02	2.49E-02	2.53E-02	3.30E-03	5.31E-01	2.33E-02	2.32E-02
GOATMILK								
ADULT	3.56E-03	3.12E-03	1.36E-02	4.00E-03	4.34E-03	2.58E-01	2.89E-03	2.85E-03
TEEN	5.71E-03	5.00E-03	5.96E-03	6.63E-03	5.60E-03	3.89E-01	4.74E-03	4.66E-03
CHILD	1.32E-02	1.15E-02	1.46E-02	1.46E-02	4.62E-03	7.76E-01	1.14E-02	1.12E-02
INFANT	2.71E-02	2.39E-02	3.09E-02	3.18E-02	4.62E-03	1.87E+00	2.39E-02	2.36E-02
INHAL								
ADULT	1.87E-04	1.94E-04	5.66E-05	2.55E-04	2.94E-04	2.05E-02	2.02E-04	1.53E-04
TEEN	1.17E-04	1.14E-04	5.05E-05	1.76E-04	2.05E-04	1.76E-02	1.36E-04	8.45E-05
CHILD	1.32E-04	1.04E-04	7.84E-05	1.81E-04	1.09E-04	2.44E-02	1.35E-04	8.57E-05
INFANT	1.54E-04	1.05E-04	1.16E-04	2.50E-04	7.65E-05	4.18E-02	1.72E-04	9.12E-05

LIQUID EFFLUENTS AND THEIR DOSES

TABLES 4.9a through 4.9z CONTAINS INFORMATION ON THE IMPACT FROM LIQUID EFFLUENTS FROM THE HOPE CREEK GENERATING STATION

INDIVIDUAL DOSES TO ADULTS ARE ON TABLE 4.9e

POPULATION DOSES ARE ON TABLES 4.9y and 4.9z

HOPE CREEK [illegible]ERATING STATION - LIQUID DOSE CALCULATIONS

CASE 1

DISCHARGE=0.54E+02 CFS SOURCE TERM MULTIPLIER=0.20E+01

SALTWATER SITE
HOPE CREEK LIQUID SOURCE TERM RUN 7 (NO,NO,NO)
GRIEF RH103M 1.60E-04
GRIEF RH105M 1.00E-04
GRIEF RH106 2.00E-05
GRIEF BA137M 8.90E-04

UNL=2 LADTAP

NO RECONCENTRATION OF NUCLIDES

			INGESTION DOSE FACTORS (MREM/PCI INTAKE)							SHORELINE (MREM/HR)/(PCI/M**2)		
NUCLIDE	CURIE/YEAR	BONE	LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI-LLI	SKIN	TOTAL BODY	RECON
11NA 24	9.80E-03	2.26E-06	2.26E-06	2.26E-06	2.26E-06	2.26E-06	2.26E-06	2.26E-06	2.90E-08	2.50E-08	1.00E+00
15P 32	2.80E-03	1.93E-04	1.21E-05	7.47E-06	0.0	0.0	0.0	2.17E-05	0.0	0.0	1.00E+00
24CR 51	7.60E-02	0.0	0.0	2.66E-09	1.59E-09	5.87E-10	3.53E-09	6.69E-07	2.60E-10	2.20E-10	1.00E+00
25MN 54	3.00E-03	0.0	4.57E-06	8.73E-07	0.0	1.36E-06	0.0	1.40E-05	6.80E-09	5.80E-09	1.00E+00
25MN 56	1.16E-03	0.0	1.15E-07	2.05E-08	0.0	1.46E-07	0.0	3.67E-06	1.30E-08	1.10E-08	1.00E+00
26FE 55	1.70E-02	6.20E-06	2.79E-05	7.33E-06	0.0	0.0	3.23E-05	1.09E-05	0.0	0.0	1.00E+00
26FE 59	4.80E-04	4.34E-06	1.03E-05	3.92E-06	0.0	0.0	2.86E-06	3.40E-05	9.40E-09	8.00E-09	1.00E+00
27CO 58	1.12E-02	0.0	7.46E-07	1.67E-06	0.0	0.0	0.0	1.51E-05	8.20E-09	7.00E-09	1.00E+00
27CO 60	2.40E-02	0.0	2.15E-06	4.72E-06	0.0	0.0	0.0	4.02E-05	2.00E-08	1.70E-08	1.00E+00
29CU 64	2.60E-02	0.0	8.34E-08	3.92E-08	0.0	2.10E-07	0.0	7.10E-06	1.70E-09	1.50E-09	1.00E+00
30ZN 65	3.40E-03	4.85E-06	1.54E-05	6.97E-06	0.0	1.03E-05	0.0	9.70E-06	4.60E-09	4.00E-09	1.00E+00
30ZN 69M	1.90E-03	1.70E-07	4.09E-07	3.73E-08	0.0	2.48E-07	0.0	2.49E-05	3.40E-09	2.90E-09	1.00E+00
30ZN 69	2.00E-03	1.03E-08	1.98E-08	1.37E-09	0.0	1.28E-08	0.0	2.96E-09	0.0	0.0	1.00E+00
74W 187	6.40E-04	1.03E-07	8.62E-08	3.02E-08	0.0	0.0	0.0	2.82E-05	3.60E-09	3.10E-09	1.00E+00
93NP 239	3.80E-02	1.20E-09	1.18E-10	6.46E-11	0.0	3.65E-10	0.0	2.40E-05	1.10E-09	9.50E-10	1.00E+00
35BR 83	6.00E-05	0.0	0.0	4.02E-08	0.0	0.0	0.0	5.79E-08	9.30E-11	6.40E-11	1.00E+00
38SR 89	1.62E-03	3.09E-04	0.0	8.85E-06	0.0	0.0	0.0	4.94E-05	6.50E-13	5.60E-13	1.00E+00
38SR 90	1.00E-04	7.61E-03	0.0	1.86E-03	0.0	0.0	0.0	1.02E-04	0.0	0.0	1.00E+00
39Y 90	6.00E-05	9.63E-09	0.0	2.58E-10	0.0	0.0	0.0	1.02E-04	2.60E-12	2.20E-12	1.00E+00
38SR 91	2.00E-03	5.82E-06	0.0	2.56E-07	0.0	0.0	0.0	2.93E-05	8.30E-09	7.10E-09	1.00E+00
39Y 91M	1.34E-03	9.10E-11	0.0	3.53E-12	0.0	0.0	0.0	2.67E-10	4.40E-09	3.80E-09	1.00E+00
39Y 91	1.04E-03	1.41E-07	0.0	3.78E-09	0.0	0.0	0.0	7.76E-05	2.70E-11	2.40E-11	1.00E+00
38SR 92	2.60E-04	2.16E-06	0.0	9.31E-08	0.0	0.0	0.0	4.26E-05	1.00E-08	9.00E-09	1.00E+00
39Y 92	1.24E-03	8.46E-10	0.0	2.47E-11	0.0	0.0	0.0	1.48E-05	1.90E-09	1.60E-09	1.00E+00
39Y 93	2.20E-03	2.68E-09	0.0	7.40E-11	0.0	0.0	0.0	8.50E-05	7.80E-10	5.70E-10	1.00E+00
40ZR 95	1.20E-04	3.04E-08	9.76E-09	6.61E-09	0.0	1.54E-08	0.0	3.03E-05	5.80E-09	5.00E-09	1.00E+00
41NB 95	1.20E-04	6.23E-09	3.46E-09	1.36E-09	0.0	3.43E-09	0.0	2.10E-05	6.00E-09	5.10E-09	1.00E+00
42MO 99	1.28E-02	0.0	4.31E-06	8.20E-07	0.0	9.77E-06	0.0	9.99E-06	2.20E-09	1.90E-09	1.00E+00
43TC 99M	1.60E-02	2.47E-10	6.98E-10	8.90E-09	0.0	1.06E-08	3.42E-10	4.13E-07	1.10E-09	9.60E-10	1.00E+00
44RU 103	6.00E-04	1.85E-07	0.0	7.98E-08	0.0	7.07E-07	0.0	2.16E-05	4.20E-09	3.60E-09	1.00E+00
44RU 105	2.00E-04	1.54E-08	0.0	6.08E-09	0.0	1.99E-07	0.0	9.42E-06	5.10E-09	4.50E-09	1.00E+00
45RH 105	8.00E-04	1.22E-07	8.86E-08	5.83E-08	0.0	3.76E-07	0.0	1.41E-05	7.70E-10	6.60E-10	1.00E+00
44RU 106	4.80E-03	2.75E-06	0.0	3.48E-07	0.0	5.32E-06	0.0	1.78E-04	1.80E-09	1.50E-09	1.00E+00
52TE 129M	6.20E-04	1.15E-05	4.30E-06	1.82E-06	3.95E-06	4.80E-05	0.0	5.79E-05	9.00E-10	7.70E-10	1.00E+00
52TE 129	4.00E-04	3.15E-08	1.19E-08	7.66E-09	2.41E-08	1.32E-07	0.0	2.37E-08	8.40E-10	7.10E-10	1.00E+00
52TE 131M	2.80E-04	1.74E-06	8.47E-07	7.06E-07	1.34E-06	8.58E-06	0.0	8.40E-05	9.90E-09	8.40E-09	1.00E+00
52TE 131	6.00E-05	1.97E-08	8.24E-09	6.22E-09	1.62E-08	8.64E-08	0.0	2.95E-09	2.60E-06	2.20E-09	1.00E+00
53I 131	5.80E-02	4.16E-06	5.96E-06	3.41E-06	1.95E-03	1.02E-05	0.0	1.57E-06	3.40E-09	2.80E-09	1.00E+00
52TE 132	8.00E-05	2.53E-05	1.64E-06	1.53E-06	1.80E-06	1.58E-05	0.0	7.71E-05	2.00E-09	1.70E-09	1.00E+00
53I 132	5.40E-04	2.03E-07	5.43E-07	1.93E-07	7.15E-05	8.66E-07	0.0	1.02E-07	2.00E-08	1.70E-08	1.00E+00
53I 133	3.40E-02	1.43E-06	2.48E-06	7.57E-07	4.77E-04	4.33E-06	0.0	2.18E-06	4.50E-09	3.70E-09	1.00E+00
53I 134	4.00E-05	1.06E-07	2.88E-07	1.03E-07	3.74E-05	4.59E-07	0.0	2.51E-10	1.90E-08	1.60E-08	1.00E+00
55CS 134	2.60E-02	6.22E-05	1.48E-04	1.21E-04	0.0	4.80E-05	1.59E-05	2.59E-06	1.40E-08	1.20E-08	1.00E+00
53I 135	4.80E-03	4.43E-07	1.17E-06	4.29E-07	1.53E-04	1.86E-06	0.0	1.31E-06	1.40E-08	1.20E-08	1.00E+00
55CS 136	4.60E-04	6.51E-06	2.57E-05	1.85E-05	0.0	1.43E-05	1.96E-06	2.92E-06	1.70E-08	1.50E-08	1.00E+00
55CS 137	5.00E-02	7.98E-05	1.09E-04	7.15E-05	0.0	3.71E-05	1.23E-05	2.10E-06	4.90E-09	4.20E-09	1.00E+00

57LA 140	4.40E-03	2.50E-09	1.26E-09	3.34E-10	0.0	0.0	0.0	9.25E-05	1.70E-08	1.50E-08	1.00E+00	
57LA 141	4.00E-05	3.19E-10	9.91E-11	1.62E-11	0.0	0.0	0.0	1.18E-05	2.80E-10	2.50E-10	1.00E+00	CASE 1
58CE [illegible]1	5.00E-04	9.37E-09	6.34E-09	7.18E-10	0.0	2.9[illegible]09	0.0	2.42E-05	6.20E-10	5.50E-10	1.00E+00	
57LA [illegible]2	2.00E-05	1.28E-10	5.82E-11	1.45E-11	0.0	0.0	0.0	4.25E-07	1.80E-08	1.50E-08	1.00E+00	
58CE 143	1.00E-04	1.65E-09	1.22E-06	1.35E-10	0.0	5.38E-10	0.0	4.56E-05	2.50E-09	2.20E-09	1.00E+00	
59PR 143	5.80E-04	9.21E-09	3.70E-09	4.57E-10	0.0	2.13E-09	0.0	4.03E-05	0.0	0.0	1.00E+00	
58CE 144	1.04E-02	4.89E-07	2.04E-07	2.62E-08	0.0	1.21E-07	0.0	1.65E-04	3.70E-10	3.20E-10	1.00E+00	
59PR 144	4.00E-05	3.02E-11	1.25E-11	1.53E-12	0.0	7.36E-12	0.0	4.33E-18	2.30E-10	2.00E-10	1.00E+00	
60ND 147	4.00E-05	6.30E-09	7.28E-09	4.35E-10	0.0	4.25E-09	0.0	3.49E-05	1.20E-09	1.00E-09	1.00E+00	
1H 3	8.60E+01	0.0	1.34E-07	1.34E-07	1.34E-07	1.34E-07	1.34E-07	1.34E-07	0.0	0.0	1.00E+00	

HCGS

Table 4.9c

* * * TEENAGER DOSE FACTORS * * *

NUCLIDE	CURIE/YEAR	INGESTION DOSE FACTORS (MREM/PCI INTAKE) BONE	LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI-LLI	SHORELINE (MREM/HR)/(PCI/M**2) SKIN	TOTAL BODY	RECON
27CO 58	1.12E-02	0.0	9.92E-07	2.26E-06	0.0	0.0	0.0	1.34E-05			
27CO 60	2.40E-02	0.0	2.76E-06	6.30E-06	0.0	0.0	0.0	3.31E-05			
38SR 89	1.62E-03	4.60E-04	0.0	1.32E-05	0.0	0.0	0.0	4.99E-05			
38SR 90	1.00E-04	1.04E-02	0.0	2.57E-03	0.0	0.0	0.0	2.20E-04			
39Y 90	6.00E-05	3.30E-08	0.0	8.87E-10	0.0	0.0	3.75E-05	1.09E-04			
39Y 91	1.04E-03	1.96E-07	0.0	5.23E-09	0.0	0.0	0.0	7.53E-05			
40ZR 95	1.20E-04	3.72E-08	1.24E-08	8.66E-09	0.0	1.54E-08	0.0	2.68E-05			
41NB 95	1.20E-04	7.24E-09	4.36E-09	2.46E-09	0.0	3.43E-09	0.0	1.78E-05			
44RU 103	6.00E-04	2.37E-07	0.0	1.06E-07	0.0	7.07E-07	0.0	1.85E-05			
44RU 106	4.80E-03	4.00E-06	0.0	5.03E-07	0.0	5.32E-06	0.0	1.81E-04			
52TE 129M	6.20E-04	1.66E-05	6.15E-06	2.61E-06	5.30E-06	4.80E-05	0.0	5.80E-05			
53I 131	5.80E-02	5.57E-06	7.87E-06	4.69E-06	2.27E-03	1.02E-05	0.0	1.49E-06			
52TE 132	8.00E-05	3.55E-06	2.22E-06	2.10E-06	2.36E-06	1.58E-05	0.0	8.00E-05			
53I 133	3.40E-02	2.03E-06	3.44E-06	1.06E-06	6.25E-04	4.33E-06	0.0	2.50E-06			
55CS 134	2.60E-02	8.05E-05	1.94E-04	9.06E-05	0.0	4.80E-05	2.35E-05	2.24E-06			
55CS 137	5.00E-02	1.07E-04	1.44E-04	5.05E-05	0.0	3.71E-05	1.91E-05	1.92E-06			
56BA 140	5.40E-03	2.83E-05	3.48E-08	1.82E-06	0.0	8.68E-09	2.33E-08	4.14E-06			
57LA 140	4.40E-03	3.48E-09	1.72E-09	4.55E-10	0.0	0.0	0.0	9.48E-05			
58CE 141	5.00E-04	1.26E-08	8.46E-09	9.70E-10	0.0	2.94E-09	0.0	2.29E-05			
58CE 144	1.04E-02	7.22E-07	2.96E-07	3.83E-08	0.0	1.21E-07	0.0	1.70E-04			
1H 3	8.60E+01	0.0	1.06E-07	1.06E-07	1.06E-07	1.34E-07	1.06E-07	1.06E-07			

* * * CHILD DOSE FACTORS * * *

NUCLIDE	CURIE/YEAR	INGESTION DOSE FACTORS (MREM/PCI INTAKE) BONE	LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI-LLI	SHORELINE (MREM/HR)/(PCI/M**2) SKIN	TOTAL BODY	RECON
27CO 58	1.12E-02	0.0	1.85E-06	5.58E-06	0.0	0.0	0.0	1.10E-05			
27CO 60	2.40E-02	0.0	5.17E-06	1.55E-05	0.0	0.0	0.0	2.86E-05			
38SR 89	1.62E-03	1.38E-03	0.0	3.95E-05	0.0	0.0	0.0	5.15E-05			
38SR 90	1.00E-04	1.72E-02	0.0	4.36E-03	0.0	0.0	0.0	2.29E-04			
39Y 90	6.00E-05	4.21E-08	0.0	1.13E-09	0.0	0.0	0.0	1.20E-04			
39Y 91	1.04E-03	5.85E-07	0.0	1.56E-08	0.0	0.0	0.0	7.77E-05			
40ZR 95	1.20E-04	1.04E-07	2.42E-08	2.20E-08	0.0	1.54E-08	0.0	2.50E-05			
41NB 95	1.20E-04	1.95E-08	8.32E-09	6.11E-09	0.0	3.43E-09	0.0	1.44E-05			
44RU 103	6.00E-04	6.78E-07	0.0	2.74E-07	0.0	7.07E-07	0.0	1.78E-05			
44RU 106	4.80E-03	1.19E-05	0.0	1.48E-06	0.0	5.32E-06	0.0	1.85E-04			
52TE 129M	6.20E-04	4.95E-05	1.38E-05	7.65E-06	1.58E-05	4.80E-05	0.0	5.96E-05			
53I 131	5.80E-02	1.63E-05	1.67E-05	1.26E-05	5.43E-03	1.02E-05	0.0	1.43E-06			
52TE 132	8.00E-05	1.02E-05	4.50E-06	5.42E-06	6.62E-06	1.58E-05	0.0	7.89E-05			
53I 133	3.40E-02	5.98E-06	7.38E-06	2.90E-06	1.78E-03	4.33E-06	0.0	2.99E-06			
55CS 134	2.60E-02	2.24E-04	3.77E-04	8.02E-05	0.0	4.80E-05	4.19E-05	2.04E-06			
55CS 137	5.00E-02	3.12E-04	3.02E-04	4.50E-05	0.0	3.71E-05	3.54E-05	1.84E-06			
56BA 140	5.40E-03	8.26E-05	7.25E-08	4.85E-06	0.0	8.68E-09	4.32E-08	4.21E-06			
57LA 140	4.40E-03	1.01E-08	3.52E-09	1.19E-09	0.0	0.0	0.0	1.00E-04			
58CE 141	5.00E-04	3.76E-08	1.88E-08	2.80E-09	0.0	2.94E-09	0.0	2.36E-05			
58CE 144	1.04E-02	2.14E-06	6.70E-07	1.14E-07	0.0	1.21E-07	0.0	1.74E-04			
1H 3	8.60E+01	0.0	2.03E-07	2.03E-07	2.03E-07	1.34E-07	2.03E-07	2.03E-07			

* * * INFANT DOSE FACTORS * * *

NUCLIDE	CURIE/YEAR	INGESTION DOSE FACTORS (MREM/PCI INTAKE) BONE	LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI-LLI	SHORELINE (MREM/HR)/(PCI/M**2) SKIN	TOTAL BODY	RECON
27CO 58	1.12E-02	0.0	3.78E-06	9.26E-06	0.0	0.0	0.0	9.79E-06			
27CO 60	2.40E-02	0.0	1.07E-05	2.56E-05	0.0	0.0	0.0	2.64E-05			
38SR 89	1.62E-03	2.93E-03	0.0	8.42E-05	0.0	0.0	0.0	5.48E-05			
38SR 90	1.00E-04	2.51E-02	0.0	6.40E-03	0.0	0.0	0.0	2.43E-04			

CASE 1

39Y	90	6.00E-05	8.97E-08	0.0	2.41E-09	0.0	0.0	0.0	1.29E-04
39Y	91	1.04E-03	1.25E-06	0.0	3.33E-08	0.0	0.0	0.0	8.27E-05
40ZR	95	1.20E-04	2.11E-07	5.32E-08	3.78E-06	0.0	1.54E-0[illegible]	0.0	2.38E-05
41NB	95	1.20E-04	3.89E-08	1.75E-08	1.03E-08	0.0	3.43E-09	0.0	1.40E-05
44RU	103	6.00E-04	1.41E-06	0.0	4.85E-07	0.0	7.07E-07	0.0	1.76E-05
44RU	106	4.80E-03	2.54E-05	0.0	3.12E-06	0.0	5.32E-06	0.0	1.97E-04
52TE	129M	6.20E-04	1.05E-04	3.61E-05	1.60E-05	3.95E-05	4.80E-05	0.0	6.33E-05
53I	131	5.80E-02	3.42E-05	4.07E-05	2.38E-05	1.31E-02	1.02E-05	0.0	1.53E-06
52TE	132	8.00E-05	2.13E-05	1.05E-05	9.76E-06	1.55E-05	1.58E-05	0.0	8.08E-05
53I	133	3.40E-02	1.26E-05	1.84E-05	5.58E-06	7.35E-03	4.33E-06	0.0	3.27E-06
55CS	134	2.60E-02	4.58E-04	8.24E-04	6.97E-05	0.0	4.80E-05	9.42E-05	1.96E-06
55CS	137	5.00E-02	6.53E-04	7.31E-04	4.20E-05	0.0	3.71E-05	8.81E-05	1.89E-06
56BA	140	5.40E-03	1.74E-04	1.75E-07	8.99E-06	0.0	8.68E-09	1.07E-07	4.43E-06
57LA	140	4.40E-03	2.12E-08	8.37E-09	2.16E-09	0.0	0.0	0.0	1.04E-04
58CE	141	5.00E-04	8.00E-08	4.91E-08	5.75E-09	0.0	2.94E-09	0.0	2.38E-05
58CE	144	1.04E-02	4.49E-06	1.77E-06	2.42E-07	0.0	1.21E-07	0.0	1.85E-04
1H	3	8.60E+01	0.0	3.07E-07	3.07E-07	3.07E-07	1.34E-07	3.07E-07	3.07E-07

TOTAL NUMBER IN SOURCE TERM IS 58 TOTAL RELEASE IS 8.6460E+01

HCGS

ADULT DOSES

DOSE (MREM PER YEAR INTAKE)

PATHWAY	SKIN	BONE	LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI-LLI
FISH		6.68E-01	1.26E-01	5.66E-02	4.67E-02	9.42E-03	7.47E-02	1.16E-01
INVERTEBRATE		2.01E-01	1.44E-01	4.97E-02	5.80E-02	5.22E-02	1.15E-01	1.72E-01
SHORELINE	9.26E-04	7.91E-04	7.91E-04	7.91E-04	7.91E-04	7.91E-04	7.91E-04	7.91E-04
SWIMMING	0.0	1.10E-04	1.10E-04	1.10E-04	1.10E-04	1.10E-04	1.10E-04	1.10E-04
BOATING	0.0	2.38E-05	2.38E-05	2.38E-05	2.38E-05	2.38E-05	2.38E-05	2.38E-05
TOTAL	9.26E-04	8.70E-01	2.70E-01	1.07E-01	1.06E-01	6.25E-02	1.91E-01	2.88E-01

	USAGE (KG/YR,HR/YR)	DILUTION	TIME(HR)
FISH	21.0	10.0	34.00
INVERTEBRATE	5.0	10.0	34.00
SHORELINE	12.0	10.0	10.00
SWIMMING	120.0	10.0	10.00
BOATING	52.0	10.0	10.00

SHOREWIDTH FACTOR=0.2 ~~0.2~~ 0.5

* * * ISOTOPE CONTRIBUTION * * *

Table 4.9e

PATHWAY	SKIN	BONE	LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI-LLI
FISH		P 32 96%	P 32 32%	P 32 43%	I 131 94%	MN 54 1%	FE 55 96%	P 32 62%
		FE 55 2%	FE 55 49%	FE 55 28%	I 133 4%	ZN 65 32%	CS 137 1%	FE 55 21%
		CS 137 1%	ZN 65 3%	ZN 65 3%		I 131 2%		FE 59 1%
			CS 134 5%	CS 134 9%		CS 134 23%		CO 60 3%
			CS 137 7%	CS 137 11%		CS 137 34%		ZN 65 2%
						H 3 4%		NB 95 2%
INVERTEBRATE		P 32 78%	P 32 6%	P 32 12%	TE 129M 4%	ZN 65 34%	FE 55 99%	P 32 10%
		FE 55 10%	FE 55 68%	FE 55 52%	I 131 90%	TE 129M 57%		FE 55 22%
		ZN 65 4%	ZN 65 18%	CO 60 2%	I 133 4%	TE 131M 2%		FE 59 1%
		TE 129M 3%	TE 129M 1%	ZN 65 2%		TE 132 1%		CO 58 1%
				TE 129M 2%				CO 60 5%
				CS 134 1%				ZN 65 10%
				CS 137 1%				ZN 69M 2%
								RU 1 6 5%
								TE 129M 21%
								TE 131M 6%
								TE 132 2%
								LA 140 1%
								CE 144 6%
SHORELINE	CO 60 42%	CO 60 42%						
	CS 134 14%	CS 134 14%						
	CS 137 41%	CS 137 42%						
SWIM		NA 24 11%						
		MN 54 1%						
		CO 58 4%						
		CO 60 25%						
		CU 64 1%						
		NP 239 1%						
		MO 99 1%						
		I 131 9%						

I	133	5%
CS	134	17%
I	135	1%
CS	137	11%
LA	140	3%

TEENAGER DOSES

DOSE (MREM PER YEAR INTAKE)

PATHWAY	SKIN	BONE	LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI-LLI
FISH		5.12E-01	9.96E-02	4.08E-02	4.16E-02	7.18E-03	5.76E-02	8.71E-02
INVERTEBRATE		1.54E-01	1.11E-01	3.82E-02	5.19E-02	3.97E-02	8.78E-02	1.29E-01
SHORELINE	5.17E-03	4.41E-03	4.41E-03	4.41E-03	4.41E-03	4.41E-03	4.41E-03	4.41E-03
SWIMMING	0.0	2.20E-04	2.20E-04	2.20E-04	2.20E-04	2.20E-04	2.20E-04	2.20E-04
BOATING	0.0	2.38E-05	2.38E-05	2.38E-05	2.38E-05	2.38E-05	2.38E-05	2.38E-05
TOTAL	5.17E-03	6.71E-01	2.15E-01	8.36E-02	9.81E-02	5.15E-02	1.50E-01	2.21E-01

	USAGE (KG/YR,HR/YR)	DILUTION	TIME(HR)
FISH	16.0	10.0	34.00
INVERTEBRATE	3.8	10.0	34.00
SHORELINE	67.0	10.0	10.00
SWIMMING	240.0	10.0	10.00
BOATING	52.0	10.0	10.00

SHOREWIDTH FACTOR=0.2

* * * ISOTOPE CONTRIBUTION * * *

PATHWAY	SKIN	BONE	LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI-LLI
FISH		P 32 95%	P 32 30%	P 32 46%	I 131 93%	MN 54 1%	FE 55 95%	P 32 63%
		FE 55 2%	FE 55 47%	FE 55 30%	I 133 5%	ZN 65 32%	CS 134 1%	FE 55 21%
		CS 137 1%	ZN 65 3%	CO 60 1%		I 131 2%	CS 137 2%	FE 59 1%
			CS 134 6%	ZN 65 3%		CS 134 23%		CO 60 3%
			CS 137 9%	CS 134 7%		CS 137 34%		ZN 65 2%
				CS 137 8%		H 3 4%		NB 95 2%
INVERTEBRATE		P 32 77%	P 32 6%	P 32 12%	TE 129M 4%	ZN 65 34%	FE 55 99%	P 32 10%
		FE 55 10%	FE 55 67%	FE 55 51%	I 131 89%	TE 129M 57%		FE 55 22%
		ZN 65 4%	ZN 65 18%	CO 60 3%	I 133 5%	TE 131M 2%		FE 59 1%
		TE 129M 5%	TE 129M 2%	ZN 65 24%		TE 132 1%		CO 60 4%
			CS 137 1%	TE 129M 3%				ZN 65 10%
				CS 134 1%				ZN 69M 2%
				CS 137 1%				RU 1 6 5%
								TE 129M 21%
								TE 131M 6%
								TE 132 2%
								LA 140 1%
								CE 144 6%
SHORELINE	CO 60 42%	CO 60 42%						
	CS 134 14%	CS 134 14%						
	CS 137 41%	CS 137 42%						
SWIM		NA 24 11%						
		MN 54 1%						
		CO 58 4%						
		CO 60 25%						
		CU 64 1%						
		N? 39 1%						
		MO 99 1?						
		I 131 9%						
		I 133 5%						

	SKIN	BONE		LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI_LLI
SWIM (con't)		Cs 134	17%						
		I 135	1%						
		Cs 137	11%						
		La 140	3%						

CHILD DOSES

DOSE (MREM PER YEAR INTAKE)

PATHWAY	SKIN	BONE	LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI-LLI
FISH		2.29E-01	5.05E-02	1.78E-02	4.33E-02	3.09E-03	2.57E-02	3.73E-02
INVERTEBRATE		7.80E-02	5.28E-02	1.92E-02	5.67E-02	1.77E-02	3.94E-02	5.80E-02
SHORELINE	1.08E-03	9.22E-04	9.22E-04	9.22E-04	9.22E-04	9.22E-04	9.22E-04	9.22E-04
SWIMMING	0.0	1.10E-04	1.10E-04	1.10E-04	1.10E-04	1.10E-04	1.10E-04	1.10E-04
BOATING	0.0	1.33E-05	1.33E-05	1.33E-05	1.33E-05	1.33E-05	1.33E-05	1.33E-05
TOTAL	1.08E-03	3.08E-01	1.04E-01	3.81E-02	1.01E-01	2.19E-02	6.62E-02	9.63E-02

	USAGE (KG/YR,HR/YR)	DILUTION	TIME(HR)
FISH	6.9	10.0	34.00
INVERTEBRATE	1.7	10.0	34.00
SHORELINE	14.0	10.0	10.00
SWIMMING	120.0	10.0	10.00
BOATING	29.0	10.0	10.00

SHOREWIDTH FACTOR=0.2

* * * ISOTOPE CONTRIBUTION * * *

PATHWAY	SKIN	BONE	LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI-LLI
FISH		P 32 92%	P 32 26%	P 32 45%	I 131 92%	MN 54 1%	FE 55 92%	P 32 63%
		FE 55 1%	FE 55 40%	FE 55 30%	I 133 6%	ZN 65 32%	CS 134 2%	FE 55 21%
		CS 134 1%	ZN 65 2%	CO 60 3%		I 131 2%	CS 137 3%	FE 59 1%
		CS 137 3%	CS 134 11%	ZN 65 3%		CS 134 23%		CO 60 2%
			CS 137 17%	CS 134 6%		CS 137 34%		ZN 65 2%
				CS 137 7%		H 3 4%		NB 95 1%
				H 3 1%				
INVERTEBRATE		P 32 68%	P 32 6%	P 32 10%	TE 129M 5%	ZN 65 34%	FE 55 98%	P 32 10%
		FE 55 9%	FE 55 63%	FE 55 46%	I 131 87%	TE 129M 57%		FE 55 22%
		ZN 65 3%	ZN 65 17%	CO 58 1%	I 133 6%	TE 131M 2%		FE 59 1%
		TE 129M 13%	TE 129M 5%	CO 60 6%		TE 132 1%		CO 60 4%
		CS 137 1%	CS 134 1%	ZN 65 21%				ZN 65 10%
			CS 137 2%	TE 129M 8%				ZN 69M 2%
				CS 137 1%				RU 1 6 5%
								TE 129M 22%
								TE 131M 6%
								TE 132 2%
								LA 140 1%
								CE 144 6%
SHORELINE	CO 60 42%	CO 60 42%						
	CS 134 14%	CS 134 14%						
	CS 137 41%	CS 137 42%						
SWIM		NA 24 11%						
		MN 54 1%						
		CO 58 4%						
		CO 60 25%						
		CU 64 1%						
		NP 239 1%						
		MO 99 1%						
		I 131 9%						

Swim (con't)	I	133	5%
	CS	134	17%
	I	135	1%
	CS	137	11%
	LA	140	3%

* * * FISH CONSUMPTION POPULATION DOSES * * *
MAN-REM

E 1

SPORTFISH HARVEST

DOSE(MAN-REM)

PATHWAY	AGE GROUP	USAGE	BONE	LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI-LLI
FISH	ADULT	2.12E+05	1.47E+00	3.47E-01	1.51E-01	7.40E-02	2.81E-02	2.29E-01	2.80E-01
FISH	TEENAGER	3.38E+04	2.36E-01	5.81E-02	2.26E-02	1.37E-02	4.50E-03	3.70E-02	4.41E-02
FISH	CHILD	2.05E+04	1.50E-01	4.19E-02	1.38E-02	1.97E-02	2.72E-03	2.31E-02	2.65E-02
FISH	TOTAL	2.66E+05	1.86E+00	4.47E-01	1.87E-01	1.07E-01	3.53E-02	2.89E-01	3.51E-01

DILUTION	CATCH	TIME(HR)-INCLUDES FOOD PROCESSING TIME OF 1.68E+02 HR	POPULATION=4.65E+04
0.44E+05	0.19E+04	0.37E+03	
0.19E+03	0.35E+04	0.33E+03	
0.13E+03	0.45E+04	0.29E+03	
0.14E+02	0.61E+04	0.23E+03	
0.51E+01	0.93E+04	0.19E+03	
0.45E+01	0.12E+05	0.18E+03	
0.78E+01	0.20E+05	0.22E+03	
0.96E+02	0.46E+05	0.27E+03	
0.30E+03	0.78E+05	0.33E+03	
0.15E+04	0.85E+05	0.40E+03	

AVERAGE INDIVIDUAL CONSUMPTION (KG/YR) ADULT=6.90E+00 TEEN=5.20E+00 CHILD=2.20E+00

* * * ISOTOPE CONTRIBUTION * * *

AGE GROUP	BONE	LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI-LLI
ADULT	P 32 94%	P 32 25%	P 32 35%	I 131 98%	MN 54 1%	FE 55 96%	P 32 55%
	FE 55 2%	FE 55 55%	FE 55 33%	H 3 1%	ZN 65 32%	CS 137 1%	MN 54 1%
	CS 137 1%	ZN 65 3%	CO 60 1%		I 131 1%		FE 55 26%
		CS 134 5%	ZN 65 4%		CS 134 23%		FE 59 2%
		CS 137 8%	CS 134 11%		CS 137 33%		CO 60 4%
			CS 137 12%		H 3 4%		ZN 65 3%
							NB 95 3%
TEENAGER	P 32 94%	P 32 23%	P 32 38%	I 131 98%	MN 54 1%	FE 55 95%	P 32 56%
	FE 55 2%	FE 55 52%	FE 55 35%	H 3 1%	ZN 65 32%	CS 134 1%	MN 54 1%
	CS 137 1%	ZN 65 3%	CO 60 1%		I 131 1%	CS 137 2%	FE 55 27%
		CS 134 7%	ZN 65 4%		CS 134 23%		FE 59 2%
		CS 137 10%	CS 134 8%		CS 137 35%		CO 60 3%
			CS 137 9%		H 3 4%		ZN 65 3%
							NB 95 2%
CHILD	P 32 89%	P 32 20%	P 32 37%	I 131 98%	MN 54 1%	FE 55 92%	P 32 57%
	FE 55 2%	FE 55 44%	FE 55 35%	H 3 1%	ZN 65 32%	CS 134 2%	MN 54 1%
	CS 134 2%	ZN 65 3%	CO 60 3%		I 131 1%	CS 137 3%	FE 55 27%
	CS 137 5%	CS 134 12%	ZN 65 4%		CS 134 23%		FE 59 2%
		CS 137 18%	CS 134 7%		CS 137 35%		CO 60 3%
			CS 137 8%		H 3 4%		ZN 65 3%
			H 3 1%				NB 95 2%

* * * FISH CONSUMPTION POPULATION DOSES * * *
MAN-REM

COMMERCIAL HARVEST

DOSE(MAN-REM)

PATHWAY	AGE GROUP	USAGE	BONE	LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI-LLI
FISH	ADULT	3.14E+07	2.28E-01	5.97E-02	2.55E-02	1.02E-02	4.97E-03	4.07E-02	4.59E-02
FISH	TEENAGER	5.02E+06	3.68E-02	9.99E-03	3.81E-03	1.89E-03	7.95E-04	6.58E-03	7.22E-03
FISH	CHILD	3.04E+06	2.35E-02	7.25E-03	2.33E-03	2.72E-03	4.81E-04	4.11E-03	4.33E-03
FISH	TOTAL	3.95E+07	2.88E-01	7.69E-02	3.16E-02	1.48E-02	6.25E-03	5.14E-02	5.75E-02

DILUTION	CATCH	TIME(HR)-INCLUDES FOOD PROCESSING TIME OF 2.40E+02 HR	POPULATION=6.90E+06
0.44E+05	0.55E+04	0.45E+03	
0.19E+03	0.10E+05	0.40E+03	
0.13E+03	0.13E+05	0.36E+03	
0.14E+02	0.18E+05	0.31E+03	
0.51E+01	0.28E+05	0.26E+03	
0.45E+01	0.35E+05	0.26E+03	
0.78E+01	0.59E+05	0.29E+03	
0.96E+02	0.14E+06	0.34E+03	
0.30E+03	0.23E+06	0.40E+03	
0.15E+04	0.25E+06	0.47E+03	

AVERAGE INDIVIDUAL CONSUMPTION (KG/YR) ADULT=6.90E+00 TEEN=5.20E+00 CHILD=2.20E+00

* * * ISOTOPE CONTRIBUTION * * *

AGE GROUP	BONE	LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI-LLI
ADULT	P 32 93%	P 32 22%	P 32 32%	I 131 97%	MN 54 1%	FE 55 96%	P 32 52%
	FE 55 3%	FE 55 56%	FE 55 35%	H 3 2%	ZN 65 32%	CS 137 1%	MN 54 1%
	CS 137 1%	ZN 65 4%	CO 60 1%		I 131 1%		FE 55 28%
		CS 134 6%	ZN 65 4%		CS 134 23%		FE 59 2%
		CS 137 8%	CS 134 11%		CS 137 35%		CO 60 5%
			CS 137 13%		H 3 5%		ZN 65 3%
							NB 95 3%
TEENAGER	P 32 93%	P 32 21%	P 32 34%	I 131 98%	MN 54 1%	FE 55 95%	P 32 53%
	FE 55 3%	FE 55 54%	FE 55 37%	H 3 1%	ZN 65 32%	CS 134 1%	MN 54 1%
	CS 137 2%	ZN 65 3%	CO 60 1%		I 131 1%	CS 137 2%	FE 55 29%
		CS 134 7%	ZN 65 4%		CS 134 23%		FE 59 2%
		CS 137 11%	CS 134 9%		CS 137 35%		CO 60 4%
			CS 137 10%		H 3 5%		ZN 65 3%
							NB 95 2%
CHILD	P 32 87%	P 32 17%	P 32 34%	I 131 98%	MN 54 1%	FE 55 92%	P 32 53%
	FE 55 3%	FE 55 45%	FE 55 37%	H 3 1%	ZN 65 32%	CS 134 2%	MN 54 1%
	CS 134 2%	ZN 65 3%	CO 60 3%		I 131 1%	CS 137 4%	FE 55 29%
	CS 137 6%	CS 134 12%	ZN 65 4%		CS 134 23%		FE 59 2%
		CS 137 19%	CS 134 8%		CS 137 35%		CO 60 3%
			CS 137 8%		H 3 5%		ZN 65 3%
			H 3 1%				NB 95 2%

NEPA DOSES

NOTE__TOTAL NEPA DOSE MUST INCLUDE SPORT CATCH

C[illegible] 1

DOSE(MAN-REM)

PATHWAY	AGE GROUP	USAGE	BONE	LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI-LLI
FISH	ADULT	6.29E+05	3.80E+00	9.95E-01	4.25E-01	1.71E-01	8.29E-02	6.78E-01	7.65E-01
FISH	TEENAGER	1.01E+05	6.13E-01	1.67E-01	6.34E-02	3.15E-02	1.33E-02	1.13E-01	1.20E-01
FISH	CHILD	6.07E+04	3.92E-01	1.21E-01	3.89E-02	4.54E-02	8.01E-03	6.85E-02	7.21E-02
FISH	TOTAL	7.90E+05	4.81E+00	1.28E+00	5.27E-01	2.47E-01	1.04E-01	8.56E-01	9.58E-01

DILUTION	CATCH	TIME(HR)-INCLUDES FOOD PROCESSING TIME OF 2.40E+02 HR	POPULATION=1.38E+05
0.44E+05	0.55E+04	0.45E+03	
0.19E+03	0.10E+05	0.40E+03	
0.13E+03	0.13E+05	0.36E+03	
0.14E+02	0.18E+05	0.31E+03	
0.51E+01	0.28E+05	0.26E+03	
0.45E+01	0.35E+05	0.26E+03	
0.78E+01	0.59E+05	0.29E+03	
0.96E+02	0.14E+06	0.34E+03	
0.30E+03	0.23E+06	0.40E+03	
0.15E+04	0.25E+06	0.47E+03	

NEPA fish

AVERAGE INDIVIDUAL CONSUMPTION (KG/YR) ADULT=6.90E+00 TEEN=5.20E+00 CHILD=2.20E+00

* * * INVERTEBRATE CONSUMPTION POPULATION DOSES * * *
MAN-REM

SHORTFISH HARVEST

Table 4.9n

DOSE(MAN-REM)

PATHWAY	AGE GROUP	USAGE	BONE	LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI-LLI
INVER	ADULT	3.10E+04	2.85E-01	2.63E-01	8.89E-02	5.74E-02	8.59E-02	2.17E-01	2.59E-01
INVER	TEENAGER	4.93E+03	4.62E-02	4.24E-02	1.43E-02	1.07E-02	1.37E-02	3.46E-02	4.08E-02
INVER	CHILD	3.10E+03	3.34E-02	2.82E-02	1.00E-02	1.65E-02	8.59E-03	2.18E-02	2.56E-02
INVER	TOTAL	3.90E+04	3.64E-01	3.33E-01	1.13E-01	8.46E-02	1.08E-01	2.73E-01	3.26E-01

DILUTION	CATCH	TIME(HR)-INCLUDES FOOD PROCESSING TIME OF 1.68E+02 HR	POPULATION=4.69E+04
0.44E+05	0.27E+03	0.37E+03	200
0.19E+03	0.51E+03	0.33E+03	160
0.13E+03	0.66E+03	0.29E+03	120
0.14E+02	0.90E+03	0.23E+03	60
0.51E+01	0.14E+04	0.19E+03	20
0.45E+01	0.17E+04	0.18E+03	10
0.78E+01	0.29E+04	0.22E+03	20
0.96E+02	0.68E+04	0.27E+03	100
0.30E+03	0.11E+05	0.33E+03	160
0.15E+04	0.12E+05	0.40E+03	235

Invert - spot OK
Haze - spot

AVERAGE INDIVIDUAL CONSUMPTION (KG/YR) ADULT=1.00E+00 TEEN=7.50E-01 CHILD=3.30E-01

* * * ISOTOPE CONTRIBUTION * * *

Table 4.9o

AGE GROUP	BONE	LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI-LLI
ADULT	P 32 73% FE 55 14% ZN 65 5% TE 129M 4%	P 32 5% FE 55 71% ZN 65 19% TE 129M 1% CS 137 1%	P 32 9% FE 55 55% CO 60 2% ZN 65 25% TE 129M 2% CS 134 1% CS 137 1%	TE 129M 7% I 131 92%	ZN 65 39% TE 129M 57% CS 137 1%	FE 55 99%	P 32 9% FE 55 28% FE 59 2% CO 58 1% CO 60 7% ZN 65 12% RU 1 6 6% TE 129M 22% CE 144 7%
TEENAGER	P 32 72% FE 55 14% ZN 65 5% TE 129M 5%	P 32 4% FE 55 70% ZN 65 18% TE 129M 2% CS 137 1%	P 32 9% FE 55 54% CO 60 3% ZN 65 25% TE 129M 2% CS 134 1% CS 137 1%	TE 129M 8% I 131 91%	ZN 65 39% TE 129M 57% CS 137 1%	FE 55 99%	P 32 9% FE 55 28% FE 59 2% CO 58 1% CO 60 6% ZN 65 12% RU 1 6 6% TE 129M 23% CE 144 8%
CHILD	P 32 63% FE 55 12% ZN 65 4% TE 129M 15% CS 137 2%	P 32 4% FE 55 66% ZN 65 17% TE 129M 5% CS 134 1% CS 137 2%	P 32 8% FE 55 48% CO 58 1% CO 60 7% ZN 65 22% TE 129M 7% CS 134 1% CS 137 1%	TE 129M 9% I 131 89%	ZN 65 39% TE 129M 57% CS 137 1%	FE 55 98%	P 32 9% FE 55 28% FE 59 2% CO 60 5% ZN 65 12% RU 1 6 6% TE 129M 23% CE 144 8%

* * * INVERTEBRATE CONSUMPTION POPULATION DOSES * * *

MAN-REM

COMMERCIAL HARVEST

DOSE(MAN-REM)

PATHWAY	AGE GROUP	USAGE	BONE	LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI-LLI
INVER	ADULT	4.55E+06	1.46E-01	1.49E-01	5.01E-02	2.58E-02	4.73E-02	1.24E-01	1.43E-01
INVER	TEENAGER	7.24E+05	2.38E-02	2.40E-02	8.04E-03	4.84E-03	7.52E-03	1.98E-02	2.25E-02
INVER	CHILD	4.55E+05	1.73E-02	1.60E-02	5.63E-03	7.44E-03	4.73E-03	1.25E-02	1.41E-02
INVER	TOTAL	5.73E+06	1.87E-01	1.89E-01	6.37E-02	3.81E-02	5.95E-02	1.57E-01	1.80E-01

DILUTION	CATCH	TIME(HR)-INCLUDES FOOD PROCESSING TIME OF 2.40E+02 HR	POPULATION=6.90E+06
0.44E+05	0.11E+05	0.45E+03	
0.19E+03	0.21E+05	0.40E+03	
0.13E+03	0.27E+05	0.36E+03	
0.14E+02	0.37E+05	0.31E+03	
0.51E+01	0.56E+05	0.26E+03	
0.45E+01	0.70E+05	0.26E+03	
0.78E+01	0.12E+06	0.29E+03	
0.96E+02	0.28E+06	0.34E+03	
0.30E+03	0.47E+06	0.40E+03	
0.15E+04	0.51E+06	0.47E+03	

Commercial invert

AVERAGE INDIVIDUAL CONSUMPTION (KG/YR) ADULT=1.00E+00 TEEN=7.50E-01 CHILD=3.30E-01

* * * ISOTOPE CONTRIBUTION * * *

AGE GROUP	BONE	LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI-LLI
ADULT	P 32 71% FE 55 16% ZN 65 6% TE 129M 4%	P 32 4% FE 55 71% ZN 65 19% TE 129M 1% CS 137 1%	P 32 8% FE 55 56% CO 60 2% ZN 65 25% TE 129M 2% CS 134 1% CS 137 2%	TE 129M 8% I 131 91%	ZN 65 40% TE 129M 56% CS 137 1%	FE 55 99%	P 32 8% FE 55 29% FE 59 2% CO 58 1% CO 60 7% ZN 65 12% RU 1 0 6 6% TE 129M 22% CE 144 7%
TEENAGER	P 32 69% FE 55 15% ZN 65 6% TE 129M 6% CS 137 1%	P 32 4% FE 55 70% ZN 65 19% TE 129M 2% CS 137 1%	P 32 7% FE 55 55% CO 60 3% ZN 65 25% TE 129M 2% CS 134 1% CS 137 1%	TE 129M 9% I 131 89%	ZN 65 40% TE 129M 56% CS 137 1%	FE 55 99%	P 32 8% FE 55 29% FE 59 2% CO 58 1% CO 60 6% ZN 65 12% RU 1 0 6 6% TE 129M 22% CE 144 8%
CHILD	P 32 60% FE 55 13% ZN 65 5% TE 129M 15% CS 137 2%	P 32 4% FE 55 66% ZN 65 17% TE 129M 4% CS 134 1% CS 137 2%	P 32 7% FE 55 49% CO 58 1% CO 60 7% ZN 65 23% TE 129M 7% CS 134 1%	TE 129M 11% I 131 87%	ZN 65 40% TE 129M 56% CS 137 1%	FE 55 98%	P 32 8% FE 55 29% FE 59 2% CO 60 5% ZN 65 12% RU 1 0 6 6% TE 129M 25%

NEPA DOSES — Table 4.9q — CASE 1

NOTE__TOTAL NEPA DOSE MUST INCLUDE SPORT CATCH

DOSE(MAN-REM)

PATHWAY	AGE GROUP	USAGE	BONE	LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI-LLI
INVER	ADULT	1.27E+06	1.05E+01	1.06E+01	3.58E+00	1.85E+00	3.38E+00	8.89E+00	1.02E+01
INVER	TEENAGER	2.02E+05	1.70E+00	1.72E+00	5.75E-01	3.46E-01	5.38E-01	1.42E+00	1.61E+00
INVER	CHILD	1.27E+05	1.24E+00	1.14E+00	4.03E-01	5.32E-01	3.38E-01	8.93E-01	1.01E+00
INVER	TOTAL	1.60E+06	1.34E+01	1.35E+01	4.56E+00	2.73E+00	4.26E+00	1.12E+01	1.29E+01

DILUTION CATCH TIME(HR)-INCLUDES FOOD PROCESSING TIME OF 2.40E+02 HR POPULATION=1.93E+06

DILUTION	CATCH	TIME(HR)
0.44E+05	0.11E+05	0.45E+03
0.19E+03	0.21E+05	0.40E+03
0.13E+03	0.27E+05	0.36E+03
0.14E+02	0.37E+05	0.31E+03
0.51E+01	0.56E+05	0.26E+03
0.45E+01	0.70E+05	0.26E+03
0.78E+01	0.12E+06	0.29E+03
0.96E+02	0.28E+06	0.34E+03
0.30E+03	0.47E+06	0.40E+03
0.15E+04	0.51E+06	0.47E+03

NEPA Smart

AVERAGE INDIVIDUAL CONSUMPTION (KG/YR) ADULT=1.00E+00 TEEN=7.50E-01 CHILD=3.30E-01

Table 4.9r

* * * POPULATION WATER CONSUMPTION DOSES * * *

HYDROSPHERE TRITIUM DOSE — CASE 1

PATHWAY	AGE GROUP	USAGE	BONE	LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI-LLI
WATER	TOTAL	2.20E+00	2.82E-10	2.82E-10					

* * * RECREATION POPULATION DOSES * * *

CASE 1

DOSE(MAN-REM)

PATHWAY	AGE GROUP	USAGE	SKIN	TOTAL BODY	THYROID
SHORELINE	TOTAL POPUL	3.68E+05	6.41E-06	5.48E-06	5.48E-06

LOCATION- REGION U5

DILUTION=0.44E+05 TRANSIT TIME=0.21E+03 HR SWF=0.2

* * * ISOTOPE CONTRIBUTION * * *

AGE GROUP	SKIN	TOTAL BODY
ADULT		
	CO 60 42%	CO 60 42%
	CS 134 14%	CS 134 14%
	CS 137 42%	CS 137 42%

DOSE(MAN-REM)

PATHWAY	AGE GROUP	USAGE	SKIN	TOTAL BODY	THYROID
SHORELINE	TOTAL POPUL	3.40E+05	1.36E-03	1.16E-03	1.16E-03

LOCATION- REGION U4

DILUTION=0.19E+03 190 TRANSIT TIME=0.16E+03 HR SWF=0.2 0.5

DOSE(MAN-REM)

PATHWAY	AGE GROUP	USAGE	SKIN	TOTAL BODY	THYROID
SHORELINE	TOTAL POPUL	3.68E+05	2.15E-03	1.83E-03	1.83E-03

LOCATION- REGION U3

DILUTION=0.13E+03 130 TRANSIT TIME=0.12E+03 HR SWF=0.2

DOSE(MAN-REM)

PATHWAY	AGE GROUP	USAGE	SKIN	TOTAL BODY	THYROID
SHORELINE	TOTAL POPUL	3.68E+05	1.97E-02	1.68E-02	1.68E-02

LOCATION- REGION U2

DILUTION=0.14E+02 160 TRANSIT TIME=0.67E+02 HR SWF=0.2

DOSE(MAN-REM)

PATHWAY	AGE GROUP	USAGE	SKIN	TOTAL BODY	THYROID
SHORELINE	TOTAL POPUL	4.00E+05	6.05E-02	5.17E-02	5.17E-02

LOCATION- REGION U1

DILUTION=0.51E+01 51 TRANSIT TIME=0.22E+02 HR SWF=0.2

CASE 1

			DOSE(MAN-REM)		
PATHWAY	AGE GROUP	USAGE	SKIN	TOTAL BODY	THYROID
SHORELINE	TOTAL POPUL	3.40E+05	5.83E-02	4.98E-02	4.98E-02

LOCATION- REGION D1

DILUTION=0.45E+01 TRANSIT TIME=0.17E+02 HR SWF=0.2

			DOSE(MAN-REM)		
PATHWAY	AGE GROUP	USAGE	SKIN	TOTAL BODY	THYROID
SHORELINE	TOTAL POPUL	4.60E+05	4.55E-02	3.88E-02	3.88E-02

LOCATION- REGION D2

DILUTION=0.78E+01 TRANSIT TIME=0.47E+02 HR SWF=0.2

7.8

			DOSE(MAN-REM)		
PATHWAY	AGE GROUP	USAGE	SKIN	TOTAL BODY	THYROID
SHORELINE	TOTAL POPUL	3.64E+05	2.92E-03	2.49E-03	2.49E-03

LOCATION- REGION D3

DILUTION=0.96E+02 TRANSIT TIME=0.10E+03 HR SWF=0.2

96

			DOSE(MAN-REM)		
PATHWAY	AGE GROUP	USAGE	SKIN	TOTAL BODY	THYROID
SHORELINE	TOTAL POPUL	4.36E+05	1.13E-03	9.64E-04	9.64E-04

LOCATION- REGION D4

DILUTION=0.30E+03 TRANSIT TIME=0.16E+03 HR SWF=0.2

300

			DOSE(MAN-REM)		
PATHWAY	AGE GROUP	USAGE	SKIN	TOTAL BODY	THYROID
SHORELINE	TOTAL POPUL	5.56E+05	2.79E-04	2.38E-04	2.38E-04

LOCATION- REGION D5

DILUTION=0.15E+04 TRANSIT TIME=0.23E+03 HR SWF=0.2

~~15,000~~ 1500

			DOSE(MAN-REM)		
PATHWAY	AGE GROUP	USAGE	SKIN	TOTAL BODY	THYROID
SWIMMING	TOTAL POPUL	2.62E+05	0.0	2.84E-08	2.84E-08

LOCATION- 0.2 RE

DILUTION=0.44E+05 TRANSIT TIME=0.21E+03 HR

44000

• • • ISOTOPE CONTRIBUTION • • •

Table 4.9t

HCGS

AGE GROUP	SKIN	TOTAL BODY
ADULT		

CASE 1

CR	51	1%
MN	54	1%
CO	58	6%
CO	60	37%
ZN	65	1%
I	131	2%
CS	134	25%
CS	137	16%

DOSE(MAN-REM)

PATHWAY	AGE GROUP	USAGE	SKIN	TOTAL BODY	THYROID
SWIMMING	TOTAL POPUL	1.87E+05	0.0	6.16E-06	6.16E-06

LOCATION- 0.2 RE

DILUTION=0.19E+03 TRANSIT TIME=0.16E+03 HR

190

DOSE(MAN-REM)

PATHWAY	AGE GROUP	USAGE	SKIN	TOTAL BODY	THYROID
SWIMMING	TOTAL POPUL	2.02E+05	0.0	9.94E-06	9.94E-06

LOCATION- 0.2 RE

DILUTION=0.13E+03 TRANSIT TIME=0.12E+03 HR

130

DOSE(MAN-REM)

PATHWAY	AGE GROUP	USAGE	SKIN	TOTAL BODY	THYROID
SWIMMING	TOTAL POPUL	2.02E+05	0.0	9.75E-05	9.75E-05

LOCATION- 0.2 RE

DILUTION=0.14E+02 TRANSIT TIME=0.67E+02 HR

14

DOSE(MAN-REM)

PATHWAY	AGE GROUP	USAGE	SKIN	TOTAL BODY	THYROID
SWIMMING	TOTAL POPUL	2.20E+05	0.0	3.54E-04	3.54E-04

LOCATION- 0.2 RE

DILUTION=0.51E+01 TRANSIT TIME=0.22E+02 HR

5.1

DOSE(MAN-REM)

PATHWAY	AGE GROUP	USAGE	SKIN	TOTAL BODY	THYROID
SWIMMING	TOTAL POPUL	1.87E+05	0.0	3.56E-04	3.56E-04

LOCATION- 0.2 RE

DILUTION=0.45E+01 TRANSIT TIME=0.17E+02 HR

4.5

Table 4.9u

HCGS

CASE 1

DOSE(MAN-REM)

PATHWAY	AGE GROUP	USAGE	SKIN	TOTAL BODY	THYROID
SWIMMING	TOTAL POPUL	2.53E+05	0.0	2.36E-04	2.36E-04

LOCATION- 0.2 RE

DILUTION=0.78E+01 TRANSIT TIME=0.47E+02 HR

7.8

DOSE(MAN-REM)

PATHWAY	AGE GROUP	USAGE	SKIN	TOTAL BODY	THYROID
SWIMMING	TOTAL POPUL	2.02E+05	0.0	1.39E-05	1.39E-05

LOCATION- 0.2 RE

DILUTION=0.96E+02 TRANSIT TIME=0.10E+03 HR

96

DOSE(MAN-REM)

PATHWAY	AGE GROUP	USAGE	SKIN	TOTAL BODY	THYROID
SWIMMING	TOTAL POPUL	2.40E+05	0.0	5.10E-06	5.10E-06

LOCATION- 0.2 RE

DILUTION=0.30E+03 TRANSIT TIME=0.16E+03 HR

300

DOSE(MAN-REM)

PATHWAY	AGE GROUP	USAGE	SKIN	TOTAL BODY	THYROID
SWIMMING	TOTAL POPUL	3.06E+05	0.0	1.22E-06	1.22E-06

LOCATION- 0.2 RE

DILUTION=0.15E+04 TRANSIT TIME=0.23E+03 HR

1500

DOSE(MAN-REM)

PATHWAY	AGE GROUP	USAGE	SKIN	TOTAL BODY	THYROID
BOATING	TOTAL POPUL	6.72E+03	0.0	4.71E-10	4.71E-10

LOCATION- 0.2 RE

DILUTION=0.44E+05 TRANSIT TIME=0.21E+03 HR

DOSE(MAN-REM)

PATHWAY	AGE GROUP	USAGE	SKIN	TOTAL BODY	THYROID
BOATING	TOTAL POPUL	1.25E+04	0.0	2.06E-07	2.06E-07

LOCATION- 0.2 RE

DILUTION=0.19E+03 TRANSIT TIME=0.15E+03 HR

Table 4.9v

HCGS

DOSE(MAN-REM)

PATHWAY	AGE GROUP	USAGE	SKIN	TOTAL BODY	THYROID
BOATING	TOTAL POPUL	1.63E+04	0.0	4.01E-07	4.01E-07

LOCATION- 0.2 RE

DILUTION=0.13E+03 TRANSIT TIME=0.12E+03 HR

DOSE(MAN-REM)

PATHWAY	AGE GROUP	USAGE	SKIN	TOTAL BODY	THYROID
BOATING	TOTAL POPUL	2.21E+04	0.0	5.32E-06	5.32E-06

LOCATION- 0.2 RE

DILUTION=0.14E+02 TRANSIT TIME=0.67E+02 HR

DOSE(MAN-REM)

PATHWAY	AGE GROUP	USAGE	SKIN	TOTAL BODY	THYROID
BOATING	TOTAL POPUL	3.36E+04	0.0	2.70E-05	2.70E-05

LOCATION- 0.2 RE

DILUTION=0.51E+01 TRANSIT TIME=0.22E+02 HR

DOSE(MAN-REM)

PATHWAY	AGE GROUP	USAGE	SKIN	TOTAL BODY	THYROID
BOATING	TOTAL POPUL	4.22E+04	0.0	4.02E-05	4.02E-05

LOCATION- 0.2 RE

DILUTION=0.45E+01 TRANSIT TIME=0.17E+02 HR

DOSE(MAN-REM)

PATHWAY	AGE GROUP	USAGE	SKIN	TOTAL BODY	THYROID
BOATING	TOTAL POPUL	7.20E+04	0.0	3.36E-05	3.36E-05

LOCATION- 0.2 RE

DILUTION=0.78E+01 TRANSIT TIME=0.47E+02 HR

DOSE(MAN-REM)

PATHWAY	AGE GROUP	USAGE	SKIN	TOTAL BODY	THYROID
BOATING	TOTAL POPUL	1.67E+05	0.0	5.75E-06	5.75E-06

LOCATION- 0.2 RE

DILUTION=0.96E+02 TRANSIT TIME=0.10E+03 HR

DOSE(MAN-REM)

PATHWAY	AGE GROUP	USAGE	SKIN	TOTAL BODY	THYROID

BOATING	TOTAL POPUL	2.81E+05	0.0	2.[illegible]06	2.99E-06

[illegible]SE 1

LOCATION- 0.2 RE

DILUTION=0.30E+03 TRANSIT TIME=0.16E+03 HR

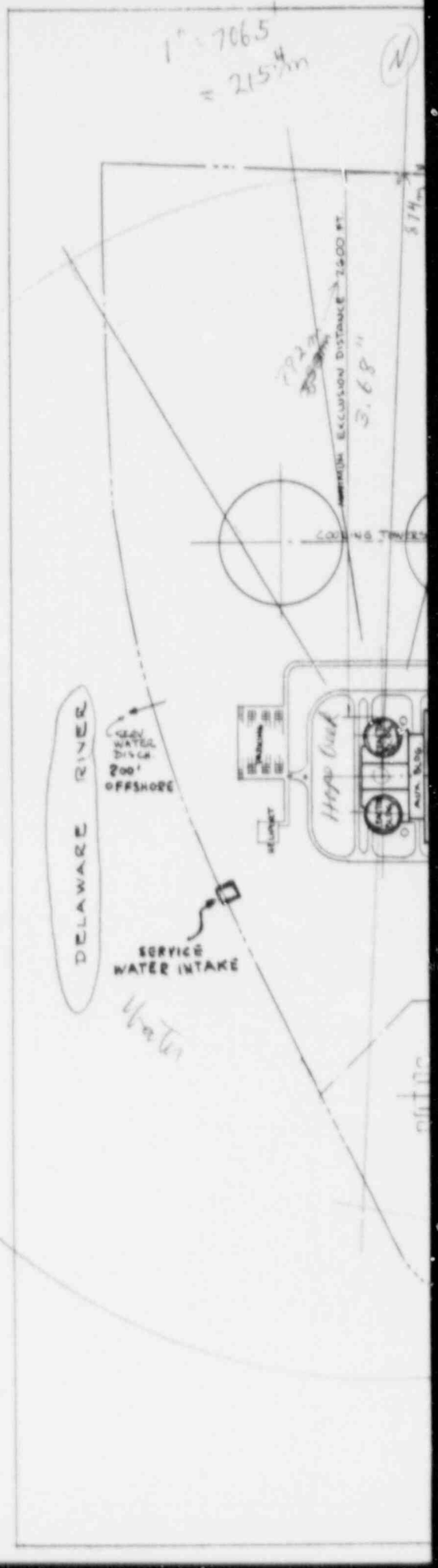
			DOSE(MAN-REM)		
PATHWAY	AGE GROUP	USAGE	SKIN	TOTAL BODY	THYROID
BOATING	TOTAL POPUL	3.06E+05	0.0	6.11E-07	6.11E-07

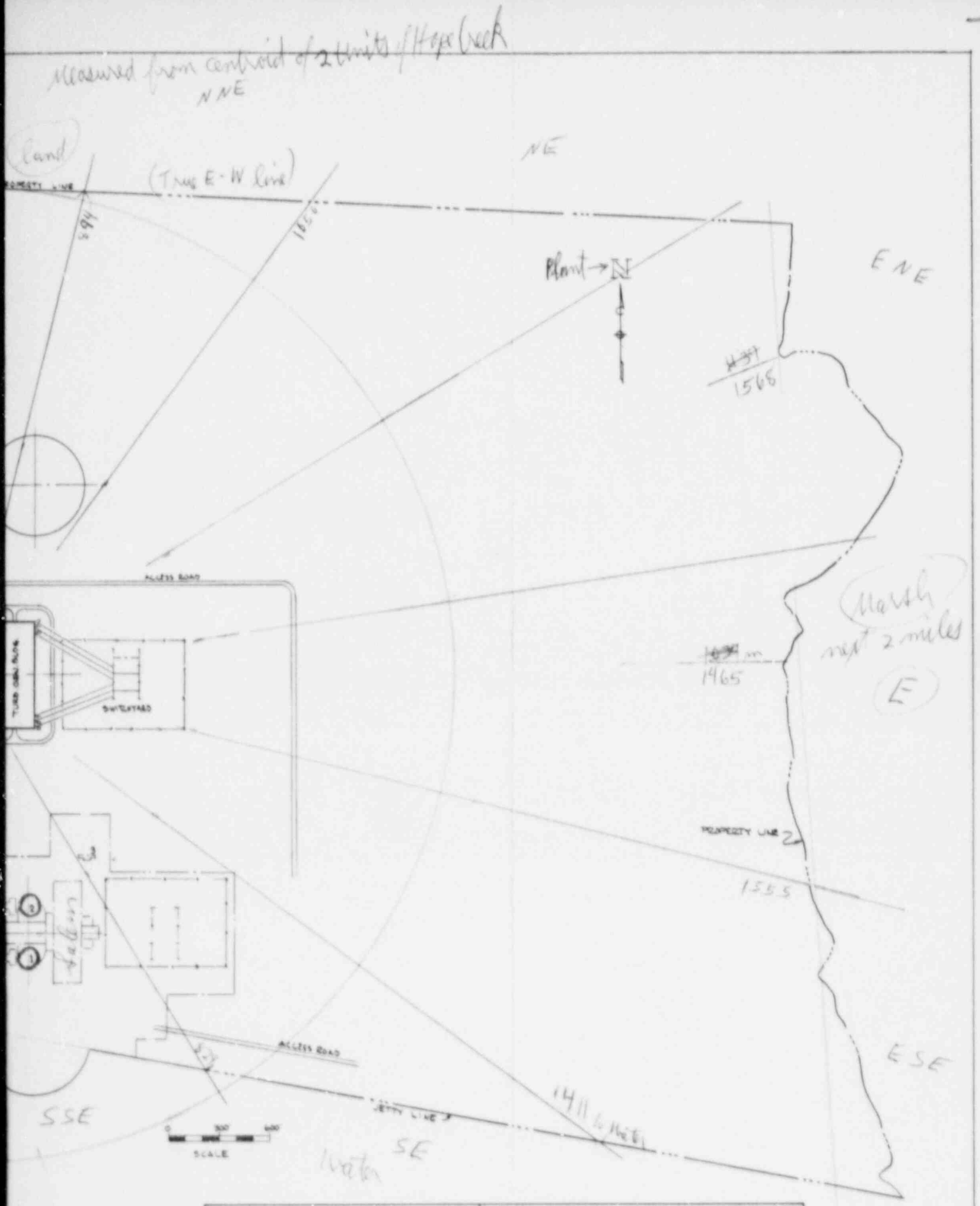
LOCATION- 0.2 RE

DILUTION=0.15E+04 TRANSIT TIME=0.23E+03 HR

TI
APERTURE
CARD

Also Available On
Aperture Card





PUBLIC SERVICE ELECTRIC AND GAS COMPANY	INTAKE & DISCHARGE LOCATION
HOPE CREEK GEN. STATION	AMENDMENT 6 FIG 6.3-2

8805270103-01

* * * COST-BENEFIT ANALYSIS * * * TABLE 4.9y

CA[illegible]

NUCLIDE	RELEASE CI/YR	MAN-REM DOSE		MAN-REM PER CURIE	
		TOTAL BODY	THYROID	TOTAL BODY	THYROID
11NA 24	9.80E-03	6.65E-05	6.65E-05	6.79E-03	6.79E-03
15P 32	2.80E-03	9.34E-02	4.78E-08	3.33E+01	1.71E-05
24CR 51	7.60E-02	8.19E-05	7.18E-05	1.08E-03	9.44E-04
25MN 54	3.00E-03	8.89E-04	5.66E-04	2.96E-01	1.89E-01
25MN 56	1.16E-03	4.32E-08	4.32E-08	3.72E-05	3.72E-05
26FE 55	1.70E-02	1.71E-01	3.11E-09	1.01E+01	1.83E-07
26FE 59	4.80E-04	2.27E-03	2.01E-05	4.72E+00	4.18E-02
27CO 58	1.12E-02	1.86E-03	6.23E-04	1.66E-01	5.56E-02
27CO 60	2.40E-02	7.75E-02	6.94E-02	3.23E+00	2.89E+00
29CU 64	2.60E-02	6.94E-06	6.93E-06	2.67E-04	2.67E-04
30ZN 65	3.40E-03	5.47E-02	3.46E-04	1.61E+01	1.02E-01
30ZN 69M	1.90E-03	1.15E-06	1.14E-06	6.05E-04	6.01E-04
30ZN 69	2.00E-03	1.23E-14	1.23E-14	6.14E-12	6.14E-12
74W 187	6.40E-04	7.36E-07	7.35E-07	1.15E-03	1.15E-03
93NP 239	3.80E-02	2.34E-05	2.34E-05	6.15E-04	6.15E-04
35BR 83	6.00E-05	8.27E-12	8.27E-12	1.38E-07	1.38E-07
38SR 89	1.62E-03	1.99E-05	2.55E-08	1.23E-02	1.57E-05
38SR 90	1.00E-04	2.54E-04	1.55E-10	2.54E+00	1.55E-06
39Y 90	6.00E-05	1.69E-09	1.60E-09	2.82E-05	2.66E-05
38SR 91	2.00E-03	1.81E-06	1.81E-06	9.06E-04	9.06E-04
39Y 91M	1.34E-03	8.77E-13	8.77E-13	6.55E-10	6.55E-10
39Y 91	1.04E-03	3.67E-07	1.66E-07	3.53E-04	1.60E-04
38SR 92	2.60E-04	9.93E-09	9.93E-09	3.82E-05	3.82E-05
39Y 92	1.24E-03	2.51E-08	2.51E-08	2.03E-05	2.03E-05
39Y 93	2.20E-03	2.20E-07	2.20E-07	1.00E-04	1.00E-04
40ZR 95	1.20E-04	4.52E-04	4.48E-06	3.76E-02	3.73E-02
41NB 95	1.20E-04	3.72E-06	2.60E-06	3.10E-02	2.16E-02
42MO 99	1.28E-02	1.97E-05	1.71E-05	1.54E-03	1.33E-03
43TC 99M	1.60E-02	7.86E-07	7.86E-07	4.91E-05	4.91E-05
44RU 103	6.00E-04	1.20E-05	1.00E-05	2.00E-02	1.67E-02
44RU 105	2.00E-04	2.23E-08	2.23E-08	1.12E-04	1.12E-04
45RH 105	8.00E-04	3.10E-07	2.57E-07	3.88E-04	3.21E-04
44RU 106	4.80E-03	3.62E-04	2.77E-04	7.55E-02	5.76E-02
52TE 129M	6.20E-04	4.73E-03	1.00E-02	7.63E+00	1.62E+01
52TE 129	4.00E-04	3.03E-12	3.03E-12	7.57E-09	7.57E-09
52TE 131M	2.80E-04	6.27E-06	1.10E-05	2.24E-02	3.92E-02
52TE 131	6.00E-05	4.71E-23	4.71E-23	7.84E-19	7.84E-19
53I 131	5.80E-02	6.73E-04	2.32E-01	1.16E-02	4.01E+00
52TE 132	8.00E-05	8.00E-05	9.44E-05	1.00E+00	1.18E+00
53I 132	5.40E-04	1.50E-08	1.50E-08	2.78E-05	2.78E-05
53I 133	3.40E-02	4.03E-05	1.22E-04	1.18E-03	3.58E-03
53I 134	4.00E-05	2.29E-13	2.29E-13	5.73E-09	5.73E-09
55CS 134	2.60E-02	5.04E-02	2.40E-02	1.94E+00	9.21E-01
53I 135	4.80E-03	3.91E-06	3.91E-06	8.15E-04	8.15E-04
55CS 136	4.60E-04	6.04E-05	1.35E-05	1.31E-01	2.93E-02
55CS 137	5.00E-02	9.90E-02	6.90E-02	1.98E+00	1.38E+00
56BA 139	4.00E-05	6.47E-13	6.47E-13	1.62E-08	1.62E-08
56BA 140	5.40E-03	5.27E-05	2.07E-05	9.75E-03	3.83E-03
57LA 140	4.40E-03	3.68E-05	3.68E-05	8.36E-03	8.36E-03
57LA 141	4.00E-05	1.24E-10	1.24E-10	3.10E-06	3.10E-06
58CE 141	5.00E-04	1.07E-06	1.07E-06	2.15E-03	2.13E-03
57LA 142	2.00E-05	4.28E-11	4.28E-11	2.14E-06	2.14E-06
58CE 143	1.00E-04	1.02E-07	1.02E-07	1.02E-03	1.02E-03
59PR 143	5.80E-04	9.61E-09	2.46E-09	1.66E-05	4.25E-06
58CE 144	1.04E-02	1.08E-04	9.87E-05	1.04E-02	9.49E-03
59PR 144	4.00E-05	6.27E-30	6.27E-30	1.57E-25	1.57E-25
60ND 147	4.00E-05	7.06E-08	7.02E-08	1.77E-03	1.76E-03
1H 3	8.60E+01	2.53E-03	2.53E-03	2.94E-05	2.94E-05

Table 4.9z

TOTAL INTEGRATED MAN REM DOSE (LIQUIDS)

Total Body	Thyroid
5.61E-01	4.10E-01

HCGS

POPULATION AND INDIVIDUAL DOSE CALCULATIONS FOR HOPE CREEK GENERATING STATION

RELEASE, ENVIRONS INVENTORY, AND ANNUAL PATHWAY INVENTORIES-CI

NUCLIDE	RELEASE	ENVIRON.	GROUND	VEGETATION	MILK	MEAT
NP [illegible]	[illegible]+01	6.10E-03	0.0	0.0	0.0	0.0
NP [illegible]	[illegible]+02	1.30E-01	0.0	0.0	0.0	0.0
NP [illegible]	[illegible]+02	4.99E+03	0.0	0.0	0.0	0.0
NP [illegible]	[illegible]+02	7.52E-02	0.0	0.0	0.0	0.0
NP [illegible]	[illegible]+02	2.70E-01	0.0	0.0	0.0	0.0
AL [illegible]	[illegible]+00	9.32E-02	0.0	0.0	0.0	0.0
AL [illegible]	[illegible]+03	1.13E+02	0.0	0.0	0.0	0.0
AL [illegible]	[illegible]+03	6.32E-02	0.0	0.0	0.0	0.0
AL [illegible]	[illegible]+03	3.34E+03	0.0	0.0	0.0	0.0
AL [illegible]	[illegible]+03	1.40E-01	0.0	0.0	0.0	0.0
I [illegible]	[illegible]-01	2.01E-02	2.45E-03	2.88E-07	1.07E-06	2.14E-04
I [illegible]	[illegible]+03	1.03E-02	9.66E-04	3.34E-24	3.60E-08	7.83E-15
C [illegible]	[illegible]+01	2.65E+02	0.0	1.26E-03	2.45E-04	1.09E-04
MN [illegible]	[illegible]+01	1.51E-02	0.0	0.0	0.0	0.0
H [illegible]	[illegible]+01	8.72E+02	0.0	3.89E-04	6.40E-05	1.30E-05
CR [illegible]	[illegible]-01	2.85E-03	5.36E-04	1.78E-07	1.31E-08	1.57E-07
MN [illegible]	[illegible]-01	2.37E-03	4.45E-04	6.42E-08	3.14E-10	1.59E-10
FE [illegible]	[illegible]-03	2.32E-04	4.37E-05	1.71E-08	4.98E-10	2.12E-09
CO [illegible]	[illegible]-03	3.74E-04	7.02E-05	2.56E-08	5.44E-10	9.95E-10
CO [illegible]	[illegible]-03	4.06E-02	7.62E-03	2.41E-07	4.69E-09	9.96E-09
ZN [illegible]	[illegible]-04	4.85E-04	9.10E-05	2.06E-08	1.47E-08	1.78E-09
SR [illegible]	[illegible]-02	2.59E-03	4.49E-04	1.76E-07	3.26E-09	3.22E-10
SR [illegible]	[illegible]-05	5.80E-04	1.09E-04	2.04E-09	3.39E-11	3.80E-12
ZR [illegible]	[illegible]-04	5.72E-05	1.07E-05	4.01E-09	4.53E-13	4.09E-10
SB [illegible]	[illegible]-04	1.43E-04	2.69E-05	1.03E-08	3.39E-10	1.23E-10
CS [illegible]	[illegible]-04	2.53E-03	4.76E-04	3.14E-08	7.36E-09	3.97E-10
CS [illegible]	[illegible]-04	6.37E-06	1.20E-06	1.35E-10	1.97E-10	4.52E-12
CS [illegible]	[illegible]-03	2.05E-02	3.86E-03	6.75E-08	1.56E-08	8.52E-10
CE [illegible]	[illegible]-02	1.11E-03	2.09E-04	2.25E-08	1.15E-09	6.32E-10
CE [illegible]	[illegible]-03	1.62E-04	3.04E-05	1.10E-08	1.93E-10	4.50E-11

GASPAR

POPULATION AND INDIVIDUAL DOSE CALCULATIONS FOR HOPE CREEK GENERATING STATION

SITE POPULATION DATA

DIR	0.0-1.	1.-2.	2.-3.	3.-4.	4.-5.	5.-10.	10.-20.	20.-30.	30.-40.	40.-50.	TOTAL
N	0.0	0.0	0.0	0.0	0.0	0.0	1.506E+05	2.088E+05	1.927E+05	2.255E+05	7.777E+05
NNE	0.0	0.0	0.0	0.0	6.400E+01	1.215E+04	2.386E+04	1.448E+05	1.267E+06	1.594E+06	3.042E+06
NE	0.0	0.0	1.100E+01	5.200E+01	6.980E+02	2.993E+03	1.912E+04	7.912E+04	5.032E+05	5.273E+05	1.123E+06
ENE	0.0	0.0	0.0	6.900E+01	2.120E+02	1.641E+03	9.230E+03	4.442E+04	8.304E+04	8.501E+04	2.236E+05
E	0.0	0.0	0.0	4.000E+01	0.0	1.001E+03	3.425E+04	7.690E+04	5.577E+04	2.970E+04	1.977E+05
ESE	0.0	0.0	0.0	0.0	2.300E+01	2.810E+02	1.725E+04	2.103E+04	9.572E+03	3.903E+04	8.718E+04
SE	0.0	0.0	0.0	0.0	0.0	6.103E+01	3.185E+03	1.192E+03	3.870E+02	2.761E+04	3.244E+04
SSE	0.0	0.0	0.0	0.0	0.0	9.810E+02	3.470E+02	1.351E+03	6.090E+03	8.216E+03	1.699E+04
S	0.0	0.0	0.0	0.0	3.540E+02	1.783E+03	1.907E+04	6.787E+04	1.606E+04	1.458E+04	1.197E+05
SSW	0.0	0.0	0.0	2.840E+02	5.000E+01	5.463E+03	2.038E+04	9.398E+03	1.020E+04	1.283E+04	5.861E+04
SW	0.0	0.0	0.0	0.0	4.550E+02	6.665E+03	8.849E+03	6.320E+03	7.471E+03	1.147E+04	4.723E+04
WSW	0.0	0.0	5.000E+01	5.000E+01	4.550E+02	1.582E+04	5.867E+03	3.583E+03	1.655E+04	5.867E+04	1.010E+05
W	0.0	0.0	5.000E+01	2.530E+02	5.050E+02	3.183E+04	7.307E+03	8.151E+03	1.063E+05	2.036E+05	3.580E+05
WNW	0.0	0.0	0.0	2.021E+03	4.040E+02	7.578E+03	2.382E+04	3.458E+04	5.877E+04	3.776E+04	1.649E+05
NW	0.0	0.0	0.0	1.263E+03	1.865E+03	1.006E+03	9.383E+04	3.849E+04	2.085E+04	2.856E+04	1.859E+05
NNW	0.0	0.0	0.0	1.010E+02	1.720E+03	1.824E+03	1.638E+05	8.800E+04	6.375E+04	3.544E+04	3.546E+05
TOTAL	0.0	0.0	1.110E+02	4.133E+03	6.805E+03	9.103E+04	5.918E+05	8.340E+05	2.418E+06	2.939E+06	6.885E+06

DENSITY(/M**2) = 3.44E-04

SITE VEGETATION PRODUCTION, KGR (INCLUDES FRUITS & VEGETABLES)

DIR	0.0-1.	1.-2.	2.-3.	3.-4.	4.-5.	5.-10.	10.-20.	20.-30.	30.-40.	40.-50.	TOTAL
N	0.0	0.0	0.0	0.0	0.0	1.450E+06	1.300E+07	2.870E+05	1.690E+06	0.0	1.643E+07
NNE	0.0	0.0	0.0	0.0	1.640E+05	1.160E+07	4.070E+07	4.340E+07	1.490E+06	0.0	9.735E+07
NE	0.0	0.0	0.0	0.0	9.110E+03	1.160E+07	3.640E+07	0.0	1.580E+07	2.460E+07	8.841E+07
ENE	0.0	0.0	0.0	0.0	0.0	8.730E+06	2.760E+07	6.160E+07	1.530E+07	2.200E+07	1.152E+08
E	0.0	0.0	0.0	0.0	0.0	4.670E+06	5.440E+07	4.730E+07	2.310E+07	7.780E+06	1.372E+08
ESE	0.0	0.0	0.0	0.0	0.0	8.750E+06	6.130E+07	0.0	1.040E+07	9.610E+06	9.006E+07
SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.120E+06	1.510E+07	1.622E+07
SSE	0.0	0.0	0.0	0.0	0.0	0.0	1.380E+07	1.760E+07	1.950E+07	1.290E+07	6.380E+07
S	0.0	0.0	0.0	0.0	1.820E+03	1.090E+06	8.530E+06	6.890E+06	9.400E+06	2.390E+06	2.830E+07
SSW	0.0	0.0	0.0	1.280E+03	0.0	1.320E+06	3.070E+06	7.220E+05	6.210E+06	1.330E+07	2.462E+07
SW	0.0	0.0	0.0	0.0	1.930E+04	1.540E+06	3.140E+06	5.220E+06	4.260E+06	4.500E+06	1.868E+07
WSW	0.0	0.0	0.0	0.0	4.540E+03	1.220E+07	4.510E+06	7.860E+06	1.280E+07	6.060E+06	4.343E+07
W	0.0	0.0	0.0	0.0	4.540E+03	1.540E+06	4.960E+06	2.020E+06	2.620E+06	8.310E+06	1.945E+07
WNW	0.0	0.0	0.0	0.0	5.500E+03	1.320E+06	4.880E+06	3.440E+06	9.100E+06	8.460E+06	2.721E+07
NW	0.0	0.0	0.0	1.720E+03	4.820E+03	2.200E+05	4.510E+06	6.280E+06	3.920E+06	6.550E+06	2.149E+07
NNW	0.0	0.0	0.0	0.0	9.080E+02	0.0	0.0	2.090E+06	3.210E+06	6.090E+06	1.139E+07
TOTAL	0.0	0.0	0.0	3.000E+03	2.145E+05	6.603E+07	2.609E+08	1.847E+08	1.399E+08	1.476E+08	8.193E+08

DENSITY(/M**2) = 4.10E-02

POPULATION AND INDIVIDUAL DOSE CALCULATIONS FOR HOPE CREEK GENERATING STATION

SITE MILK PRODUCTION, LITERS

DIR	0.0-1.	1.-2.	2.-3.	3.-4.	4.-5.	5.-10.	10.-20.	20.-30.	30.-40.	40.-50.	TOTAL
N	0.0	0.0	0.0	0.0	0.0	3.270E+05	2.940E+06	3.480E+05	2.030E+06	6.420E+06	1.207E+07
NNE	0.0	0.0	0.0	0.0	1.360E+05	2.620E+06	2.940E+06	3.480E+06	2.030E+06	6.420E+06	1.763E+07
NE	0.0	0.0	0.0	0.0	0.0	2.620E+06	9.150E+06	1.810E+06	6.250E+06	0.0	1.364E+07
ENE	0.0	0.0	0.0	0.0	0.0	1.960E+06	8.180E+06	0.0	2.490E+05	1.040E+07	2.079E+07
E	0.0	0.0	0.0	0.0	0.0	7.130E+05	1.770E+06	2.560E+06	3.530E+05	0.0	5.396E+06
ESE	0.0	0.0	0.0	0.0	0.0	2.850E+05	2.000E+06	0.0	2.850E+05	9.150E+05	3.485E+06
SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.970E+05	1.320E+06	1.617E+06
SSE	0.0	0.0	0.0	0.0	0.0	0.0	2.990E+06	3.820E+06	5.280E+06	3.730E+06	1.582E+07
S	0.0	0.0	0.0	0.0	0.0	1.300E+06	2.700E+06	1.490E+06	2.160E+06	6.970E+05	8.147E+06
SSW	0.0	0.0	0.0	0.0	0.0	1.560E+06	2.150E+06	6.730E+05	0.0	0.0	4.383E+06
SW	0.0	0.0	0.0	0.0	0.0	1.820E+06	3.240E+06	6.950E+06	7.170E+06	6.690E+06	2.587E+07
WSW	0.0	0.0	0.0	0.0	0.0	1.820E+06	5.540E+06	7.740E+06	1.610E+07	5.150E+06	3.135E+07
W	0.0	0.0	0.0	0.0	2.890E+05	1.820E+06	7.350E+06	3.480E+06	7.520E+06	1.700E+07	3.746E+07
WNW	0.0	0.0	0.0	0.0	0.0	1.560E+06	6.860E+06	1.360E+07	4.030E+07	4.840E+07	1.107E+08
NW	0.0	0.0	0.0	0.0	0.0	2.600E+06	5.630E+06	2.020E+07	2.770E+07	4.860E+07	1.041E+08
NNW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.490E+06	2.270E+07	4.060E+07	6.579E+07
TOTAL	0.0	0.0	0.0	0.0	4.250E+05	2.100E+07	6.344E+07	6.864E+07	1.292E+08	1.955E+08	4.783E+08

DENSITY(/A**2) = 2.39E-02

SITE ANNUAL MEAT PRODUCTION, KGR (NON-POULTRY)

DIR	0.0-1.	1.-2.	2.-3.	3.-4.	4.-5.	5.-10.	10.-20.	20.-30.	30.-40.	40.-50.	TOTAL
N	0.0	0.0	0.0	0.0	0.0	3.796E+04	3.403E+05	1.660E+05	9.685E+05	1.738E+06	3.251E+06
NNE	0.0	0.0	0.0	0.0	7.800E+03	3.027E+05	1.055E+06	4.562E+06	1.572E+05	0.0	6.085E+06
NE	0.0	0.0	0.0	0.0	1.140E+04	3.027E+05	9.448E+05	0.0	7.740E+05	2.664E+06	4.696E+06
ENE	0.0	0.0	0.0	0.0	0.0	2.271E+05	7.180E+05	3.687E+06	1.022E+06	3.574E+05	6.012E+06
E	0.0	0.0	0.0	0.0	0.0	8.603E+04	3.291E+05	1.573E+06	5.446E+05	1.042E+05	2.637E+06
ESE	0.0	0.0	0.0	0.0	0.0	5.295E+04	3.715E+05	0.0	1.959E+05	8.952E+05	1.515E+06
SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.041E+05	1.981E+06	2.185E+06
SSE	0.0	0.0	0.0	0.0	0.0	0.0	1.060E+06	1.355E+06	1.971E+06	2.998E+06	7.384E+06
S	0.0	0.0	0.0	0.0	0.0	1.016E+05	6.703E+05	5.300E+05	7.662E+05	1.766E+05	2.245E+06
SSW	0.0	0.0	0.0	0.0	0.0	1.219E+05	2.599E+05	2.605E+05	7.150E+05	1.544E+06	2.901E+06
SW	0.0	0.0	0.0	0.0	0.0	1.417E+05	3.605E+05	1.980E+06	2.378E+06	2.080E+06	6.941E+06
WSW	0.0	0.0	0.0	0.0	3.720E+03	1.417E+05	6.587E+05	1.192E+06	2.003E+06	9.116E+05	4.911E+06
W	0.0	0.0	0.0	0.0	1.860E+04	1.417E+05	7.451E+05	3.972E+05	9.155E+05	2.815E+06	5.033E+06
WNW	0.0	0.0	0.0	0.0	1.320E+03	1.219E+05	6.618E+05	1.823E+06	6.977E+06	1.144E+07	2.103E+07
NW	0.0	0.0	0.0	2.400E+02	0.0	2.021E+04	4.738E+05	2.543E+06	3.911E+06	8.501E+06	1.545E+07
NNW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.562E+05	3.208E+06	7.756E+06	1.122E+07
TOTAL	0.0	0.0	0.0	2.400E+02	4.284E+04	1.800E+06	8.649E+06	2.032E+07	2.671E+07	4.596E+07	1.035E+08

DENSITY(/A**2) = 5.17E-03

TABLE 2.5-6 (continued)

Map Location	Name of Owner	Mailing Address	Distance from site (miles-direction)	Number of Young Cows	Number of Milk Cows	Total Milk Production (lbs/yr.)	
45	Bob Kux	Box 35 Port Penn	4.1 - NW	47	45	454,500	27
46	Ed Deporti	St. Georges	8.8 - NW	60	60	606,000	
47	Wills Passmore	R.D. #1 Box 64 Townsend	6 - SW	55	55	555,500	
48	T. Alkinson	R.D. #1 Townsend	6.2 - SW	50	50	505,000	
49	Carton Blendt Jr.	R.D. #1 Townsend	6.1 - SW	50	50	505,000	15
50	Loyd & David Sheats	R.D. #2 Middletown	5.7 - WSW	125	125	1,262,500	
51	David Reed	R.D. #2 Middletown	5.9 - WNW	55	55	555,500	
52	Phillips	R.D. #2 Middletown	4.4 - W	30	0	-	27
53	NA	NA	6 - SW	0	4	40,400	
54	NA	NA	6.2 - SW	0	2	20,200	
55	McNatt - Moore	Port Penn	4.5 - NNW	9	0	-	27
56	Steller	Townson	4.3 - SW	1	1	10,100	
57	Voss	R.D. #2 Middletown	5.0 - W	25	0	-	
58	W. David	Townson	5.1 - SSW	0	1	10,100	

NA - Not Available

Notes: 1) Total milk production based on an average of 10,100 lbs/yr. per cow.
2) Dairy information for New Castle County, Delaware, was given in total number of cows, therefore an approximate number of milk cows was obtained.
3) Herds 53-54 were obtained after making a site visit to Delaware; no names or addresses were available. 27
4) Information on dairy cows in a five mile radius of site updated in summer, 1973.

TABLE 2.5-6 (continued)

Map Location	Name of Owner	Mailing Address	Distance from site (Miles-direction)	Number of Young Cows	Number of Milk Cows	Total Milk production (lbs/yr.)
Cumberland Co., New Jersey						
30	Albert S. Fogg	R.D. #3 Bridgeton	9.9 - E	40	70	707,000
New Castle Co., Delaware						
31	George Baxter	R #1 Middletown	6.6 - NW	40	40	404,000
32	W. E. Bullen	R #1 Middletown	6.6 - WNW	50	50	505,000
33	R. Chambers	R #1 Middletown	5.2 - NW	60	60	606,000
34	W. Cleaver	R #1 Middletown	8.8 - W	60	60	606,000
35	J. Coverdale	R #1 Middletown	7.6 WNW	55	55	555,500
36	S. Coverdale	R #1 Middletown	7.8 - WNW	55	55	555,500
37	Raymond Burris	R.D. #2 Middletown	8.6 - W	50	50	505,000
38	Samuel Deats	R #1 Middletown	10 - WNW	60	60	606,000
39	Robert Emerson	R.D. #2 Middletown	8.2 - WNW	60	60	606,000
40	J. Fennimore	Box 161 Middletown	8.3 - W	50	50	505,000
41	Claude D. Hamman	R.D. #2 Middletown	4.9 - W	50	75	575,700
42	Harvey Voshell	R #1 Middletown	10.2 - NW	60	60	606,000
43	Edger Wooleyham	R.D. #2 Middletown	9.3 - NW	50	50	505,000
44	Leroy Deporti	Odessa	6.7 - WSW	50	50	505,000

Table 2.5-6
(Sheet 3 of 4)

Amendment 27

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TABLE 2.5-6 (continued)

Map Location	Name of Owner	Mailing Address	Distance from site (miles-direction)	Number of Young Cows	Number of Milk Cows	Total Milk Production (lbs/yr.)
15	F. Sowers	R.D. #3 Salem	4.4 - NNE	1	2	20,200
16	Norman Johnson	R.D. #2 Salem	8 - ENE	170	0	0
17	Ar. Peterson	Box 15 Alloway	9.5 - ENE	45	57	575,700
18	Albert M. Bell	R.D. #2 Salem	7.7 - NE	20	40	404,000
19	Walt Bradway	R.D. #2 Salem	7 - E	0	7	70,700
20	Norman Counseller	R.D. #2 Salem	6.5 - E	11	28	282,800
21	W. Deldon	R.D. #2 Salem	11 - E	34	52	525,200
22	Howard Henderson, Jr.	R.D. #2 Salem	5.2 - E	10	16	161,600
23	Richard Keen	R.D. #2 Salem	8.2 - NE	20	45	454,500
24	Ross Peterson	Howard Ave.	8 - NE	25	0	0
25	Vicent Retman	R.D. #1 Salem	9 - NNE	10	6	60,600
26	Bob Ridgway	R.D. #3 Salem	6.6 - NE	25	45	454,500
27	Edgar Stoms	R.D. #1 Salem	9 - NNE	20	45	454,500
28	W.K. Thomaski	R.D. #2 Salem	8.3 - ENE	50	0	0
29	A. Weigel	R.D. #1 Salem	9.2 - NNE	8	30	303,000

Table 2.5-6
(Sheet 2 of 4)

Amendment 27

TABLE 2.5-6

Dairy Farms Within 10 Miles of the Site

Map Location	Name of Owner	Mailing Address	Distance from site (miles-direction)	Number of Young Cows	Number of Milk Cows	Total Milk Production (lbs/yr.)
Salem Co., N.J.						
1	Dr. Webster	R.D. #3 Salem	5.6 - NNE	NA	50	505,000
2	A. Farnkaopf	R.D. #3 Salem	5.1 - NNE	10	60	60,600
3	L. Richie	30 S. Tillury Rd.	7.3 - NNE	10	28	282,800
4	B. Haynes, Jr.	R.D. #3 Salem	6.3 - NNE	25	73	737,300
5	F. Schrier	R.D. #3 Salem	10 - NNE	1	34	343,400
6	L. Fogg	R.D. #2 Salem	6 E	50	50	505,000
7	W. Dixon	R.D. #2 Salem	5.5 - E	11	21	212,100
8	F. Smith	R.D. #2 Salem	7 - E	3	31	313,100
9	J.H. Griscom	R.D. #1 Salem	9.3 - NNE	25	74	747,400
10	Ar. Griscom, Jr.	R.D. #1 Salem	11 - NE	65	80	808,000
11	Waldac Farms, Inc.	R.D. #1 Salem	12 - NE	107	100	1,010,000
12	Charles Harris	R.D. #2 Salem	5.2 - NE	0	15	151,500
13	W. Gaunt	R.D. #2 Salem	8.5 - ENE	23	35	353,500
14	Horrace Stoms	R.D. #2 Salem	7.4 - NE	35	70	707,000

Amendment 27

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Salem

Bdy dist
N 1315 - 1280
1520 1430
1681

300' meteo tower shown

700 Acres - Reactor in SW corner (~~Pg 12.3-35~~)

Bdy = 1375 m ~~north~~ (Pg. 12.3-36)

Applicants LPZ = 5 mi

AERIAL PHOTOGRAPH OF SITE

FIG. 2.2-4

Figure 2. - Map of Artificial Island and the location of the Salem Nuclear Generating Station, Salem County, New Jersey. Note locations of Hope and Hope Alloway Halfway creeks.

POPULATION AND INDIVIDUAL DOSE CALCULATIONS FOR HOPE CREEK GENERATING STATION

AGRICULTURAL PRODUCTIVITY

PRODUCT	CAP USE	PRODUCTION	EXPORT	T.POP SERVED
VEGETATION	1.99E+02	8.19E+09	0.0	4.12E+06
MILK	1.35E+02	4.78E+08	0.0	3.55E+06
MEAT	7.84E+01	1.03E+08	0.0	1.32E+06

0.20 0.14 0.66

200.00 240.00 190.00

170.00 200.00 110.00

57.00 59.00 55.00

Table 4.11a

CASE 1

POPULATION AND INDIVIDUAL DOSE CALCULATIONS FOR HOPE CREEK GENERATING STATION

ID	SPECIAL LOCATION	DIR	MILES	X/Q	X/QDEC	X/QDEP	DEPOSIT	PL	CO	VT	MT	CM	GM	IN
1	DAIRY FARM #1	2	4.00	2.94E-08	2.94E-08	1.02E-08	1.02E-10	0	0	0	0	0	0	0
1	DAIRY FARM #2	13	5.00	2.41E-08	2.41E-08	5.68E-09	5.68E-11	0	0	0	0	0	0	0
1	VEG FARM #1	16	4.40	4.83E-08	4.83E-08	1.67E-08	1.67E-10	0	0	0	0	0	0	0
1	PUBLIC POINT	1	0.50	1.23E-06	1.23E-06	7.59E-07	7.59E-09	0	0	0	0	0	0	0
1	RESIDENCE	4	3.50	5.74E-08	5.74E-08	1.85E-08	1.85E-10	0	0	0	0	0	0	0

S Bdy
Rad

POPULATION AND INDIVIDUAL DOSE CALCULATIONS FOR HOPE CREEK GENERATING STATION

SITE ANNUAL ~~AVERAGE~~ D DEPLETED X/Q DATA, SEC/M3

SEC	0.0-1.	1.-2.	2.-3.	3.-4.	4.-5.	5.-10.	10.-20.	20.-30.	30.-40.	40.-50.
N	1.56[illegible]E-07	1.352E-07	5.266E-08	2.765E-08	1.695E-08	6.187E-09	1.578E-09	6.469E-10	3.573E-10	2.112E-10
[illegible]	9.[illegible]E-07	9.135E-08	3.577E-08	1.885E-08	1.159E-08	4.253E-09	1.102E-09	4.789E-10	2.728E-10	1.606E-10
NE	1.[illegible]E-07	1.017E-07	3.985E-08	2.094E-08	1.284E-08	4.672E-09	1.189E-09	5.041E-10	2.834E-10	1.660E-10
ENE	9.[illegible]E-07	9.029E-08	3.533E-08	1.848E-08	1.127E-08	4.042E-09	1.008E-09	4.325E-10	2.448E-10	1.417E-10
E	1.[illegible]E-07	1.266E-07	4.915E-08	2.568E-08	1.569E-08	5.678E-09	1.433E-09	5.903E-10	3.272E-10	1.925E-10
ESE	1.[illegible]E-07	1.000E-07	3.882E-08	2.040E-08	1.253E-08	4.603E-09	1.198E-09	5.166E-10	2.935E-10	1.739E-10
SE	8.[illegible]E-07	1.315E-07	5.063E-08	2.652E-08	1.626E-08	5.961E-09	1.541E-09	6.418E-10	3.581E-10	2.134E-10
SSE	9.[illegible]E-07	9.312E-08	3.593E-08	1.881E-08	1.153E-08	4.216E-09	1.094E-09	4.779E-10	2.734E-10	1.616E-10
S	1.[illegible]E-07	1.033E-07	3.986E-08	2.076E-08	1.265E-08	4.552E-09	1.146E-09	4.863E-10	2.740E-10	1.603E-10
SSW	3.[illegible]E-07	7.587E-08	2.933E-08	1.520E-08	9.211E-09	3.264E-09	8.094E-10	3.619E-10	2.095E-10	1.208E-10
SW	4.[illegible]E-07	7.425E-08	2.873E-08	1.497E-08	9.121E-09	3.278E-09	8.315E-10	3.751E-10	2.180E-10	1.267E-10
WSW	2.[illegible]E-07	4.890E-08	1.872E-08	9.674E-09	5.855E-09	2.076E-09	5.295E-10	2.673E-10	1.634E-10	9.399E-11
W	2.[illegible]E-07	5.820E-08	2.231E-08	1.156E-08	7.018E-09	2.509E-09	6.421E-10	3.089E-10	1.850E-10	1.072E-10
WNW	2.[illegible]E-07	3.983E-08	1.536E-08	7.935E-09	4.792E-09	1.684E-09	3.961E-10	1.346E-10	6.591E-11	3.864E-11
NW	4.[illegible]E-07	8.288E-08	3.277E-08	1.723E-08	1.054E-08	3.802E-09	9.544E-10	4.141E-10	2.355E-10	1.360E-10
NNW	8.[illegible]E-07	1.235E-07	4.907E-08	2.593E-08	1.595E-08	5.823E-09	1.474E-09	6.023E-10	3.314E-10	1.939E-10

SITE ANNUAL DEPOSITION DATA, M-2

SEC	0.0-1.	1.-2.	2.-3.	3.-4.	4.-5.	5.-10.	10.-20.	20.-30.	30.-40.	40.-50.
N	1.[illegible]E-09	1.352E-09	5.266E-10	2.765E-10	1.695E-10	6.187E-11	1.578E-11	6.469E-12	3.573E-12	2.112E-12
NNE	9.[illegible]E-09	9.135E-10	3.577E-10	1.885E-10	1.159E-10	4.253E-11	1.102E-11	4.789E-12	2.728E-12	1.606E-12
NE	1.[illegible]E-09	1.017E-09	3.985E-10	2.094E-10	1.284E-10	4.672E-11	1.189E-11	5.041E-12	2.834E-12	1.660E-12
ENE	9.[illegible]E-09	9.029E-10	3.533E-10	1.848E-10	1.127E-10	4.042E-11	1.008E-11	4.325E-12	2.448E-12	1.417E-12
E	1.[illegible]E-09	1.266E-09	4.915E-10	2.568E-10	1.569E-10	5.678E-11	1.433E-11	5.903E-12	3.272E-12	1.925E-12
ESE	1.[illegible]E-09	1.000E-09	3.882E-10	2.040E-10	1.253E-10	4.603E-11	1.198E-11	5.166E-12	2.935E-12	1.739E-12
SE	8.[illegible]E-09	1.315E-09	5.063E-10	2.652E-10	1.626E-10	5.961E-11	1.541E-11	6.418E-12	3.581E-12	2.134E-12
SSE	9.[illegible]E-09	9.312E-10	3.593E-10	1.881E-10	1.153E-10	4.216E-11	1.094E-11	4.779E-12	2.734E-12	1.616E-12
S	1.[illegible]E-09	1.033E-09	3.986E-10	2.076E-10	1.265E-10	4.552E-11	1.146E-11	4.863E-12	2.740E-12	1.603E-12
SSW	3.[illegible]E-09	7.587E-10	2.933E-10	1.520E-10	9.211E-11	3.264E-11	8.094E-12	3.619E-12	2.095E-12	1.208E-12
SW	4.[illegible]E-09	7.425E-10	2.873E-10	1.497E-10	9.121E-11	3.278E-11	8.315E-12	3.751E-12	2.180E-12	1.267E-12
WSW	2.[illegible]E-09	4.890E-10	1.872E-10	9.674E-11	5.855E-11	2.076E-11	5.295E-12	2.673E-12	1.634E-12	9.399E-13
W	2.[illegible]E-09	5.820E-10	2.231E-10	1.156E-10	7.018E-11	2.509E-11	6.421E-12	3.089E-12	1.850E-12	1.072E-12
WNW	2.[illegible]E-09	3.983E-10	1.536E-10	7.935E-11	4.792E-11	1.684E-11	3.961E-12	1.346E-12	6.591E-13	3.864E-13
NW	4.[illegible]E-09	8.288E-10	3.277E-10	1.723E-10	1.054E-10	3.802E-11	9.544E-12	4.141E-12	2.355E-12	1.360E-12
NNW	8.[illegible]E-09	1.235E-09	4.907E-10	2.593E-10	1.595E-10	5.823E-11	1.474E-11	6.023E-12	3.314E-12	1.939E-12

POPULATION AND INDIVIDUAL DOSE CALCULATIONS FOR HOPE CREEK GENERATING STATION

SITE ANNUAL X/Q DATA, SEC/M3

DIR	0.0-1.	1.-2.	2.-3.	3.-4.	4.-5.	5.-10.	10.-20.	20.-30.	30.-40.	40.-50.
N	1.226E-06	3.024E-07	1.345E-07	7.693E-08	5.038E-08	2.105E-08	6.400E-09	2.742E-09	1.604E-09	1.078E-09
NNE	7.998E-07	1.972E-07	8.762E-08	5.013E-08	3.279E-08	1.369E-08	4.171E-09	1.821E-09	1.089E-09	7.451E-10
NE	6.678E-07	2.265E-07	1.012E-07	5.806E-08	3.804E-08	1.592E-08	4.859E-09	2.108E-09	1.251E-09	8.503E-10
ENE	8.022E-07	2.232E-07	9.952E-08	5.736E-08	3.769E-08	1.585E-08	4.862E-09	2.116E-09	1.257E-09	8.557E-10
E	1.177E-06	2.975E-07	1.329E-07	7.625E-08	4.996E-08	2.091E-08	6.371E-09	2.734E-09	1.600E-09	1.077E-09
ESE	8.960E-07	2.082E-07	9.159E-08	5.216E-08	3.403E-08	1.414E-08	4.283E-09	1.861E-09	1.109E-09	7.570E-10
SE	1.243E-06	2.834E-07	1.245E-07	7.089E-08	4.624E-08	1.922E-08	5.810E-09	2.489E-09	1.460E-09	9.835E-10
SSE	8.630E-07	1.963E-07	8.712E-08	5.207E-08	3.235E-08	1.342E-08	4.063E-09	2.521E-09	1.058E-09	7.237E-10
S	2.047E-07	2.502E-07	1.117E-07	6.405E-08	4.195E-08	1.755E-08	5.347E-09	2.309E-09	1.362E-09	9.225E-10
SSW	7.502E-07	2.131E-07	9.674E-08	5.587E-08	3.676E-08	1.549E-08	4.762E-09	2.078E-09	1.237E-09	8.428E-10
SW	7.117E-07	1.872E-07	8.418E-08	4.844E-08	3.180E-08	1.336E-08	4.099E-09	1.798E-09	1.079E-09	7.400E-10
WSW	4.937E-07	1.328E-07	5.976E-08	3.437E-08	2.255E-08	9.459E-09	2.904E-09	1.301E-09	8.003E-10	5.589E-10
W	6.243E-07	1.683E-07	7.592E-08	4.375E-08	2.875E-08	1.210E-08	3.720E-09	1.643E-09	9.929E-10	6.843E-10
WNW	4.223E-07	1.249E-07	5.711E-08	3.310E-08	2.183E-08	9.238E-09	2.835E-09	1.182E-09	6.637E-10	4.312E-10
NW	7.153E-07	2.063E-07	9.394E-08	5.434E-08	3.579E-08	1.512E-08	4.660E-09	2.039E-09	1.216E-09	8.300E-10
NNW	1.008E-06	2.725E-07	1.229E-07	7.082E-08	4.653E-08	1.957E-08	5.992E-09	2.585E-09	1.520E-09	1.026E-09

SITE ANNUAL [redacted] X/Q [redacted], SEC/M3

DIR	0.0-1.	1.-2.	2.-3.	3.-4.	4.-5.	5.-10.	10.-20.	20.-30.	30.-40.	40.-50.
N	1.226E-06	3.024E-07	1.345E-07	7.693E-08	5.038E-08	2.105E-08	6.400E-09	2.742E-09	1.604E-09	1.078E-09
NNE	7.998E-07	1.972E-07	8.762E-08	5.013E-08	3.279E-08	1.369E-08	4.171E-09	1.821E-09	1.089E-09	7.451E-10
NE	6.678E-07	2.265E-07	1.012E-07	5.806E-08	3.804E-08	1.592E-08	4.859E-09	2.108E-09	1.251E-09	8.503E-10
ENE	8.022E-07	2.232E-07	9.952E-08	5.736E-08	3.769E-08	1.585E-08	4.862E-09	2.116E-09	1.257E-09	8.557E-10
E	1.177E-06	2.975E-07	1.329E-07	7.625E-08	4.996E-08	2.091E-08	6.371E-09	2.734E-09	1.600E-09	1.077E-09
ESE	8.960E-07	2.082E-07	9.159E-08	5.216E-08	3.403E-08	1.414E-08	4.283E-09	1.861E-09	1.109E-09	7.570E-10
SE	1.243E-06	2.834E-07	1.245E-07	7.089E-08	4.624E-08	1.922E-08	5.810E-09	2.489E-09	1.460E-09	9.835E-10
SSE	8.630E-07	1.963E-07	8.712E-08	5.207E-08	3.235E-08	1.342E-08	4.063E-09	2.521E-09	1.058E-09	7.237E-10
S	2.047E-07	2.502E-07	1.117E-07	6.405E-08	4.195E-08	1.755E-08	5.347E-09	2.309E-09	1.362E-09	9.225E-10
SSW	7.502E-07	2.131E-07	9.674E-08	5.587E-08	3.676E-08	1.549E-08	4.762E-09	2.078E-09	1.237E-09	8.428E-10
SW	7.117E-07	1.872E-07	8.418E-08	4.844E-08	3.180E-08	1.336E-08	4.099E-09	1.798E-09	1.079E-09	7.400E-10
WSW	4.937E-07	1.328E-07	5.976E-08	3.437E-08	2.255E-08	9.459E-09	2.904E-09	1.301E-09	8.003E-10	5.589E-10
W	6.243E-07	1.683E-07	7.592E-08	4.375E-08	2.875E-08	1.210E-08	3.720E-09	1.643E-09	9.929E-10	6.843E-10
WNW	4.223E-07	1.249E-07	5.711E-08	3.310E-08	2.183E-08	9.238E-09	2.835E-09	1.182E-09	6.637E-10	4.312E-10
NW	7.153E-07	2.063E-07	9.394E-08	5.434E-08	3.579E-08	1.512E-08	4.660E-09	2.039E-09	1.216E-09	8.300E-10
NNW	1.008E-06	2.725E-07	1.229E-07	7.082E-08	4.653E-08	1.957E-08	5.992E-09	2.585E-09	1.520E-09	1.026E-09

POPULAT[illegible] AND INDIVIDUAL DOSE CALCULATIONS FOR HOPE CREEK GEN[illegible]TING STATION
ALARA ANNUAL INTEGRATED POPULATION DOSE SUMMARY (MANREM)
PATHWAY = MEAT

CA[illegible]1

HCGS

NUCLIDE	T.BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
I 131	9.44E-05 0.11%	3.31E-05 0.04%	1.17E-04 0.04%	1.54E-04 0.18%	2.18E-04 0.34%	4.95E-02 37.23%	0.0 0.0 %	0.0 0.0 %
I 133	7.81E-12 0.0 %	1.80E-11 0.0 %	1.51E-11 0.0 %	2.40E-11 0.0 %	3.41E-11 0.0 %	4.85E-09 0.0 %	0.0 0.0 %	0.0 0.0 %
C 14	8.16E-02 97.51%	8.16E-02 97.17%	2.80E-01 99.84%	8.16E-02 97.37%	6.20E-02 96.83%	8.16E-02 61.42%	8.16E-02 97.82%	8.16E-02 97.85%
H 3	1.79E-03 2.14%	1.79E-03 2.13%	0.0 0.0 %	1.79E-03 2.14%	1.75E-03 2.72%	1.79E-03 1.35%	1.79E-03 2.15%	1.79E-03 2.15%
CR 51	4.18E-09 0.0 %	1.05E-06 0.0 %	0.0 0.0 %	0.0 0.0 %	9.22E-10 0.0 %	2.50E-09 0.0 %	5.55E-09 0.0 %	0.0 0.0 %
MN 54	1.39E-07 0.0 %	2.23E-06 0.0 %	0.0 0.0 %	7.28E-07 0.0 %	2.17E-07 0.0 %	0.0 0.0 %	0.0 0.0 %	0.0 0.0 %
FE 59	8.33E-06 0.0 %	7.22E-05 0.09%	9.22E-06 0.0 %	2.19E-05 0.03%	0.0 0.0 %	0.0 0.0 %	6.08E-06 0.0 %	0.0 0.0 %
CO 58	2.09E-06 0.0 %	1.45E-05 0.02%	0.0 0.0 %	8.72E-07 0.0 %	0.0 0.0 %	0.0 0.0 %	0.0 0.0 %	0.0 0.0 %
CO 60	5.88E-05 0.07%	3.82E-04 0.45%	0.0 0.0 %	2.49E-05 0.03%	0.0 0.0 %	0.0 0.0 %	0.0 0.0 %	0.0 0.0 %
ZN 65	1.24E-05 0.01%	1.72E-05 0.02%	8.61E-06 0.0 %	2.73E-05 0.03%	1.83E-05 0.03%	0.0 0.0 %	0.0 0.0 %	0.0 0.0 %
SR 89	3.94E-06 0.0 %	1.60E-05 0.02%	1.37E-04 0.05%	0.0 0.0 %	0.0 0.0 %	0.0 0.0 %	0.0 0.0 %	0.0 0.0 %
SR 90	8.25E-06 0.0 %	4.80E-07 0.0 %	3.35E-05 0.01%	0.0 0.0 %	0.0 0.0 %	0.0 0.0 %	0.0 0.0 %	0.0 0.0 %
ZR 95	2.70E-09 0.0 %	1.24E-05 0.01%	1.24E-08 0.0 %	3.99E-09 0.0 %	6.29E-09 0.0 %	0.0 0.0 %	0.0 0.0 %	0.0 0.0 %
SB124	1.37E-07 0.0 %	9.82E-06 0.01%	3.47E-07 0.0 %	6.54E-05 0.0 %	0.0 0.0 %	8.38E-10 0.0 %	2.69E-07 0.0 %	0.0 0.0 %
CS134	4.53E-05 0.05%	9.94E-07 0.0 %	3.15E-05 0.01%	6.93E-05 0.08%	1.91E-05 0.03%	0.0 0.0 %	7.61E-06 0.0 %	0.0 0.0 %
CS136	8.48E-08 0.0 %	1.34E-06 0.0 %	2.98E-08 0.0 %	1.16E-07 0.0 %	6.56E-08 0.0 %	0.0 0.0 %	8.99E-09 0.0 %	0.0 0.0 %
CS137	5.69E-05 0.07%	1.75E-06 0.0 %	8.91E-05 0.03%	1.12E-04 0.13%	3.16E-05 0.05%	0.0 0.0 %	1.29E-05 0.02%	0.0 0.0 %
BA140	1.09E-06 0.0 %	2.17E-05 0.03%	1.71E-05 0.0 %	1.95E-08 0.0 %	5.49E-09 0.0 %	0.0 0.0 %	1.15E-08 0.0 %	0.0 0.0 %
CE141	4.23E-11	1.08E-06	5.57E-10	3.48E-10	1.32E-10	0.0	0.0	0.0

ALARA
Pop doses
(meat)

Table 4.11d

	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %
TOTAL	8.37E-02	8.40E-02	2.80E-01	8.38E-02	6.41E-02	1.33E-01	8.34E-02	8.34E-02

SE 1

Table 4.11e

Table 4.11 e

POPULATION AND INDIVIDUAL DOSE CALCULATIONS FOR HOPE CREEK GENERATING STATION
ALARA ANNUAL INTEGRATED POPULATION DOSE SUMMARY (MANREM)
PATHWAY = COW MILK

CASE 1

NUCLIDE	T.BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
I 131	6.42E-03	1.63E-03	8.05E-03	9.71E-03	1.09E-02	3.10E+00	0.0	0.0
	2.33%	0.60%	1.40%	3.45%	6.72%	91.25%	0.0	0.0 %
I 133	4.90E-05	8.82E-05	9.73E-05	1.41E-04	1.56E-04	3.01E-02	0.0	0.0
	0.02%	0.03%	0.02%	0.05%	0.10%	0.89%	0.0 %	0.0 %
C 14	2.58E-01	2.58E-01	5.63E-01	2.58E-01	1.42E-01	2.58E-01	2.58E-01	2.58E-01
	93.54%	95.67%	97.64%	91.61%	87.23%	7.58%	96.33%	96.51%
H 3	9.32E-03	9.32E-03	0.0	9.32E-03	8.58E-03	9.32E-03	9.32E-03	9.32E-03
	3.38%	3.46%	0.0 %	3.32%	5.28%	0.27%	3.49%	3.49%
CR 51	3.48E-08	8.75E-06	0.0	0.0	7.68E-09	2.08E-08	4.62E-08	0.0
	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %
MN 54	2.74E-07	4.40E-06	0.0	1.44E-06	4.27E-07	0.0	0.0	0.0
	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %
FE 59	1.95E-06	1.69E-05	2.16E-06	5.13E-06	0.0	0.0	1.42E-06	0.0
	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %
CO 58	1.51E-06	7.46E-06	0.0	5.85E-07	0.0	0.0	0.0	0.0
	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %
CO 60	3.64E-05	1.68E-04	0.0	1.43E-05	0.0	0.0	0.0	0.0
	0.01%	0.06%	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %
ZN 65	1.02E-04	1.43E-04	7.13E-05	2.26E-04	1.51E-04	0.0	0.0	0.0
	0.04%	0.05%	0.01%	0.08%	0.09%	0.0 %	0.0 %	0.0 %
SR 89	5.71E-05	1.63E-04	1.99E-03	0.0	0.0	0.0	0.0	0.0
	0.02%	0.06%	0.35%	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %
SR 90	8.15E-05	4.90E-06	3.28E-04	0.0	0.0	0.0	0.0	0.0
	0.03%	0.0 %	0.06%	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %
ZR 95	2.86E-12	1.31E-08	1.32E-11	4.23E-12	6.67E-12	0.0	0.0	0.0
	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %
SB124	3.76E-07	2.69E-05	9.52E-07	1.80E-08	0.0	2.30E-09	7.38E-07	0.0
	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %
CS134	7.68E-04	1.75E-05	7.87E-04	1.59E-03	3.53E-04	0.0	1.77E-04	0.0
	0.28%	0.0 %	0.14%	0.56%	0.22%	0.0 %	0.07%	0.0 %
CS136	3.64E-06	5.74E-07	1.28E-06	5.05E-06	2.81E-06	0.0	3.85E-07	0.0
	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %
CS137	9.41E-04	3.11E-05	2.24E-03	2.57E-03	5.78E-04	0.0	3.04E-04	0.0
	0.34%	0.01%	0.39%	0.91%	0.36%	0.0 %	0.11%	0.0 %
BA140	2.67E-06	2.81E-05	4.32E-05	4.51E-08	9.95E-09	0.0	2.71E-08	0.0
	0.0 %	0.01%	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %
CE141	2.50E-10	4.58E-06	3.31E-09	1.91E-09	5.66E-10	0.0	0.0	0.0

	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %
TOTAL	2.75E-01	2.69E-01	5.76E-01	2.81E-01	1.62E-0	3.40E+00	2.67E-01	2.67E-01

CASE 1

HCGS

Table 4.11g

POPULATION AND INDIVIDUAL DOSE CALCULATIONS FOR HOPE CREEK GENERATING STATION

CASE 1

ALARA ANNUAL INTEGRATED POPULATION DOSE SUMMARY (MANREM)

PATHWAY = VEGET

NUCLIDE	T.BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
I 131	1.58E-03	4.40E-04	1.97E-03	2.43E-03	2.94E-03	7.78E-01	0.0	0.0
	0.13%	0.03%	0.06%	0.19%	0.38%	38.57%	0.0 %	0.0 %
I 133	4.14E-21	8.00E-21	8.17E-21	1.21E-20	1.45E-20	2.55E-18	0.0	0.0
	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %
C 14	1.18E+00	1.18E+00	2.99E+00	1.16E+00	7.16E-01	1.18E+00	1.18E+00	1.18E+00
	94.06%	93.81%	95.77%	93.95%	92.35%	58.67%	95.36%	95.51%
H 3	5.56E-02	5.56E-02	0.0	5.56E-02	5.21E-02	5.56E-02	5.56E-02	5.56E-02
	4.42%	4.41%	0.0 %	4.41%	6.71%	2.76%	4.48%	4.49%
CR 51	4.74E-07	1.19E-04	0.0	0.0	1.05E-07	2.83E-07	6.29E-07	0.0
	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %
MN 54	5.61E-05	8.99E-04	0.0	2.94E-04	8.74E-05	0.0	0.0	0.0
	0.0 %	0.07%	0.0 %	0.02%	0.01%	0.0 %	0.0 %	0.0 %
FE 59	6.68E-05	5.80E-04	7.40E-05	1.76E-04	0.0	0.0	4.88E-05	0.0
	0.0 %	0.05%	0.0 %	0.01%	0.0 %	0.0 %	0.0 %	0.0 %
CO 58	6.53E-05	3.58E-04	0.0	2.58E-05	0.0	0.0	0.0	0.0
	0.0 %	0.03%	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %
CO 60	1.72E-03	8.84E-03	0.0	6.90E-04	0.0	0.0	0.0	0.0
	0.14%	0.70%	0.0 %	0.05%	0.0 %	0.0 %	0.0 %	0.0 %
ZN 65	1.44E-04	2.00E-04	9.99E-05	3.17E-04	2.12E-04	0.0	0.0	0.0
	0.01%	0.02%	0.0 %	0.03%	0.03%	0.0 %	0.0 %	0.0 %
SR 89	2.77E-03	8.78E-03	9.68E-02	0.0	0.0	0.0	0.0	0.0
	0.22%	0.70%	3.10%	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %
SR 90	5.06E-03	3.00E-04	2.04E-02	0.0	0.0	0.0	0.0	0.0
	0.40%	0.02%	0.65%	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %
ZR 95	2.65E-08	1.21E-04	1.22E-07	3.91E-08	6.17E-08	0.0	0.0	0.0
	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %
SB124	1.14E-05	8.15E-04	2.88E-05	5.44E-07	0.0	6.96E-08	2.24E-05	0.0
	0.0 %	0.06%	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %
CS134	3.38E-03	7.59E-05	3.07E-03	6.33E-03	1.51E-03	0.0	7.03E-04	0.0
	0.27%	0.0 %	0.10%	0.50%	0.19%	0.0 %	0.06%	0.0 %
CS136	2.49E-06	3.94E-07	8.78E-07	3.46E-06	1.93E-06	0.0	2.64E-07	0.0
	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %
CS137	4.23E-03	1.36E-04	8.85E-03	1.04E-02	2.50E-03	0.0	1.22E-03	0.0
	0.34%	0.01%	0.28%	0.82%	0.32%	0.0 %	0.10%	0.0 %
BA140	4.79E-05	6.28E-04	7.69E-04	8.22E-07	1.95E-07	0.0	4.91E-07	0.0
	0.0 %	0.05%	0.02%	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %
CE141	1.30E-08	2.63E-04	1.72E-07	1.01E-07	3.24E-08	0.0	0.0	0.0

	0.0 %	0.02%	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %
TOTAL	1.26E+00	1.26E+00	3.12E+00	1.26E+00	7.76E-0	2.02E+00	1.24E+00	1.24E+00

CASE 1

Table 4.111

POPULATION AND INDIVIDUAL DOSE CALCULATIONS FOR HOPE CREEK GENERATING STATION
ALARA ANNUAL INTEGRATED POPULATION DOSE SUMMARY (MANREM)
PATHWAY = INHAL

NUCLIDE	T.BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
I 131	3.79E-03 11.16%	8.93E-04 2.67%	4.72E-03 41.39%	6.17E-03 13.64%	8.85E-03 18.06%	2.03E+00 50.32%	0.0 0.0 %	0.0 0.0 %
I 133	3.11E-03 9.15%	4.83E-03 14.47%	6.08E-03 53.37%	9.58E-03 21.18%	1.37E-02 27.99%	1.97E+00 49.01%	0.0 0.0 %	0.0 0.0 %
H 3	2.70E-02 79.35%	2.70E-02 80.71%	0.0 0.0 %	2.70E-02 59.55%	2.64E-02 53.86%	2.70E-02 0.67%	2.70E-02 78.89%	2.70E-02 100.00%
CR 51	1.70E-07 0.0 %	5.65E-06 0.02%	0.0 0.0 %	0.0 0.0 %	3.88E-03 0.0 %	1.04E-07 0.0 %	2.45E-05 0.07%	0.0 0.0 %
MN 54	7.91E-07 0.0 %	9.72E-06 0.03%	0.0 0.0 %	4.97E-06 0.01%	1.24E-06 0.0 %	0.0 0.0 %	1.76E-04 0.51%	0.0 0.0 %
FE 59	9.12E-07 0.0 %	1.62E-05 0.05%	1.02E-06 0.0 %	2.40E-03 5.30%	0.0 0.0 %	0.0 0.0 %	8.77E-05 0.26%	0.0 0.0 %
CO 58	1.49E-07 0.0 %	8.86E-06 0.03%	0.0 0.0 %	1.13E-07 0.0 %	0.0 0.0 %	0.0 0.0 %	9.61E-05 0.28%	0.0 0.0 %
CO 60	4.99E-06 0.01%	1.10E-04 0.33%	0.0 0.0 %	3.85E-06 0.0 %	0.0 0.0 %	0.0 0.0 %	2.87E-03 8.40%	0.0 0.0 %
ZR 65	1.52E-06 0.0 %	1.75E-06 0.0 %	1.06E-06 0.0 %	3.38E-06 0.0 %	2.26E-06 0.0 %	0.0 0.0 %	2.85E-05 0.08%	0.0 0.0 %
SR 89	5.77E-06 0.02%	2.76E-04 0.83%	2.01E-04 1.76%	0.0 0.0 %	0.0 0.0 %	0.0 0.0 %	1.44E-03 4.22%	0.0 0.0 %
SR 90	1.54E-05 0.05%	2.18E-06 0.0 %	2.51E-04 2.20%	0.0 0.0 %	0.0 0.0 %	0.0 0.0 %	3.73E-05 0.11%	0.0 0.0 %
ZR 95	3.35E-07 0.0 %	2.16E-06 0.0 %	1.54E-06 0.01%	4.95E-07 0.0 %	7.79E-07 0.0 %	0.0 0.0 %	2.56E-05 0.07%	0.0 0.0 %
SB124	4.87E-07 0.0 %	1.59E-05 0.05%	1.22E-06 0.01%	2.31E-08 0.0 %	0.0 0.0 %	2.96E-09 0.0 %	9.73E-05 0.28%	0.0 0.0 %
CS134	3.85E-05 0.11%	5.64E-07 0.0 %	2.66E-05 0.23%	5.59E-05 0.12%	1.62E-05 0.03%	0.0 0.0 %	6.59E-06 0.02%	0.0 0.0 %
CS136	9.02E-07 0.0 %	9.47E-08 0.0 %	3.17E-07 0.0 %	1.19E-06 0.0 %	6.94E-07 0.0 %	0.0 0.0 %	9.73E-08 0.0 %	0.0 0.0 %
CS137	4.24E-05 0.12%	8.71E-07 0.0 %	6.59E-05 0.58%	7.88E-05 0.17%	2.36E-05 0.05%	0.0 0.0 %	9.84E-06 0.03%	0.0 0.0 %
BA140	3.11E-06 0.0 %	2.56E-04 0.77%	4.74E-05 0.42%	5.81E-08 0.0 %	2.41E-08 0.0 %	0.0 0.0 %	2.27E-03 6.66%	0.0 0.0 %
CE141	1.05E-07 0.0 %	9.81E-06 0.03%	1.37E-06 0.01%	9.24E-07 0.0 %	5.16E-07 0.0 %	0.0 0.0 %	3.74E-05 0.11%	0.0 0.0 %
TOTAL	3.40E-02	3.34E-02	1.14E-02	4.53E-02	4.90E-02	4.03E+00	3.42E-02	2.70E-02

POPULAT[illegible] AND INDIVIDUAL DOSE CALCULATIONS FOR HOPE CREEK GEN[illegible]TING STATION
ALARA ANNUAL INTEGRATED POPULATION DOSE SUMMARY (MANREM)
PATHWAY = GROUND

NUCLIDE	T.BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
I 131	4.35E-03	4.35E-03	4.35E-03	4.35E-03	4.35E-03	4.35E-03	4.35E-03	5.28E-03
	4.11%	4.11%	4.11%	4.11%	4.11%	4.11%	4.11%	4.24%
I 133	2.26E-03	2.26E-03	2.26E-03	2.26E-03	2.26E-03	2.26E-03	2.26E-03	2.75E-03
	2.14%	2.14%	2.14%	2.14%	2.14%	2.14%	2.14%	2.21%
CR 51	7.47E-05	7.47E-05	7.47E-05	7.47E-05	7.47E-05	7.47E-05	7.47E-05	8.83E-05
	0.07%	0.07%	0.07%	0.07%	0.07%	0.07%	0.07%	0.07%
MN 54	1.64E-03	1.64E-03	1.64E-03	1.64E-03	1.64E-03	1.64E-03	1.64E-03	1.92E-03
	1.55%	1.55%	1.55%	1.55%	1.55%	1.55%	1.55%	1.54%
FE 59	2.21E-04	2.21E-04	2.21E-04	2.21E-04	2.21E-04	2.21E-04	2.21E-04	2.60E-04
	0.21%	0.21%	0.21%	0.21%	0.21%	0.21%	0.21%	0.21%
CO 58	3.11E-04	3.11E-04	3.11E-04	3.11E-04	3.11E-04	3.11E-04	3.11E-04	3.65E-04
	0.29%	0.29%	0.29%	0.29%	0.29%	0.29%	0.29%	0.29%
CO 60	8.21E-02	8.21E-02	8.21E-02	8.21E-02	8.21E-02	8.21E-02	8.21E-02	9.66E-02
	77.73%	77.73%	77.73%	77.73%	77.73%	77.73%	77.73%	77.68%
ZN 65	2.31E-04	2.31E-04	2.31E-04	2.31E-04	2.31E-04	2.31E-04	2.31E-04	2.65E-04
	0.22%	0.22%	0.22%	0.22%	0.22%	0.22%	0.22%	0.21%
SR 89	1.59E-07	1.59E-07	1.59E-07	1.59E-07	1.59E-07	1.59E-07	1.59E-07	1.85E-07
	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %
ZR 95	3.40E-05	3.40E-05	3.40E-05	3.40E-05	3.40E-05	3.40E-05	3.40E-05	3.95E-05
	0.03%	0.03%	0.03%	0.03%	0.03%	0.03%	0.03%	0.03%
SB124	2.21E-04	2.21E-04	2.21E-04	2.21E-04	2.21E-04	2.21E-04	2.21E-04	2.55E-04
	0.21%	0.21%	0.21%	0.21%	0.21%	0.21%	0.21%	0.21%
CS134	3.62E-03	3.62E-03	3.62E-03	3.62E-03	3.62E-03	3.62E-03	3.62E-03	4.22E-03
	3.42%	3.42%	3.42%	3.42%	3.42%	3.42%	3.42%	3.39%
CS136	1.14E-05	1.14E-05	1.14E-05	1.14E-05	1.14E-05	1.14E-05	1.14E-05	1.29E-05
	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%
CS137	1.03E-02	1.03E-02	1.03E-02	1.03E-02	1.03E-02	1.03E-02	1.03E-02	1.20E-02
	9.72%	9.72%	9.72%	9.72%	9.72%	9.72%	9.72%	9.63%
BA140	2.78E-04	2.78E-04	2.78E-04	2.78E-04	2.78E-04	2.78E-04	2.78E-04	3.17E-04
	0.26%	0.26%	0.26%	0.26%	0.26%	0.26%	0.26%	0.26%
CE141	1.06E-05	1.06E-05	1.06E-05	1.06E-05	1.06E-05	1.06E-05	1.06E-05	1.19E-05
	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.0 %
TOTAL	1.06E-01	1.06E-01	1.06E-01	1.06E-01	1.06E-01	1.06E-01	1.06E-01	1.24E-01

CASE 1.

POPULATION AND INDIVIDUAL DOSE CALCULATIONS FOR HOPE CREEK GE[illegible]ATING STATION
ALARA ANNUAL INTEGRATED POPULATION DOSE SUMMARY (MANR 4)
PATHWAY = PLUME

NUCLIDE	T.BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
KR 83M	1.47E-07 0.0 %	1.47E-07 0.0 %	1.47E-07 0.0 %	1.47E-07 0.0 %	1.47E-07 0.0 %	1.47E-07 0.0 %	1.15E-05 0.0 %	4.17E-05 0.0 %
KR 85M	3.09E-02 1.18%	3.09E-02 1.18%	3.09E-02 1.18%	3.09E-02 1.18%	3.09E-02 1.18%	3.09E-02 1.18%	3.19E-02 1.20%	1.13E-01 1.71%
KR 85	1.58E-03 0.06%	1.58E-03 0.06%	1.53E-03 0.06%	1.58E-03 0.06%	1.58E-03 0.06%	1.58E-03 0.06%	5.25E-03 0.20%	2.65E-01 4.01%
KR 87	1.68E-01 6.47%	1.68E-01 6.47%	1.68E-01 6.47%	1.68E-01 6.47%	1.68E-01 6.47%	1.68E-01 6.47%	1.74E-01 6.54%	7.49E-01 11.35%
KR 88	1.06E+00 40.57%	1.06E+00 40.57%	1.06E+00 40.57%	1.06E+00 40.57%	1.06E+00 40.57%	1.06E+00 40.57%	1.06E+00 39.84%	1.55E+00 23.54%
XE131M	3.43E-05 0.0 %	3.43E-05 0.0 %	3.43E-05 0.0 %	3.43E-05 0.0 %	3.43E-05 0.0 %	3.43E-05 0.0 %	4.26E-05 0.0 %	4.22E-04 0.0 %
XE133	2.96E-01 11.37%	2.96E-01 11.37%	2.96E-01 11.37%	2.96E-01 11.37%	2.96E-01 11.37%	2.96E-01 11.37%	3.17E-01 11.92%	1.01E+00 15.33%
XE133M	4.67E-02 1.79%	4.67E-02 1.79%	4.67E-02 1.79%	4.67E-02 1.79%	4.67E-02 1.79%	4.67E-02 1.79%	4.70E-02 1.76%	7.71E-02 1.17%
XE135	6.50E-01 24.95%	6.50E-01 24.95%	6.50E-01 24.95%	6.50E-01 24.95%	6.50E-01 24.95%	6.50E-01 24.95%	6.68E-01 25.07%	2.10E+00 31.84%
XE138	3.12E-01 11.97%	3.12E-01 11.97%	3.12E-01 11.97%	3.12E-01 11.97%	3.12E-01 11.97%	3.12E-01 11.97%	3.15E-01 11.84%	6.53E-01 9.89%
AR 41	4.27E-02 1.64%	4.27E-02 1.64%	4.27E-02 1.64%	4.27E-02 1.64%	4.27E-02 1.64%	4.27E-02 1.64%	4.27E-02 1.60%	7.59E-02 1.15%
TOTAL	2.61E+00	2.61E+00	2.61E+00	2.61E+00	2.61E+00	2.61E+00	2.66E+00	6.60E+00

Table 4.11L

POPULATION AND INDIVIDUAL DOSE CALCULATIONS FOR HOPE CREEK GENERATING STATION
ALARA ANNUAL INTEGRATED POPULATION DOSE SUMMARY (HANREN)
PATHWAY = *TOTAL*

HCGS

NUCLIDE	T.BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
KR 83M	1.47E-07 0.0 %	1.47E-07 0.0 %	1.47E-07 0.0 %	1.47E-07 0.0 %	1.47E-07 0.0 %	1.47E-07 0.0 %	1.15E-05 0.0 %	4.17E-05 0.0 %
KR 85M	3.09E-02 0.71%	3.09E-02 0.71%	3.09E-02 0.46%	3.09E-02 0.70%	3.09E-02 0.82%	3.09E-02 0.25%	3.19E-02 0.73%	1.13E-01 1.36%
KR 85	1.58E-03 0.04%	1.58E-03 0.04%	1.58E-03 0.02%	1.58E-03 0.04%	1.58E-03 0.04%	1.58E-03 0.01%	5.25E-03 0.12%	2.65E-01 3.17%
KR 87	1.68E-01 3.86%	1.68E-01 3.86%	1.68E-01 2.52%	1.68E-01 3.85%	1.68E-01 4.48%	1.68E-01 1.37%	1.74E-01 3.96%	7.49E-01 8.98%
KR 88	1.06E+00 24.22%	1.06E+00 24.24%	1.06E+00 15.76%	1.06E+00 24.12%	1.06E+00 28.09%	1.06E+00 8.60%	1.06E+00 24.15%	1.55E+00 18.63%
XE131M	3.43E-05 0.0 %	3.43E-05 0.0 %	3.43E-05 0.0 %	3.43E-05 0.0 %	3.43E-05 0.0 %	3.43E-05 0.0 %	4.26E-05 0.0 %	4.22E-04 0.0 %
XE133	2.96E-01 6.79%	2.96E-01 6.80%	2.96E-01 4.42%	2.96E-01 6.76%	2.96E-01 7.87%	2.96E-01 2.41%	3.17E-01 7.22%	1.01E+00 12.13%
XE135M	4.67E-02 1.07%	4.67E-02 1.07%	4.67E-02 0.70%	4.67E-02 1.07%	4.67E-02 1.24%	4.67E-02 0.38%	4.70E-02 1.07%	7.71E-02 0.92%
XE135	6.50E-01 14.90%	6.50E-01 14.91%	6.50E-01 9.71%	6.50E-01 14.84%	6.59E-01 17.28%	6.50E-01 5.29%	6.68E-01 15.19%	2.10E+00 25.19%
XE138	3.12E-01 7.15%	3.12E-01 7.15%	3.12E-01 4.66%	3.12E-01 7.12%	3.12E-01 8.29%	3.12E-01 2.54%	3.15E-01 7.17%	6.53E-01 7.83%
I 131	1.62E-02 0.37%	7.34E-03 0.17%	1.92E-02 0.29%	2.28E-02 0.52%	2.73E-02 0.72%	5.96E+00 48.50%	4.35E-03 0.10%	5.28E-03 0.06%
I 133	5.42E-03 0.12%	7.19E-03 0.16%	8.44E-03 0.13%	1.20E-02 0.27%	1.61E-02 0.43%	2.01E+00 16.35%	2.26E-03 0.05%	2.75E-03 0.03%
C 14	1.52E+00 34.91%	1.52E+00 34.94%	3.83E+00 57.17%	1.52E+00 34.76%	9.20E-01 24.46%	1.52E+00 12.40%	1.52E+00 34.65%	1.52E+00 18.26%
AR 41	4.27E-02 0.98%	4.27E-02 0.98%	4.27E-02 0.64%	4.27E-02 0.98%	4.27E-02 1.14%	4.27E-02 0.35%	4.27E-02 0.97%	7.59E-02 0.91%
H 3	9.37E-02 2.15%	9.37E-02 2.15%	0.0 0.0 %	9.37E-02 2.14%	8.88E-02 2.36%	9.37E-02 0.76%	9.37E-02 2.13%	9.37E-02 1.12%
CR 51	7.54E-05 0.0 %	2.09E-04 0.0 %	7.47E-05 0.0 %	7.47E-05 0.0 %	7.49E-05 0.0 %	7.51E-05 0.0 %	9.99E-05 0.0 %	8.83E-05 0.0 %
MN 54	1.69E-03 0.04%	2.55E-03 0.06%	1.64E-03 0.02%	1.94E-03 0.04%	2.72E-03 0.05%	1.64E-03 0.01%	1.81E-03 0.04%	1.92E-03 0.02%
FE 59	2.99E-04 0.0 %	9.07E-04 0.02%	3.08E-04 0.0 %	2.82E-03 0.06%	2.21E-04 0.0 %	2.21E-04 0.0 %	3.65E-04 0.0 %	2.60E-04 0.0 %
CO 58	3.80E-04	7.00E-04	3.11E-04	3.59E-04	3.11E-04	3.11E-04	4.07E-04	3.65E-04

Table 4.11m

Alara tot

	0.0 %	0.02%	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %
CO 60	8.39E-02 1.92%	9.16E-02 2.10%	8.21E-02 1.23%	8.28E-02 1.89%	6.21E-02 2.18%	8.21E-02 0.67%	8.50E-02 1.93%	9.66E-02 1.16%
ZN 65	4.91E-04 0.01%	5.92E-04 0.01%	4.12E-04 0.0 %	8.05E-04 0.02%	2.15E-04 0.02%	2.31E-04 0.0 %	2.59E-04 0.0 %	2.65E-04 0.0 %
SR 89	2.84E-03 0.07%	9.24E-03 0.21%	9.91E-02 1.48%	1.59E-07 0.0 %	1.59E-07 0.0 %	1.59E-07 0.0 %	1.44E-03 0.03%	1.85E-07 0.0 %
SR 90	5.16E-03 0.12%	3.08E-04 0.0 %	2.10E-02 0.31%	0.0 0.0 %	0.0 0.0 %	0.0 0.0 %	3.73E-05 0.0 %	0.0 0.0 %
ZR 95	3.44E-05 0.0 %	1.70E-04 0.0 %	3.57E-05 0.0 %	3.46E-05 0.0 %	3.49E-05 0.0 %	3.40E-05 0.0 %	5.96E-05 0.0 %	3.95E-05 0.0 %
SB124	2.34E-04 0.0 %	1.09E-03 0.02%	2.53E-04 0.0 %	2.22E-04 0.0 %	2.21E-04 0.0 %	2.21E-04 0.0 %	3.42E-04 0.0 %	2.55E-04 0.0 %
CS134	7.84E-03 0.18%	3.71E-03 0.09%	7.53E-03 0.11%	1.17E-02 0.27%	5.51E-03 0.15%	3.62E-03 0.03%	4.51E-03 0.10%	4.22E-03 0.05%
CS136	1.85E-05 0.0 %	1.25E-05 0.0 %	1.39E-05 0.0 %	2.12E-05 0.0 %	1.69E-05 0.0 %	1.14E-05 0.0 %	1.21E-05 0.0 %	1.29E-05 0.0 %
CS137	1.55E-02 0.36%	1.04E-02 0.24%	2.15E-02 0.32%	2.34E-02 0.53%	1.34E-02 0.35%	1.03E-02 0.08%	1.18E-02 0.27%	1.20E-02 0.14%
BA140	3.32E-04 0.0 %	1.21E-03 0.03%	1.15E-03 0.02%	2.79E-04 0.0 %	2.78E-04 0.0 %	2.78E-04 0.0 %	2.55E-03 0.06%	3.17E-04 0.0 %
CE141	1.07E-05 0.0 %	2.89E-04 0.0 %	1.21E-05 0.0 %	1.16E-05 0.0 %	1.11E-05 0.0 %	1.06E-05 0.0 %	4.80E-05 0.0 %	1.19E-05 0.0 %
TOTAL	4.36E+00	4.36E+00	6.70E+00	4.38E+00	3.76E+00	1.23E+01	4.40E+00	8.34E+00

HCGS

Table 4.11n

POPULATION AND INDIVIDUAL DOSE CALCULATIONS FOR HOPE CREEK GENERATING STATION
ALASKA ANNUAL INTEGRATED POPULATION DOSE SUMMARY (MAN-REM)

PATHWAY	T.BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
PLUME	2.61E+00	2.61E+00	2.61E+00	2.61E+00	2.61E+00	2.61E+00	2.66E+00	6.63E+00
	59.72%	55.76%	38.91%	59.46%	69.25%	21.20%	60.59%	79.12%
GROUND	1.06E-01	1.06E-01	1.06E-01	1.06E-01	1.06E-01	1.06E-01	1.06E-01	1.24E-01
	2.42%	2.42%	1.58%	2.41%	2.81%	0.86%	2.40%	1.49%
INHAL	3.40E-02	3.34E-02	1.14E-02	4.53E-02	4.90E-02	4.03E+00	3.42E-02	2.70E-02
	0.78%	0.77%	0.17%	1.03%	1.30%	32.78%	0.78%	0.32%
VEGET	1.26E+00	1.26E+00	3.12E+00	1.26E+00	7.76E-01	2.02E+00	1.24E+00	1.24E+00
	28.85%	28.95%	46.56%	28.76%	20.62%	16.42%	28.24%	14.86%
COW MILK	2.75E-01	2.69E-01	5.76E-01	2.81E-01	1.62E-01	3.40E+00	2.67E-01	2.67E-01
	6.31%	6.18%	8.61%	6.42%	4.32%	27.65%	6.09%	3.20%
MEAT	8.37E-02	8.40E-02	2.80E-01	8.38E-02	6.41E-02	1.33E-01	8.34E-02	8.34E-02
	1.92%	1.93%	4.18%	1.91%	1.70%	1.08%	1.90%	1.00%
TOTAL	4.36E+00	4.35E+00	6.70E+00	4.38E+00	3.76E+00	1.23E+01	4.40E+00	8.34E+00

ADDITIONAL INFORMATION

Supplied In Response To Item 4

Section A 1 ..... Air Pathways

Section A 2 ..... Liquid Pathways

Agricultural and Farming Practices within 50 Miles of Artificial Island.

The available data on farm production and agricultura' practices within 50 miles of Artificial Island was collected and condensed to provide input parameters for radiological dose assessment. A detailed survey was conducted for the area within five miles of the Artificial Island site to obtain specific information within the immediate site environs. This survey data was current through 1975, having last been updated in February and March of 1976.

Thirty-one farms are located, at least partially, within five miles of Artificial Island as shown in Figure A 1.1 and Table A 1.1. Most of these farms are relatively small and often the products are used entirely by the individual farmers. Data collected for this part of the study was obtained by direct contact with the individual farmers and landowners. All farms and potential vegetable gardens ($\geq$ 500 sq. ft.) located at least partially within five miles of Artificial Island were located by visual surveillance and their locations marked on USGS topographic maps. Farmers were interviewed and data collected on a standard survey sheet by trained personnel familiar with the area. The 31 farms within the five-mile radius of Artificial Island produce 217 metric tons of fruits and vegetables and 1,360 metric tons of field crops per year. Apples, peaches, sweet corn, potatoes and tomatoes make up the majority of human food production. Corn (for grain or silage) and alfalfa are the prevalent field crops grown.

Only two dairy farms are located with five miles of Artificial Island. These farms and the nearest vegetable garden in each sector are listed in Table A 1.3. Annual milk production from these two farms is $4.2X10^5$ liters.

Other major animal products produced are beef and chickens. The total annual beef and poultry production is 46 metric tons.

The data on agricultural practices within 50 miles of Artificial Island was extracted from the U. S. Department of Commerce Census of Agriculture (USDCCOA) publications for the states of Delaware, Maryland, New Jersey and Pennsylvania, and from the Department of Agriculture Crop Reporting Service (CRS) publications for the respective states. In general, USDCCOA data was reported for 1969 and CRS data was available for 1974. The latter also includes summaries of the prior few years. The data showed a decrease in acreage in production over the past decade probably due to higher land costs, and suburban expansion and development. This has been offset to some extent by increases in yield, such that the total production figures have remained stable for the past several years. It was assumed that the 1969 through 1975 data could be combined without significantly affecting the applicability of the data.

Agricultural production has been divided into five areas: livestock, dairy, fruits, vegetables and field crops. County production data was apportioned into the sixteen 22 1/2 degree sectors and appropriate radial intevals by assuming that production was uniform throughout the arable cou ty land area. After subtracting urban and forested

areas, the area of the county in the sector segment of interest was determined and converted to a fraction of the county's total agricultural land. This fraction was used to calculate the fractions of each type of country agricultural production in the area of interest. For distances beyond five miles, "o" entry in the distribution tables indicates that all land within the sector was urban or forested as far as could be determined from the USGS maps used for the apportionment. Where two or more counties intersected within a segment, their respective productions were summed.

The annual meat and poultry production within 50 miles of Artificial Island is given in Table A 1.4 for the areas of interest. Table A 1.5 gives the annual production figures of beef only for the same areas. Meat and poultry production within 50 miles of Artificial Island is summarized in Table A 1.6.

Annual milk production within 50 miles of Artificial Island is given in Table A 1.7. The contributions of the two individual farms within five miles can be easily seen. The distribution of this milk is summarized in Table A 1.8.

Annual production of fruits and vegetables within 50 miles of Artificial Island are given in Tables A 1,9 and A 1.10 respectively. This data is summarized by crop type in Table A 1.13. The distribution of the truck farming produce is summarized in Table A 1.11. Annual field crop production is given in Table A 1.12 and summarized by crop type in Table A 1.14.

Information on grazing season, feeding regimes and milk production was gathered from site area field surveys. From this data, pasture grass density estimates were arrived at by an application of a bovine energy conversion model. The field survey also provided yield statistics for harvested crops for beef and dairy cattle feeding, as summarized in Table A 1.14.

In a survey of 78 dairy farms with a 50-mile radius of Artificial Island, pasture areas ranged from 4 to 130 acres with an average pasturage of 31 acres. The number of dairy cattle ranged from a single cow to as many as 300 cows on a farm. The average number of cows per farm was 61. Thus, approximately two cows per acre grazed in the sample area. The average milk production was about 30 pounds per cow per day (14 kg/cow/day).

6-7 mo

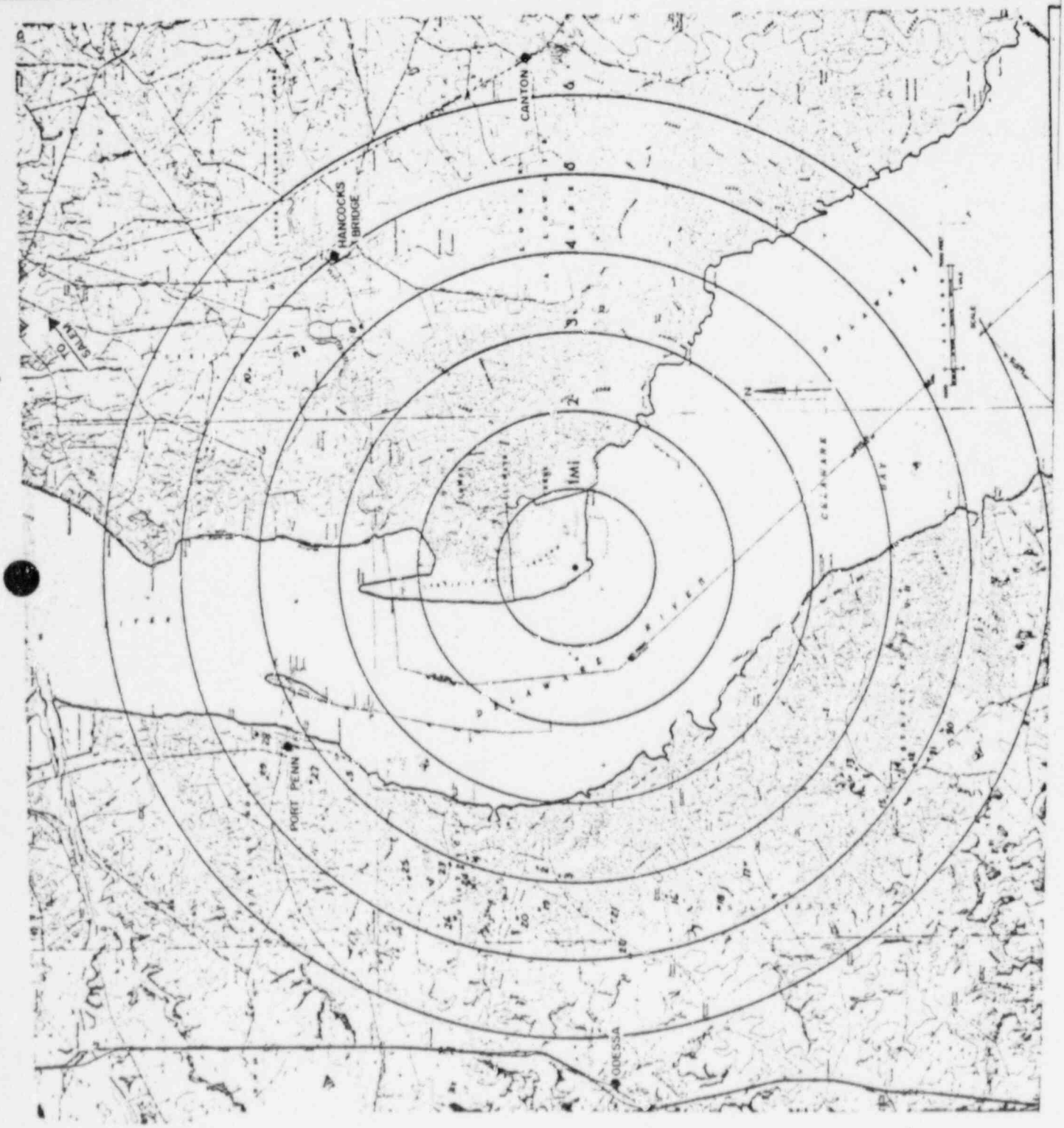
The majority of farms reported grazing from April-May through November. Most of the dairy herds were reported to be pastured 24 hours a day during these months. Based on a 30-day removal for green crop, typical of Mid-Atlantic States farms, the pasture consumption was computed to range from a minimum of 1.8 kg/cow/day to a maximum of 74 kg/cow/day, averaging around 6 kg/cow/day. An average grazing area was computed to be 2,375m^2/cow/day. The pasture density so derived ranged from 0.05 kg/m^2 to 1.7 kg/m^2 with an average of 0.23 kg/m^2.

~~so derived ranged from 0.05 kg/m to 1.7 kg/m^2 with an average of 0.23 kg/m^2.~~

SUMMARY OF HIGHEST ELEVATIONS (FEET) WITHIN 50-MILES OF ARTIFICIAL ISLAND

DIRECTION	DISTANCE RANGE (MILES)									
	0-1	1-2	2-3	3-4	4-5	5-10	10-20	20-30	30-40	40-50
N	10	20	20	River & Marsh	River & Marsh	20	100	450	600	600
NNE	10	Marsh & Mud	Marsh & River	Marsh		20	50	100	100	330	238
NE	10	River & Marsh	River & Marsh		10	20	50	200	200	250	164
ENE	10	10	Marsh & River		15	12	50	140	135	150	200
E	20	10	River & Marsh		15	10	100	117	106	120	200
ESE	20	6	Marsh & River		10	10	38	200	100	66	100
SE	20	River	River	River		River	10	10	9	11	22
SSE	20	River	River	River		River	10	10	10	9	15
S	20	River	River		17	20	10	50	53	56	52
SSW	20	River	River & Marsh		25	12	50	100	75	70	63
SW	20	River	River & Marsh		12	22	100	75	75	75	75
WSW	20	River	River & Marsh		16	30	100	69	100	70	50
W	20	River	20		30	60	100	85	84	350	457
WNW	20	River	River		24	31	67	71	445	600	750
NW	10	River	River		23	30	100	500	500	573	828
NNW	10	10	River		10	30	100	500	450	662	1,000

TABLE A 1.1



FARMS WITHIN 5 MILES OF THE SITE

Fig. A.1.1

IDENTIFICATION KEY FOR FIGURE A 1.1
FARMS WITHIN A FIVE MILE RADIUS OF ARTIFICIAL ISLAND

Map location	Farm Name	Direction & Distance (miles) from Artificial Island	
1	Dukes	SSW	3.8
2	L. Voss	W	3.8
3	Cleaver	W	3.9
4	Alexander	WNW	4.0
5	Kux	NW	3.9
6	Sowers	NNE	4.2
7	Farnkoph	NNE	4.8
8	Hinchman	NE	4.0
9	Farrell	NE	4.4
10	R. Davis	NE	4.7
11	McLain	S	4.2
12	Spicer	SSW	5.0
13	Steller	SW	4.4
14	Sheltzer	SW	5.0
15	Dickinson	SW	5.0
16	Cleaver	WSW	4.4
17	Bolton	WSW	4.4
18	Hammond	WSW	4.7
19	Phillips	W	4.4
20	Voss	W	4.6
21	Coleman	W	4.7
22	Haman	W	5.0
23	Armstrong	WNW	4.0
24	Currey	WNW	4.0
25	Betts	WNW	4.4
26	Wooleyhan	WNW	4.7
27	Willoughby	NW	4.2
28	Lesser	NNW	4.4
29	Meyer	NNW	4.6
30	W. Davis	SSW	5.1
31	L. Davis	SSW	5.2

Nearest Milk Producing Animals and Vegetable Gardens (>500 ft^2) within 5 miles of Artificial Island

Direction	Nearest Milk Animals Map* Location	(Miles)	Nearest Vegetable Gardens Map Location	(Miles)
N		---		---
NNE	7	4.8	6	4.2
NE		---	8	4.0
ENE		---		---
E		---		---
ESE		---		---
SE		---		---
SSE		---		---
S		---	11	4.2
SSW		---	1	3.8
SW		---	13	4.4
WSW		---	16	4.4
W	22	5.0	2	3.8
WNW		---	4	4.0
NW		---	5	3.9
NNW		---	28	4.4

*Map location on Figure A 1.1

Annual Meat and Poultry Production within 50 miles of Artifical Island
(kg/year)

Direction	Distance Range in Miles										
	0-1	1-2	2-3	3-4	4-5	5-10	10-20	20-30	30-40	40-50	Total
N				0	0	3.83 E 4	3.43 E 5	1.66 E 5	9.71 E 5	1.81 E 6	3.33 E 6
NNE				0	7.85 E 3	3.05 E 5	1.06 E 6	4.61 E 6	1.59 E 5	0	6.14 E 6
NE				0	1.15 E 4	3.05 E 5	9.53 E 5	0	7.81 E 5	2.66 E 6	4.71 E 6
ENE				0	0	2.20 E 5	7.24 E 5	3.72 E 6	1.06 E 6	4.11 E 5	6.14 E 6
E				0	0	8.74 E 4	3.51 E 5	1.60 E 6	6.07 E 5	1.36 E 5	2.78 E 6
ESE				0	0	5.65 E 4	3.96 E 5	0	1.99 E 5	1.71 E 6	2.36 E 6
SE				0	0	0	0	0	2.34 E 6	1.10 E 7	1.33 E 7
SSE				0	0	0	2.07 E 6	2.65 E 6	5.80 E 6	3.89 E 7	4.94 E 7
S				0	0	1.35 E 5	1.26 E 6	1.04 E 6	1.50 E 6	3.46 E 5	4.28 E 6
SSW				2.60 E 3	0	1.62 E 5	4.20 E 5	7.24 E 5	8.36 E 6	1.80 E 7	2.77 E 7
SW				0	0	1.89 E 5	4.22 E 5	2.44 E 6	3.03 E 6	2.61 E 6	8.69 E 6
WSW				0	3.72 E 3	1.89 E 5	7.33 E 5	1.25 E 6	2.14 E 6	9.44 E 5	5.26 E 6
W				0	1.86 E 4	1.83 E 5	8.58 E 5	4.31 E 5	9.16 E 5	3.07 E 6	5.48 E 6
WNW				0	1.34 E 3	1.62 E 5	7.82 E 5	2.05 E 6	9.35 E 6	1.65 E 7	2.88 E 7
NW				2.40 E 2	0	2.69 E 4	6.04 E 5	2.87 E 6	4.45 E 6	1.10 E 7	1.89 E 7
NNW				0	0	0	0	4.10 E 5	3.65 E 6	8.48 E 6	1.25 E 7
Total	0	0	0	2.84 E 3	4.30 E 4	2.07 E 6	1.10 E 7	2.40 E 7	4.53 E 7	1.18 E 8	2.00 E 8

Meat & Poultry = Total production

TABLE A 1.4

Annual Beef Production within 50 Miles of Artificial Island

(kg/year)

Direction	Distance Range in Miles										
	0-1	1-2	2-3	3-4	4-5	5-10	10-20	20-30	30-40	40-50	Total
N					0	3.00 E 4	2.70 E 5	3.60 E 4	2.10 E 5	6.44 E 5	1.19 E 6
NNE					7.80 E 3	2.40 E 5	8.39 E 5	1.88 E 5	6.48 E 3	0	1.28 E 6
NE					1.1[illegible] E 4	2.40 E 5	7.49 E 5	0	3.24 E 4	8.65 E 5	1.90 E 6
ENE					0	1.80 E 5	5.69 E 5	3.22 E 5	4.18 E 4	3.58 E 4	1.15 E 6
E					0	6.67 E 4	2.10 E 5	2.70 E 5	4.69 E 4	3.72 E 3	5.98 E 5
ESE					0	3.38 E 4	2.37 E 5	0	3.55 E 4	1.14 E 5	4.20 E 5
SE					0	0	0	0	3.29 E 4	1.51 E 5	1.84 E 5
SSE					0	0	3.84 E 5	4.91 E 5	6.73 E 5	3.88 E 5	1.94 E 6
S					0	7.18 E 4	2.71 E 5	1.92 E 5	2.78 E 5	6.41 E 4	8.76 E 5
SSW					0	3.60 E 4	1.43 E 5	8.18 E 4	2.43 E 5	5.25 E 5	1.08 E 6
SW					0	1.00 E 5	2.04 E 5	6.61 E 5	7.35 E 5	6.64 E 5	2.36 E 6
WSW					3.72 E 3	1.00 E 5	4.38 E 5	6.33 E 5	8.70 E 5	4.22 E 5	2.47 E 6
W					1.86 E 4	1.00 E 5	5.94 E 5	3.30 E 5	7.20 E 5	1.74 E 6	3.50 E 6
WNW					1.32 E 3	3.60 E 4	5.17 E 5	1.29 E 6	4.04 E 6	5.18 E 6	1.11 E 7
NW				2.40 E 2	0	1.44 E 4	3.48 E 5	1.81 E 6	2.63 E 6	4.75 E 6	9.55 E 6
NNW				0	0	0	0	1.57 E 5	2.16 E 6	3.90 E 6	6.22 E 6
Total	0	0	0	2.40 E 2	4.28 E 4	1.35 E 6	5.77 E 6	6.46 E 6	1.28 E 7	1.94 E 7	4.58 E 7

Beef

SUMMARY OF MEAT AND POULTRY PRODUCTION WITHIN 50 MILES OF ARTIFICIAL ISLAND

Livestock	Number of Animals	Meat Production (kg/year)	Production (% of Total)
Cattle	3.82 E 5	4.58 E 7	24
Sheep	1.54 E 4	5.70 E 5	--
Hogs	1.52 E 5	5.64 E 7	28
Broilers	5.06 E 7	9.62 E 7	48

Beef + Poultry 4.58 / 9.62 / 14.20 E7

Hogs 5.60 / 14.82

.06

Salem-Hope Creek to Vegetation DATA from Applicants

DATE: NAME:

Tables A-1.9, 1.10, 1.12, 1.14

DISTANCE FROM SITE (MILES)

SEC	0 - 1	1 - 2	2 - 3	3 - 4	4 - 5	5 - 10	10 - 20	20 - 30	30 - 40	40 - 50	TOTAL
N				6.88[3]	0.044[4]	0.180[4]	1.333[7]	6.040[7]	0.235[7]	0.196[7]	
NNE				7.60	16.43[4]	11.89	4.17	4.37	0.150	—	
NE				—	0.911	"	3.72	—	1.58	2.60	
ENE					—	0.894	2.77	4.20	1.53	2.21	
E					—	0.543	5.46	4.76	2.32	0.778	
ESE					—	0.914	6.15	—	1.01	0.995	
SE					—	—	—	—	0.126	1.58	
SSE					—	—	1.58	1.89	2.13	1.48	
S				—	0.252	0.134	2.921	0.739	1.01	0.256	
SSW				3.02	0.278	0.160	0.332	0.095	0.642	1.47	
SW				—	2.514	0.178	0.353	0.702	0.485	0.572	
WSW				—	0.602	1.24	0.526	0.916	1.50	0.735	
W				0.233	0.594	0.178	0.577	0.229	0.338	0.969	
WNW				1.20	0.571	0.153	1.569	0.512	1.43	1.11	
NW				1.792	0.660	0.025[5]	0.523	0.877	0.756	0.824	
NNW				—	0.091	—	—	0.249	0.617	1.21	

Total of A-1.9 1-10, & part of 1-12

Salem/Hope Creek Vegetation (Appl. Tables A-1.9, 1.10, 1.12)
milk (" Table A-1.7)
Meat (" " A-1.4)

0-5-10

Annual Milk Production within 50 Miles of Artificial Island

(l/year)

Direction	Distance Range in Miles										
	0-1	1-2	2-3	3-4	4-5	5-10	10-20	20-30	30-40	40-50	Total
N					0	3.27 E 5	2.94 E 6	3.48 E 5	2.03 E 6	6.42 E 6	1.21 E 7
NNE					1.36 E 5	2.52 E 6	9.15 E 6	1.81 E 6	6.25 E 4	0	1.37 E 7
NE					0	2.52 E 6	8.18 E 6	0	2.49 E 5	1.04 E 7	2.14 E 7
ENE					0	1.36 E 6	6.20 E 6	3.34 E 6	3.74 E 5	2.96 E 5	1.22 E 7
E					0	7.13 E 5	1.77 E 6	2.56 E 6	3.53 E 5	0	5.34 E 6
ESE					0	2.85 E 5	2.00 E 6	0	2.85 E 5	9.15 E 5	3.48 E 6
SE					0	0	0	0	2.97 E 5	1.32 E 6	1.62 E 6
SSE					0	0	2.99 E 6	3.82 E 6	5.28 E 6	3.73 E 6	1.58 E 7
S					0	1.30 E 6	2.70 E 6	1.49 E 6	2.16 E 6	4.97 E 5	8.14 E 6
SSW					0	1.56 E 6	2.15 E 6	6.73 E 5	0	0	4.38 E 6
SW					0	1.82 E 6	3.24 E 6	6.95 E 6	7.17 E 6	6.69 E 6	2.59 E 7
WSW					0	1.82 E 6	5.54 E 6	7.74 E 6	1.11 E 7	5.15 E 6	3.14 E 7
W					2.89 E 5	1.82 E 6	7.35 E 6	3.48 E 6	7.52 E 6	1.70 E 7	3.74 E 7
WNW					0	1.56 E 6	6.86 E 6	1.36 E 7	4.03 E 7	4.84 E 7	1.11 E 8
NW					0	2.60 E 5	5.63 E 6	2.02 E 7	2.77 E 7	4.80 E 7	1.02 E 8
NNW					0	0	0	2.49 E 6	2.27 E 7	4.06 E 7	6.58 E 7
Total	0	0	0	0	4.25 E 5	1.87 E 7	6.67 E 7	6.84 E 7	1.28 E 8	1.89 E 8	4.71 E 8

milk

SUMMARY OF MILK DISTRIBUTION
WITHIN 50 MILES OF ARTIFICIAL ISLAND*

State	New Jersey		Pennsylvania	
Total Utilization	Fresh	Processed	Fresh	Processed
%	67	33	75	25
Make-up of Processed:				
Ice Cream & Frozen Products		27		12
Creamery Butter				5
Cheese & other		6		8

*No data available for Delaware and Maryland; however, the distribution is assumed to be similar to that shown for New Jersey and Pennsylvania.

Relative milk production from New Jersey, Maryland, Delaware and Pennsylvania Counties within 50 miles of Artificial Island:

Production	New Jersey	Maryland	Delaware	Pennsylvania
%	10	21	6	63

Annual Truck Farming Production - Fruit, within 50 Miles of Artificial Island

(kg/year)

Direction	Distance Range in Miles										
	0-1	1-2	2-3	3-4	4-5	5-10	10-20	20-30	30-40	40-50	Total
N						2.49 E 3	1.92 E 4	6.97 E 3	4.07 E 4	1.34 E 4	8.27 E 4
NNE					3.00 E 2	1.59 E 4	6.98 E 4	1.13 E 7	3.89 E 5	0	1.17 E 7
NE					2.40 E 3	1.59 E 4	6.24 E 4	0	6.96 E 6	6.77 E 6	1.38 E 7
ENE						1.49 E 4	4.73 E 4	8.56 E 6	4.27 E 6	8.50 E 6	2.14 E 7
E						1.22 E 5	3.16 E 6	2.71 E 6	3.90 E 6	1.98 E 6	1.19 E 7
ESE						5.08 E 5	3.56 E 6	0	4.74 E 5	9.32 E 5	5.47 E 6
SE						0	0	0	6.52 E 4	1.27 E 5	1.92 E 5
SSE						0	8.67 E 5	1.11 E 6	1.50 E 6	7.24 E 5	4.19 E 6
S						7.58 E 3	4.88 E 5	4.33 E 5	8.04 E 4	2.42 E 5	1.25 E 6
SSW				1.28 E 3		9.10 E 3	1.07 E 5	2.27 E 3	5.28 E 3	1.14 E 4	1.37 E 5
SW					1.08 E 3	1.06 E 4	1.29 E 4	1.45 E 4	2.13 E 4	1.78 E 4	7.82 E 4
WSW						1.06 E 4	1.54 E 5	1.30 E 5	8.59 E 3	3.72 E 5	6.76 E 5
W						1.04 E 4	2.86 E 5	1.99 E 5	3.40 E 5	6.49 E 5	1.48 E 6
WNW					4.65 E 2	9.10 E 3	2.18 E 5	2.22 E 5	6.40 E 5	5.55 E 5	1.64 E 6
NW				4.85 E 2	1.19 E 3	1.52 E 3	8.15 E 4	3.86 E 5	6.50 E 4	1.08 E 5	6.41 E 5
NNW						0	0	2.02 E 4	5.31 E 4	9.31 E 4	1.66 E 5
Total				1.76 E 3	5.44 E 3	7.47 E 5	9.37 E 6	2.74 E 7	2.12 E 7	2.16 E 7	8.03 E 7

Truck Fruit

TABLE A 1.9

Annual Truck Farming Production - Vegetables, within 50 Miles of Artificial Island

(kg/year)

Direction	Distance Range in Miles										
	0-1	1-2	2-3	3-4	4-5	5-10	10-20	20-30	30-40	40-50	Total
N					0	1.45 E 6	1.30 E 7	2.80 E 5	1.65 E 6	1.20 E 6	1.76 E 7
NNE					1.64 E 5	1.16 E 7	4.07 E 7	3.21 E 7	1.10 E 6	0	8.57 E 7
NE					6.71 E 3	1.16 E 7	3.63 E 7	0	8.79 E 6	1.78 E 7	7.45 E 7
ENE					0	3.72 E 6	2.76 E 7	3.30 E 7	1.10 E 7	1.35 E 7	9.38 E 7
E					0	4.55 E 6	5.12 E 7	4.46 E 7	1.92 E 7	5.80 E 6	1.25 E 8
ESE					0	8.24 E 6	5.77 E 7	0	9.97 E 6	8.69 E 6	8.46 E 7
SE					0	0	0	0	1.06 E 6	1.50 E 7	1.61 E 7
SSE					0	0	1.29 E 7	1.65 E 7	1.80 E 7	1.22 E 7	5.96 E 7
S					1.82 E 3	1.09 E 6	8.04 E 6	6.46 E 6	9.32 E 6	2.15 E 6	2.71 E 7
SSW					0	1.31 E 6	2.96 E 6	7.20 E 5	6.16 E 6	1.33 E 7	2.44 E 7
SW					1.82 E 4	1.53 E 6	3.13 E 6	5.21 E 6	4.24 E 6	4.48 E 6	1.86 E 7
WSW					4.54 E 3	1.22 E 7	4.36 E 6	7.73 E 6	1.28 E 7	6.03 E 6	4.31 E 7
W					4.54 E 3	1.53 E 6	4.67 E 6	1.82 E 6	2.28 E 6	7.66 E 6	1.80 E 7
WNW					5.14 E 3	1.31 E 6	4.66 E 6	3.22 E 6	8.46 E 6	7.90 E 6	2.56 E 7
NW				1.23 E 3	3.63 E 3	2.18 E 5	4.43 E 6	5.89 E 6	3.86 E 6	6.44 E 6	2.08 E 7
NNW					9.08 E 2	0	0	2.07 E 6	3.16 E 6	6.00 E 6	1.12 E 7
Total				1.23 E 3	2.09 E 5	6.53 E 7	2.72 E 8	1.60 E 8	1.21 E 8	1.28 E 8	7.46 E 8

Truck - Veg kg/yr

TABLE A 1.10

SUMMARY OF TRUCK FARMING DISTRIBUTION - FRUITS AND VEGETABLES WITHIN 50 MILES OF ARTIFICIAL ISLAND*

State:	New Jersey		Maryland		Delaware		Pennsylvania	
Utilization %	Fresh	Processed	Fresh	Processed	Fresh	Processed	Fresh	Processed
FRUIT								
Apples	55%	45%	--	--	--	--	37	63
Peaches	99	1	--	--	--	--	89	11
VEGETABLES								
Beans, snap	100	--	20	80	--	100	10	90
Corn, sweet	100	--	--	--	--	100	--	--
Tomatoes	11	89	35	65	--	100	11	89

Relative Fruit and Vegetable Production by State within 50 Miles of Artificial Island:

	New Jersey	Maryland	Delaware	Pennsylvania
Fruits	60%	10%	15	15
Vegetables	67	20	8	5

*Based on state data and counties within the 50-mile area.

Salem Drain for Humans DATA

NAME:

DISTANCE FROM SITE (MILES)

DIR.	0 - 1	1 - 2	2 - 3	3 - 4	4 - 5	5 - 10	10 - 20	20 - 30	30 - 40	40 - 50	TOTAL
N				—	0.440	0.340[5]	3.06[+5]	0.412[+6]	0.656[+6]	0.743[+6]	
NNE				6.813		2.71	9.59[+5]	0.288	0.010	—	
NE				7.60		2.71	8.27	—	0.061	1.46	
ENE						2.04	0.76	0.422	0.062	0.258	
E						0.760	2.41	0.329	0.658	0.004	
ESE						0.387	2.72	—	0.043	0.330	
SE						—	—	—	0.135	0.628	
SSE						—	9.87	1.26	1.78	1.86	
S					0.701	1.71	6.84	0.493	0.712	0.165	
SSW				1.74	1.50	2.05	2.22	0.223	0.255	1.39	
SW				—	5.86	2.38	3.74	1.78	0.590	1.22	
WSW				—	1.48	"	2.50	1.30	2.21	0.949	
W				0.233	1.40	"	8.16	0.366	0.760	1.38	
WNW				1.20	0.105	2.05	8.09	1.68	5.20	1.64	
NW				0.077	1.78	0.341	7.15	2.49	3.63	1.69	
NNW	—	—	—	—	—	—	—	0.405	2.96	5.16	

Table A-1.12 adjusted by A-1.14

Direction	Distance Range In Miles										
	0-1	1-2	2-3	3-4	4-5	5-10	10-20	20-30	30-40	40-50	Total
N					0	1.45 E 6	1.30 E 7	2.80 E 5	1.65 E 6	1.20 E 6	1.76 E 7
NNE					1.64 E 5	1.16 E 7	4.07 E 7	3.21 E 7	1.10 E 6	0	8.57 E 7
NE					6.71 E 3	1.16 E 7	3.63 E 7	0	8.79 E 6	1.78 E 7	7.45 E 7
ENE					0	8.72 E 6	2.76 E 7	3.30 E 7	1.10 E 7	1.35 E 7	9.38 E 7
E					0	4.55 E 6	5.12 E 7	4.46 E 7	1.92 E 7	5.80 E 6	1.25 E 8
ESE					0	8.24 E 6	5.77 E 7	0	9.97 E 6	8.69 E 6	8.46 E 7
SE					0	0	0	0	1.06 E 6	1.50 E 7	1.61 E 7
SSE					0	0	1.29 E 7	1.65 E 7	1.80 E 7	1.22 E 7	5.96 E 7
S					1.82 E 3	1.09 E 6	8.04 E 6	6.46 E 6	9.32 E 6	2.15 E 6	2.71 E 7
SSW					0	1.31 E 6	2.96 E 6	7.20 E 5	6.16 E 6	1.33 E 7	2.44 E 7
SW					1.82 E 4	1.53 E 6	3.13 E 6	5.21 E 6	4.24 E 6	4.48 E 6	1.86 E 7
WSW					4.54 E 3	1.22 E 7	4.36 E 6	7.73 E 6	1.28 E 7	6.03 E 6	4.31 E 7
W					4.54 E 3	1.53 E 6	4.67 E 6	1.82 E 6	2.28 E 6	7.66 E 6	1.80 E 7
WNW					5.14 E 3	1.31 E 6	4.66 E 6	3.22 E 6	8.46 E 6	7.90 E 6	2.56 E 7
NW				1.23 E 3	3.63 E 3	2.18 E 5	4.43 E 6	5.89 E 6	3.86 E 6	6.44 E 6	2.08 E 7
NNW					9.08 E 2	0	0	2.07 E 6	3.16 E 6	6.00 E 6	1.12 E 7
Total				1.23 E 3	2.09 E 5	6.53 E 7	2.72 E 8	1.60 E 8	1.21 E 8	1.28 E 8	7.46 E 8

Truck - Veg kg/yr

HCGS

TABLE A 1.10

Direction	0-1	1-2	2-3	3-4	4-5	5-10	10-20	20-30	30-40	40-50	Total
N						2.49 E 3	1.92 E 4	6.97 E 3	4.07 E 4	1.34 E 4	8.27 E 4
NNE					3.00 E 2	1.59 E 4	6.98 E 4	1.13 E 7	3.89 E 5	0	1.17 E 7
NE					2.40 E 3	1.59 E 4	6.24 E 4	0	6.96 E 6	6.77 E 6	1.38 E 7
ENE						1.49 E 4	4.73 E 4	8.56 E 6	4.27 E 6	8.50 E 6	2.14 E 7
E						1.22 E 5	3.16 E 6	2.71 E 6	3.90 E 6	1.98 E 6	1.19 E 7
ESE						5.08 E 5	3.56 E 6	0	4.74 E 5	9.32 E 5	5.47 E 6
SE						0	0	0	6.52 E 4	1.27 E 5	1.32 E 5
SSE						0	8.67 E 5	1.11 E 6	1.50 E 6	7.24 E 5	4.19 E 6
S						7.58 E 3	4.88 E 5	4.33 E 5	8.04 E 4	2.42 E 5	1.25 E 6
SSW				1.28 E 3		9.10 E 3	1.07 E 5	2.27 E 3	5.28 E 3	1.14 E 4	1.37 E 5
SW					1.08 E 3	1.06 E 4	1.29 E 4	1.45 E 4	2.13 E 4	1.78 E 4	7.82 E 4
WSW						1.06 E 4	1.54 E 5	1.30 E 5	8.59 E 3	3.72 E 5	6.76 E 5
W						1.04 E 4	2.86 E 5	1.99 E 5	3.40 E 5	6.49 E 5	1.48 E 6
WNW					4.65 E 2	9.10 E 3	2.18 E 5	2.22 E 5	6.40 E 5	5.55 E 5	1.64 E 6
NW				4.85 E 2	1.19 E 3	1.52 E 3	8.15 E 4	3.86 E 5	6.50 E 4	1.08 E 5	6.44 E 5
NNW						0	0	2.02 E 4	5.31 E 4	9.31 E 4	1.66 E 5
Total				1.76 E 3	5.44 E 3	7.47 E 5	9.37 E 6	2.74 E 7	2.12 E 7	2.16 E 7	8.03 E 7

Truck & Fruit

HCGS

TABLE A 1.9

Annual Field Crop Production within 50 Miles of Artificial Island

(kg/year)

Direction	Distance Range in Miles										
	0-1	1-2	2-3	3-4	4-5	5-10	10-20	20-30	30-40	40-50	Total
N				0	1.26 E 5	9.76 E 5	8.78 E 6	3.26 E 6	1.88 E 7	2.13 E 7	5.32 E 7
NNE				1.95 E 5	0	7.78 E 6	2.75 E 7	8.27 E 6	2.85 E 5	0	4.40 E 7
NE				2.18 E 5	0	7.78 E 6	2.37 E 7	0	1.76 E 6	4.18 E 7	7.52 E 7
ENE				0	0	5.86 E 6	2.18 E 6	1.21 E 7	1.79 E 6	1.67 E 6	2.36 E 7
E				0	0	2.18 E 6	6.90 E 6	9.43 E 6	1.66 E 6	1.11 E 5	2.03 E 7
ESE				0	0	1.11 E 6	7.79 E 6	0	1.23 E 6	9.45 E 6	1.96 E 7
SE				0	0	0	0	0	3.88 E 6	1.80 E 7	2.19 E 7
SSE				0	0	0	2.83 E 7	3.62 E 7	5.11 E 7	5.33 E 7	1.69 E 8
S				0	2.01 E 4	4.89 E 6	1.96 E 7	1.42 E 7	2.04 E 7	4.72 E 6	6.39 E 7
SSW				4.98 E 4	4.31 E 4	5.87 E 6	7.22 E 6	6.38 E 6	7.32 E 6	3.99 E 7	6.63 E 7
SW				0	1.68 E 5	6.82 E 6	1.13 E 7	5.09 E 7	1.69 E 7	3.50 E 7	1.21 E 8
WSW				0	4.24 E 4	6.82 E 6	2.15 E 7	3.72 E 7	6.33 E 7	2.72 E 7	1.56 E 8
W				6.67 E 3	4.02 E 5	6.82 E 6	2.34 E 7	1.05 E 7	2.18 E 7	3.95 E 7	1.02 E 8
WNW				3.45 E 4	3.02 E 3	5.87 E 6	2.32 E 7	4.82 E 7	1.49 E 8	4.69 E 7	2.73 E 8
NW				2.22 E 3	5.11 E 4	9.79 E 5	2.05 E 7	7.13 E 7	1.04 E 8	4.84 E 7	2.45 E 8
NNW				0	0	0	0	1.16 E 7	8.49 E 7	1.48 E 8	2.45 E 8
Total	0	0	0	5.06 E 5	8.55 E 5	6.39 E 7	2.55 E 8	3.20 E 8	6.00 E 8	4.62 E 8	1.70 E 9

Tot Field Crops (includes Hay & silage)

TABLE A 1.12

SUMMARY OF TRUCK FARMING PRODUCTION - FRUITS AND VEGETABLES WITHIN 50 MILES OF ARTIFICIAL ISLAND

FRUIT	0 - 5 Miles		0 - 50 Miles	
	Kgx10^3	%	Kgx10^6	%
Apples	4.22	59	39.9	50
Cherries	0.02	--	0.1	--
Grapes	0.85	12	0.4	1
Peaches	0.98	14	36.5	45
Pears	0.29	4	0.5	1
Plums	0.06	--	0.1	--
Strawberries	0.78	11	2.8	3

VEGETABLES	0 - 50 Miles	
	Kgx10^6	%
Snap Beans	40	5
Cabbage, Lettuce, Spinach	87	12
Sweet Corn	81	11
Tomatoes	271	36
Potatoes	171	23
Others	98	13

SUMMARY OF FIELD CROP PRODUCTION WITHIN 50 MILES OF ARTIFICIAL ISLAND

TYPE	AREA (10^6 m^2)	QUANTITY (10^6 kg)	YIELD (kg/m^2)	PRODUCTION (% of total)
Corn Silage	256	892	3.48	39
Grain Corn	1360	890	0.65	38
Alfalfa	323	223	0.69	10
Other Hay	271	119	0.44	5
Wheat	321	90	0.28	4
Barley	220	68.2	0.31	3
Oats	53	12.7	0.24	1

1709

1 Bushel = 60 lb = 27 Kg

RAB Memo gives 6.4 kg/bu. wheat
& 0.57 kg/bu Corn

Wheat, etc = (6.4/27) × 170.9 kg = 40.5 × 10^6

Corn = (0.57/27) × 890 kg = 18.8

For humans → Tot grain = 1.93 × 10^7 kg/yr

Rate this & total production in Table A1.12 (1709 × 0.5) to get correct amounts for humans. Then add to Fruit & Veg Tables for Total Vegetation production & input to Sarpar

LIQUID PATHWAYS

Surface Water

Information on water usage in the region of interest was obtained from the concerned federal, state and other public agencies, from available statistical publications and in some cases by direct survey of its users.

South of Philadelphia there are no private or municipal utilities which use the Delaware River or Bay as a potable water source, due to the saline content of the water.[1]

Industrial use, assumed to be for cooling and processing, is shown in Table A 2.2. Facilities for recreational use of the river and bay are presented in Table A 2.1 (1)

Information on marinas was obtained in two ways. A search of the telephone directories for the areas involved resulted in information obtained directly from the marinas themselves. The second source was "the Boating Almanac"[2] for the Delaware River and Bay area. Total capacity is nearly 1700 boats; boat rentals and charter and party boats total 100 or more. Over half of these marinas are located in New Jersey along the Cohansey River, the Maurice River, and the coast inbetween.

Estimates of current and projected recreational users are presented in Tables A 2,3 & 4 for Delaware and Tables A 2,5 & 6 for New Jersey.[3]

An impressive number of Wildlife Refuges and Fish and Wildlife Management Areas are located along the river and bay. These are open to the public primarily for wildlife observation and nature study, but hunting and fishing are allowed, and in some cases boating. Information on acreage, attendance and activities was obtained from the Refuge Managers and from the United States Department of the Interior, Fish and Wildlife Service.

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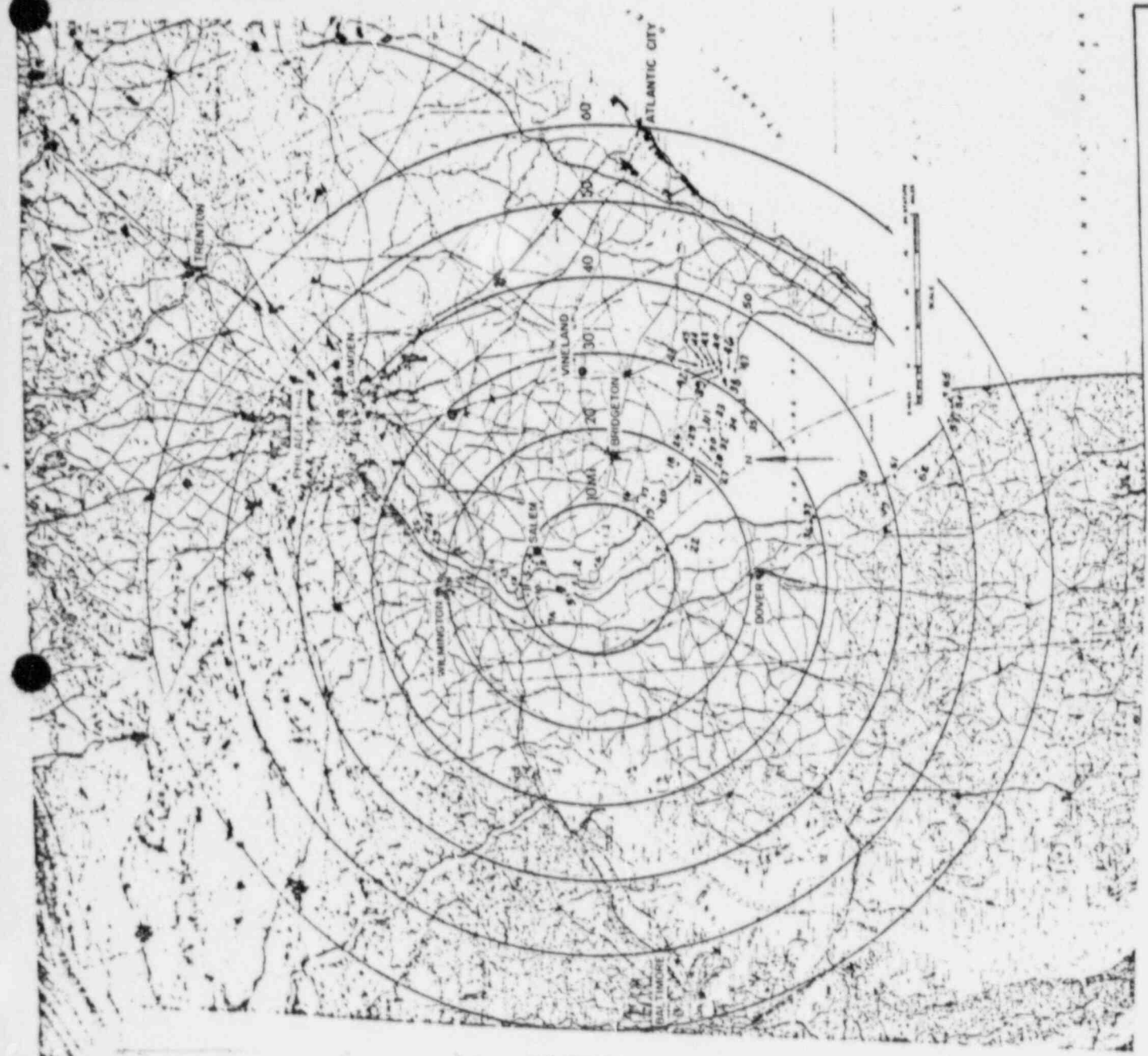
(1) Location of facilities listed on Table A 2.1 are identified on Figure A 2.1.

References

1. Personal communication, Greene A. Jones, Director, Water Programs Division, United States Environmental Protection Agency, Region III, Philadelphia, PA.

2. "The Boating Almanac", Volume #3, 1974, Boating Almanac Co., Inc., Green Village, NJ.

3. Personal communication, John Rattie, Delaware River Basin Commission, West Trenton, NJ.



WATER USERS WITHIN 50 MILES OF THE SITE

Fig A. 2.1

TABLE A 2.1

IDENTIFICATION KEY FOR Figure 2 A.1
WATER USERS WITHIN 50 MILES OF ARTIFICIAL ISLAND

Map Location	Facility	Direction & Distance from Artificial Island		Acres	Water Related Activity					Capacity		Attendance
			miles		swimming	boating	fishing	hunting (waterfowl)	fishing-commercial		(boats for hire)	
1A	Artificial Island Wildlife Refuge	N	2.3				x	x				
1	Fort Mott State Park	N	9.5	1229		x						232,042
2	Marina	NNE	2.3			x				50		
3	Marina	NNE	7.9			x				77		
4	Various ramps	NNE	8.4			x						
5	Marina	NNE	8.7			x				86		
6	Mad Horse Creek Fish & Wildlife Management Area	ESE	2.9									
7	Woodland Beach & Wildlife Refuge	SSE	9.6	3542.9	x	x	x					1000 hunter
7A	Chesapeake & Delaware Wildlife Refuge	NW	8.4									2000 hunter
8	Reedy Island	NNW	3.6	50	x	x		x				
9	Augustine Beach & Wildlife Refuge	NNW	3.8	190.7		x	x	x				
10	Marina	NNW	8.4			x			x	70		
11	Fort Delaware	NNW	9.0									13,021
12	Killcohook National Wildlife Refuge	N	10.6	704								
13	Pennsville Public Launching Ramp	N	14.0			x						
14	Marina					x				30		
15	Marina	N	18.6			x				10		
16	Marina	ESE	11.6			x			x	50		
17	Marina	ESE	11.9			x				125		
18	Marina	ESE	17.0			x				100		
19	Marina	SE	11.9			x				125		
20	Dix Fish & Wildlife Management Area	SE	13.7									
21	Marina	SE	19.8			x			x	40		
22	Bombay Hook National Wildlife Refuge	SSE	13.5	15,110			x	x				59,404
23	Marina	NNE	21.2				x					
24	Marina	NNE	25.0				x					
25	Marina	NNE	25.6				x					
26	Nantuxent Fish & Wildlife Management Area	SE	20.8									
27	Marina	SE	20.8			x				70	20	
28	Marina	SE	22.1			x				80	15	
29	Marina	SE	22.3			x			x	100	15	

TABLE A 2.1 (cont.)

Map Location	Facility	Direction & Distance from Artificial Island		Area	Water Related Activity					Capacity	Attendance
					swimming	boating	fishing	hunting (waterfowl)	fishing--commercial	(boats for hire)	
			miles								
30	Boat Rental	SE	22.8			x				20	
31	Fortescue Fish & Wildlife Management Area	SE	25.0								
32	Marina	SE	25.6			x				20	1
33	Marina	SE	26.0			x					
34	Marina	SE	26.2			x				20	18
35	Egg Island Fish & Wildlife Management Area	SE	27.9								
36	Marina	SSE	30.6						x		2
37	Bowers Beach	SSE	30.9	13.1	x	x	x				
38	Marina	ESE	31.7			x				62	1
39	Marina	ESE	32.5			x				100	1
40	Marina	ESE	32.7			x				35	1
41	Marina	ESE	32.9			x				90	
42	Marina	ESE	32.9			x	x			200	6
43	Marina	ESE	32.9			x				16	
44	Marina	ESE	33.2			x					
45	Marina	ESE	33.2			x				26	
46	Reislerville Fish & Wildlife Management Area	ESE	33.8								
47	Boat Rental					x					
48	Marina	SSE	37.8			x				100	
49	Marina	SSE	38.6							30	
50	Dennis Creek Fish & Wildlife Management Area	ESE	41.3								
51	Fowler Beach	SSE	42.5	2			x				
52	Prime Hook National Wildlife Refuge	SSE	44.5								
53	Lewes Recreational Area	SSE	52.7	1.7		x	x				
54	Boat rental	SSE	53.0						x		1
55	Cape Henlopen State Park	SSE	53.5	1641	x	x	x				1,294,994

DELAWARE RIVER SURFACE WATER WITHDRAWALS BELOW PHILADELPHIA TO AND INCLUDING DELAWARE BAY

	Average Use 1970 mgd*	Location and Remarks
Philadelphia Electric Co.	193.0	Chester Station, Pa.
Allied Chemical Corp.	1.5	Marcus Hook, Pa.
F. M. C. Corporation	4.4	Marcus Hook, Pa.
Philadelphia Electric Co.	2.7	Tilghman St. Gas Plant - Chester, Pa.
Philadelphia Electric Co.	552.2	Eddystone Station, Pa.
B.P. Oil Co.	130.1	Marcus Hook, Pa.
Union Carbide	30.2	Essington, Pa.
Sun Oil Co.	121.7	Marcus Hook, Pa.
Westinghouse Electric Co.	17.8	Lester, Pa.
Scott Paper Co.	20.5	Chester, Pa.
E. I. duPont	6.7	Gibbstown, N. J.
Texaco, Inc.	2.9	West Deptford Township, N. J.
Olin Corporation	16.8	Paulsboro Borough, N. J.
Mobil Oil Corp.	30.2	Paulsboro Borough, N. J.
Heinz Co.	0.1	Salem Creek - brackish
E. I. duPont	126.0	Deepwater, N. J.
Atlantic City Electric	336.0	Deepwater Station - Pennsgrove, N. J.
Allied Chemical Corp.	35.7	New Castle, Delaware
Atlas Chemical Ind. Inc.	10.9	New Castle, Delaware
Delmarva Power & Light Co.	354.0	Edge Moor Power Station, Wilmington, Del.
E. I. duPont	0.9	Pigments Dept. Christina River (brackish)
E. I. duPont	22.4	Edge Moor
Getty Oil Co.	317.3	Delaware City
Phoenix Steel Corp.	8.2	Claymont
Ludlow Corp.	0.1	New Castle, Delaware
Bancroft Co.	88.8	Lewes, Delaware
Fish Products Co.	3.0	Lewes, Delaware

*mgd = million gallons per day.
Ref.: personal communication, John Rattie, Delaware River Basin Commission - West Trenton, N. J.

Assumed & Projected Daily Recreation for State of Delaware

Visitors per day	Year
9,000	1966
12,700	1980
18,000	2000

Summary of Daily Capacities (1967)	Number of Persons
boating	7,900
swimming (bay)	21,592
fishing	20,171

Projected User Days - 1980:

	Del. Resident	Non-Resident
fishing	1,673,000	35,000
boating	2,238,000	40,000
swimming (bay)	600,000	10,000

Projected User Days - 2000:

	Del. Resident	Non-Resident
fishing	2,340,000	40,000
boating	3,130,000	55,000
swimming (bay)	800,000	15,000

SOURCE: Lesser, C. Marine Fisheries Survey, 1968. Compiled for Div. of Fish and Wildlife, Department of Natural Resources & Env. Control, State of Delaware, Dover, Del.

Recreational Use of Delaware River & Bay

Delaware River & tributaries	person-days
fishing-private	11,591
cruising	3,369
Delaware Bay	
fishing-private	67,234
fishing - party boat	30,319
cruising	6,179
sailing	462

SOURCE: Lesser, C. Marine Fisheries Survey, 1968. Compiled for Div. of Fish & Wildlife, Department of Natural Resources & Env. Control, State of Delaware, Dover, Del.

Recreation Demand for State of New Jersey - Delaware Bay

Average Weekend Day during Peak Season - 1970

	Resident	Non-Resident
Swimming	7,300	11,700
Sightseeing	2,400	3,500
Fishing	800	3,800
Boating	1,500	2,400
Hunting	500	800
Water Skiing	500	400
Canoeing	100	100
Sailing	100	200

SOURCE: Outdoor Recreation in New Jersey, New Jersey Statewide Comprehensive Outdoor Recreation Plan, State of New Jersey, Department of Environmental Protection, Office of Environmental Review, 1973.

DELAWARE BAY PRESENT AND FUTURE RECREATIONAL FACILITY NEEDS

RECREATION	CAPACITY (person)	ESTIMATED DEMANDS (person)		
		1970	1980	2000
Swimming	60,557	19,000	27,100	39,200
Boating	6,373	3,900	5,700	8,200
Fishing	28,219	4,[illegible]0	5,700	7,600

SOURCE: Outdoor Recreation in New Jersey, New Jersey Statewide Comprehensive Outdoor Recreation Plan, State of New Jersey, Department of Environmental Protection, Office of Environmental Review, 1973.

Commercial/Recreational Fish & Shellfish Catch From the Delaware River Bay

The present commercial fish and shellfish catch for New Jersey and Delaware is tabulated in Table A 2.7. The species selected from Cape May County statistics were only those identified by Ichthyological Associates as indigenous to the Delaware Bay.(1) Catch statistics for Delaware were not obtainable by species but it is not unreasonable to correlate them to New Jersey species by relative amounts.

Projected values were not readily available but past and present river conditions indicate that these values will not increase in the future. This is primarily due to extensive industrial and municipal waste discharge into the estuary which has resulted in poor water quality.(2)

The principal fishing ports in Delaware are Lewes and Little Creek for finfish (mostly striped bass) and Port Mahon, Flemings Landing, and Collins Beach for shellfish (mostly blue crab).(3) The principal fishing ports in New Jersey are located at Stow Creek, Greenwich, and Newport for shellfish (oyster and blue crab).(4) All marinas contacted which have dockage for commercial boats are identified in Figure A 2.1.

Since the commercial catch is limited (4.9×10^6 lbs. finfish, 4.8×10^6 lbs. blue crab, and 1×10^6 lbs. oysters), it is not unduly conservative to estimate that the entire catch is consumed locally (within 50 miles).

Statistics on recreational catch were very limited. Table A 2.8 lists some estimates for finfish and shellfish catch from 1968. Figure A 2.1 provides information on recreational areas where fishing as an activity is common. Projected values for recreational fishing in the area would not indicate any increase in numbers mainly because the best fishing is too far from population centers.(5)

There are approximately 21,000 acres of tidal marsh in New Jersey and 18,000 acres in Delaware where waterfowl can be found. Waterfowl hunting is quite popular here, in areas where this activity is allowed.

Estimates from Delaware indicate about 11,000 hunters spent 93,000 days hunting waterfowl in 1969.(6) Statistics on the number caught were unavailable, but should conform with local hunting regulations.

The only other major use of the marshes is muskrat trapping. While this activity is chiefly for the pelts, it must be assumed that the flesh is eaten. Statistics were available for 1969 with an estimate that 45,000 muskrats were caught within the study area.

REFERENCES

1. Schuler, V. J., An Ecological Study of the Delaware River in the Vicinity of Artificial Island, Ichthyological Associates, Inc., Ithaca, N. Y., 1974.

2. U.S.E.P.A., Delaware Estuary Comprehensive Study - Preliminary Report and Findings, Department of Interior, Phila., Pa. 1966.

3. The Coastal Zone of Delaware, The Governor's Task Force on Marine and Coastal Affairs, July, 1972.

4. Op. cit., ref 1.

5. Op. cit., ref 2

6. Files of Division of Fish and Wildlife, Department of Natural Resources & Environmental Control, Dover, Del.

COMMERCIAL FISH/SHELLFISH CATCH FOR NEW JERSEY & DELAWARE
WITH EMPHASIS ON DELAWARE RIVER-BAY
(pounds per year)

New Jersey Counties 1974[a]

Species	Cape May	Cumberland
Sea trout (Cynoscion arenarius)	1,790,000	123,000
Butterfish (Selenotoca papuensis)	774,000	300
Menhaden (Brevoortia tyrannus)	377,000	100,000
Bluefish (Pomatomus saltatrix)	294,000	18,500
Striped bass (Morone saxatilis)	266,000	19,700
American eel (Anguilla rostrata)	23,900	39,600
American shad (Dorosoma cepedianum)	11,500	7,730
White perch (Morone americana)	5,790	12,100
Atlantic sturgeon (Acipenserida)	8,540	-------
Spot (Leiostomus xanthurus)	4,980	2,980
Alewife (Pomolobus pseudoharengus)	2,600	-------
Carp (Cyprinus carpio) freshwater	------	47,700
Catfish (Ictalurus furcatus) freshwater	------	6,860
Finfish totals	3,560,000	378,000
Blue crab (Callinectes sapidus)		
hard shell	130,000	1,740,000
peeler	8,260	113,000
Oyster (Crassostrea virginica)	-------	985,000
Clam (Spisula solidissima)	20,600	-------
Turtle, snapper (Chelydra serpentina)	-------	5,750

Delaware Counties - 1974 [b]

	Kent	Newcastle	Sussex
(mostly blue crab)	1,800,000	878,000	1,460,000

Delaware Statewide Catch - 1968 [c]

food fish	161,000
oyster meat	43,000
clam meat	242,000
blue crab	223,000

[a] SOURCE: New Jersey Landings, Annual Summary 1974, National Marine Fisheries Service, Wash., D. C.

[b] SOURCE: Personal communication, National Marine Fisheries Service, 1976

[c] SOURCE: The Coastal Zone at Delaware - The Governor's Task Force on Marine and Coastal Affairs - July, '72

Recreational Fish/Shellfish Catch for Delaware River-Bay (1968)

Finfish*	Pounds Caught
Delaware River and Canal	
net	26,400
private boat	11,300
bridge & bank	90,900
Delaware Bay	
net	25,100
party boat	448,000
private boat	550,000
shore & jetty	23,400

*The catch is estimated at 6 fish/person-day; 65% of the total is trout, flounder, and bluefish.

Shellfish

	Person-Days	Number Caught
Crabbing		
Bowers	33	--
Lewes	2,300	15,600
Clamming		
inland bays	56,025	1,680,000

SOURCE: Lesser, Chas. Marine Fisheries Survey, 1968 - Compiled for Division of Fish and Wildlife, (Department of Natural Resources & Env. Control) State of Delaware.

Item 5

Effluent Release Data

A. Exclude first year of operation

B. Tabulate by effluent release point, month, mode of operation, refueling, shutdown

Response

Hope Creek Generating Station is under construction. Item 5 does not apply.

Item 6

Cost Benefit Analysis (if used) consistent with methodology in Regulatory Guide 1.110 (Draft Regulatory Guide 1.FF).

Response

The computer printouts indicate that the total body man-rem is 2.18 man-rem[1] (one unit basis) from gaseous effluents and 0.28 man-rem[2] from liquid effluents (one unit basis) for a total of 2.46 man-rem to the total body.

Similarly, the thyroid man-rem from gaseous effluents is 6.15 man-rem[1] and .21 man-rem[2] from liquid effluents for a total of 6.36 man-rem to the thyroid.

The base plant as represented by parameters listed in response to Question 1 of Enclosure 2 was then evaluated with various "augments" to the gaseous radioactive waste treatment systems.

An evaluation of the cost vs the benefit of three different "augments" to the gaseous radwaste system was considered. The proposed "augments" were as follows:

AUGMENT * No.	Discription	Corresponding Source Term Case No. (From Item 2)
1)	Base case (no augments)	1
2)	Steam valves ≥ 2.5 inches leak-off collection	2
3)	Charcoal and HEPA filters installed in potentially radioactive areas of the turbine building ventilation system.	3
4)	Containment prepurge clean-up system	4 [a,b]
5)	Combination of all three augments (2,3&4)	[a,c]

These augment were analyzed with the results presented on pages 6.1 through 6.9

As the total man-rem exposure from liquid effluents are very small it is evident that no augments could be added to the liquid radwaste system for a favorable cost benifit return.

1) See table 4.11n

2) See table 4.9z

a) No provision in BWR-GALE Code for prepurge internal clean-up of drywell.

b) Source term from case 1 adjusted to reflect prepurge clean-up.

c) Source term from case 4 adjusted to reflect total of all augments.

* These "augments" were originally included in the Hope Creek design. The cost-benefit analysis which follows analyzes the cost effectiveness of the originally proposed "augments".

Augment: Turbine Building Charcoal/HEPA Filters

1) The cumulative population man-rem exposures are given in Table 1.1.

2) The computer code calculates the thyroid dose to be 6.15 man-thyroid-rems* without the augment and 4.44** man-thyroid-rems with the augment. The dose reduction of this augment is 1.71 man-thyroid-rem.

3) Dose calculation models used are described on page 4.1. Detail work sheets with the basis for cost estimates are given on Table 6.1.

4) The cost benefit analysis format conforms with Regulatory Guide 1.10.

A. Direct Cost

i) The direct cost of equipment and materials is 109,600 dollars.

ii) The direct labor cost is estimated to be 19,500 dollars.

iii) The total direct costs are 129,100 dollars

B. Indirect Cost

The indirect cost factor is 1.625 which is the adjustment factor for multi-unit sites with generally unitized radwaste systems.

C. Total Capital Cost

The total capital cost is 209,788 dollars

D. Recovery Factor

The capital recovery factor which reflects the costs of borrowed money is 0.1150.

E. Annual Fixed Cost

The annual fixed costs are 24,126 dollars.

F. Operating Cost

The annual operating cost is 27,400 dollars.

G. Total Annual Cost

The total annual cost of this augment is 51,526 dollars

5) Benefit of the augment

The "benefit" of the augment arrived at by multiplying the dose reduction factor calculated in Item 2 by $1000 per man-thyroid-rem is 1710 dollars.

6) The cost of the augment (51,526 dollars) far exceeds the benefit of this augment (1710 dollars) therefore, the augment is deemed not to be cost effective.

*Table 6.4

**Table 6.6

TOTAL DIRECT COST ESTIMATE SHEET OF RADWASTE TREATMENT SYSTEM

FOR LIGHT-WATER-COOLED NUCLEAR REACTORS

Description of Augment TURBINE BUILDING CHARCOAL/HEPA FILTERS*

	ITEM	DIRECT COST (1975 $1000) LABOR	EQUIPMENT/MATERIALS	TOTAL	BASIS FOR COST ESTIMATE
1.	PROCESS EQUIPMENT	17	95.3	112.3	Cost of filters including internal components. Costs also include larger capacity fan Labor based on 1975 dollars.
2.	BUILDING ASSIGNMENT				
3.	ASSOCIATED PIPING SYSTEMS				
4.	INSTRUMENTATION AND CONTROLS				
5.	ELECTRICAL SERVICE				
6.	SPARE PARTS				
	SUBTOTAL	17	95.3	112.3	
7.	CONTINGENCY	2.5	14.3	16.8	15%
8.	TOTAL DIRECT COSTS	19.5	109.6	129.1	

* Filters for contaminated areas of turbine building only. Flow is estimated to be 30,000CFM (ref. Pg. G-10 suppl. ER)

Table 6.1
1 of 2

HCGS

Table 6.1
2 of 2

ANNUAL OPERATING AND MAINTENANCE COST ESTIMATE SHEET OF RADWASTE TREATMENT SYSTEM FOR LIGHT-WATER-COOLED NUCLEAR REACTORS

Description of Augment _ TURBINE BUILDING CHARCOAL/HEPA FILTERS *

	ITEM	COST (1975 $1000) LABOR	OTHER	TOTAL	BASIS FOR COST ESTIMATE
1.	OPERATING LABOR, SUPERVISION, AND OVERHEAD			3.8	15 min/shift + 40 hr annual test
2.	MAINTENANCE MATERIAL AND LABOR			18.0	60 HEPA or high efficiency filters @150 each & 30 charcoal filters @900 each every two years
3.	CONSUMABLES, CHEMICALS, AND SUPPLIES			-	in items 2 and 4
4.	UTILITIES AND SERVICES				
	Waste Disposal			3.0	$50/HEPA or high efficiency filter, $100/charcoal filter
	Water				
	Steam				
	Electricity			2.6	16kw additional fan HP for filter @ 0.018 $/kw-hr
	Building Services				
	Other				
5.	TOTAL O AND M ANNUAL COST			27.4	

* Filters for contaminated areas of turbine building only. Flow is estimated to be 30,000 CFM.

Augment: Steam Valve Leak-off Collection System

1. The cumulative population man-rem exposures are given in Table 1.1.

2. The computer code calculates the thyroid dose to be 3.98 * man-thyroid-rem with the augment and 6.15** man-thyroid-rem without the augment. The dose reduction factor is therefore 2.17 man-thyroid-rem.

3. Dose calculation models used are described on page 4.1. Detailed worksheets with the basis for cost estimates are given on Table 6.2.

4. The cost benifit analysis format conforms with that given in Regulatory Guide 1.10.

   A. Direct Cost

      i) The direct cost of equipment and materials is 82,000 dollars

      ii) The direct labor cost is estimated to be 155,000 dollars

      iii) The total direct cost is 237,000 dollars

   B. Indirect Cost

      The indirect cost factor is 1.625.

   C. Total Capitol Cost

      The total capitol cost is 385,130 dollars

   D. Recovery Factor

      The capitol recovery factor which reflects the costs of borrowed money is 0.1150 .

   E. Annual Fixed Cost

      The annual fixed cost is 44,290 dollars

   F. Operating Cost

      The annual operating cost is considered to be nominal considering the passive nature of the system.

   G. Annual Cost

      The total annual cost of this equipment is therefore 44,290 dollars dollars.

5. Benifit of the Augment:

The benifit of the augment is calculated to be 2170 dollars. (2.17 man-rem dose reduction times $1000/man-rem).

6. Cost Benefit Analysis:

The cost of the augment (44,290 dollars) far exceeds its potential benifit (2,170 dollars) Therefore the augment is deemed not to be cost effective.

* See table 6.5
** See table 6.4

TOTAL DIRECT COST ESTIMATE SHEET OF RADWASTE TREATMENT SYSTEM
FOR LIGHT-WATER-COOLED NUCLEAR REACTORS

Description of Augment STEAM VALVE LEAK-OFF COLLECTION SYSTEM

Table 6.2
1 of 2

	ITEM	DIRECT COST (1975 $1000) LABOR	EQUIPMENT/MATERIALS	TOTAL	BASIS FOR COST ESTIMATE
1.	PROCESS EQUIPMENT				
2.	BUILDING ASSIGNMENT				
3.	ASSOCIATED PIPING SYSTEMS	133	71	204	2,000 feet of 1 inch pipe; 1 2 inch pipe. Estimate of pip
4.	INSTRUMENTATION AND CONTROLS			-	based on 1975 dollars
5.	ELECTRICAL SERVICE	1.8	.2	2	Motorized single shutoff val to the main condenser
6.	SPARE PARTS				
	SUBTOTAL	135	71	206	
7.	CONTINGENCY	20	11	31	15%
8.	TOTAL DIRECT COSTS	155	82	237	

ANNUAL OPERATING AND MAINTENANCE COST ESTIMATE SHEET OF RADWASTE TREATMENT SYSTEM FOR LIGHT-WATER-COOLED NUCLEAR REACTORS

Description of Augment STEAM VALVE LEAK-OFF COLLECTION SYSTEM

	ITEM	COST (1975 $1000) LABOR	OTHER	TOTAL	BASIS FOR COST ESTIMATE
1.	OPERATING LABOR, SUPERVISION, AND OVERHEAD			—	Periodic inspection
2.	MAINTENANCE MATERIAL AND LABOR			–	Greasing of bearings is only maintainance anticipated. Bearings replaced every 15 years
3.	CONSUMABLES, CHEMICALS, AND SUPPLIES			–	No consumable chemicals or supplies
4.	UTILITIES AND SERVICES				
	Waste Disposal			–	
	Water			–	
	Steam			–=–	
	Electricity			negl.	.1 kw service at 0.18 $/kw-hr is negl.
	Building Services			–	
	Other			–	
5.	TOTAL O AND M ANNUAL COST			Nominal	Considering the passive devices involved

Table 6.2
2 of 2

TOTAL DIRECT COST ESTIMATE SHEET OF RADWASTE TREATMENT SYSTEM
FOR LIGHT-WATER-COOLED NUCLEAR REACTORS

Description of Augment CONTAINMENT PREPURGE CLEANUP SYSTEM *

	ITEM		DIRECT COST (1975 ~~$1000~~) LABOR	EQUIPMENT/MATERIALS	TOTAL	BASIS FOR COST ESTIMATE
1.	PROCESS EQUIPMENT	Filter	6.150	32,350	38,500	April 1, 1976 prices de-escalated
		Fan	750	1,650	2,400	to July 1, 1975 prices
		Damper	--	650	650	
		Ductwork	2,100	500	2,600	
2.	BUILDING ASSIGNMENT					
3.	ASSOCIATED PIPING SYSTEMS					
4.	INSTRUMENTATION AND CONTROLS		5,650	7,200	12,850	
5.	ELECTRICAL SERVICE		5,500	1,700	7,200	
6.	SPARE PARTS					
	SUBTOTAL		20,150	44,050	64,200	
7.	CONTINGENCY		3,000	6,600	9,600	15%
8.	TOTAL DIRECT COSTS **		23,150	50,650	73,800	

** Field over head included.

* Based upon a flow of 3,000 CFM

Table 6.3
1 of 2

ANNUAL OPERATING AND MAINTENANCE COST ESTIMATE SHEET OF RADWASTE TREATMENT SYSTEM FOR LIGHT-WATER-COOLED NUCLEAR REACTORS

Description of Augment CONTAINMENT PREPURGE CLEANUP SYSTEM 3,000 CFM

	ITEM	COST (1975 $1000) LABOR	OTHER	TOTAL	BASIS FOR COST ESTIMATE
1.	OPERATING LABOR, SUPERVISION, AND OVERHEAD			3.8	15 min/shift and 40 hr test
2.	MAINTENANCE MATERIAL AND LABOR			.5	@$150 a HEPA or high efficiency filter and $900 a charcoal filter with 6 HEPA or high efficiency filter and 3 charcoal filters changed every 5 years
3.	CONSUMABLES, CHEMICALS, AND SUPPLIES				
4.	UTILITIES AND SERVICES Waste Disposal Water Steam Electricity Building Services Other			negl.	Intermittent operation
5.	TOTAL O AND M ANNUAL COST			4.3	

Table 6.3
2 of 2

Augment: Containment Prepurge Clean-up

1. The cumulative population man-rem exposure and man-thyroid-rem exposure are given in Table 1.1.

2. The reduction to the cumulative population exposure from adding the augment is estimated to be 1.5 man-thyroid-rem. The basis for this reduction is described on page 6.7 and 6.8

3. Dose calculation models employed are described on page 4.1.Detail worksheet with the basis for cost estimates are given on Table 6.3.

4. The cost benefit analysis format conforms with that given in Reg. Guide 1.10.

   A. Direct Costs

      i) The direct cost of equipment and materials is 50,650 dollars

      ii) The direct labor cost is estimated to be 23,150 dollars

      iii) The total direct cost is 73,800 dollars

   B. Indirect Cost

      The indirect cost factor is 1.625 which is the adjustment factor for multi-unit sites with generally unitized radwaste systems.

   C. Total Capital Cost

      The total capital cost is 119,925 dollars

   D. Recovery Factor

      The capital recovery factor which reflects the costs of borrowed money is 0.1150.

   E. Annual Fixed Cost

      The annual fixed costs are 13,791 dollars

   F. Operating Cost

      The annual operating cost and maintenance cost are estimated to be 4,300 dollars

   G. Total Annual Cost

      The total annual cost of this augment is therefore 18,091 dollars

5. Benefit of the Augment

   The "benefit" of the augment arrived at by multiplying the dose reduction calculated in item 2 by $1000 per man-rem (thyroid or whole body) is 1500 dollars

6. The cost of the augment is 18,091 dollars. The most money which could be expended considering the "benefit" of the augment exceeds its benefit, therefore, the augment s not justified.

BASIS FOR THE DOSE REDUCTION FACTOR

Augment: Containment Prepurge Clean-up System

Table C-9 of Draft Reg. Guide 1.CC refers to a ratio of I-131 reactor building releases during year round operation to the I-131 released during normal operation (excluding outages) from a BWR. The same ratio factor of 2.6 was used in the analysis for the Hope Creek Generating Station.

This may be expresses mathematically as follows:

Let T = Total Release of I-131 (including purges)

Let N = Normal release of I-131 (excluding purges)

Let P = Total Release of I-131 during purge operations

- also $\frac{T}{N} = \frac{P+N}{N} = 2.6$

therefore $P = 1.6\ N$

The purging operations must therefore account for 62% of the I-131 released from the reactor.

$$\frac{P}{P+N} = .62$$

The iodine source term calculated on table 2.1 may be reduced by 62% to account for normal iodine releases (non purge)

containment source term - purge term = normal releases
1.7E-01 - (.62) (1.7E-01) = 6.5E-02. (two unit basis)

If a prepurge clean-up system were utilized, essentially all iodines would be removed prior to purging. Hence the 1.05E-02 curies of I-131 from the purge releases would be reduced to approximately zero. If the I-131 releases from purging operations are approximately zero then the containment source term would be 6.5E-02curies.

This produces a new total I-131 release source term from all buildings of 3.1E-01 curies of I-131, compared to the 4.1E-01 calculated previously in table 2.1. This affords a reduction of 25%.

The iodine releases account for a large percentage of the integrated thyroid dose. It represents more than 98% via the cow milk pathway and greater than 50% via the inhalation pathway. The most conservative assumption would be if the iodine accounted for all of the dose from these pathways. This will result in the most conservative assumption concerning the "benefit" of the clean-up system.

As Table 1.1 indicated that the total man-thyroid-rem integrated dose (one unit) is 6.15, the dose reduction achieved as a result of the internal clean-up system is 1.5 man-thyroid-rem.

This is based on the 25% reduction in the source term for I-131 and a corresponding 25% reduction in the integrated population dose.

SUMMATION OF INTEGRATED

POPULATION EXPOSURE OF

PROPOSED AUGMENTS

HCGS

BASE CASE (No. 1) - NO AUGMENTS

POPULATION AND INDIVIDUAL DOSE CALCULATIONS FOR HOPE CREEK GENERATING STATION
ALARA ANNUAL INTEGRATED POPULATION DOSE SUMMARY (MANREM)

PATHWAY	T.BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
PLUME	2.61E+00	2.61E+00	2.61E+00	2.61E+00	2.61E+00	2.61E+00	2.66E+00	6.60E+00
	59.72%	59.76%	38.91%	59.46%	69.25%	21.20%	60.59%	79.12%
GROUND	1.06E-01	1.06E-01	1.06E-01	1.06E-01	1.06E-01	1.06E-01	1.06E-01	1.24E-01
	2.42%	2.42%	1.58%	2.41%	2.81%	0.86%	2.40%	1.49%
INHAL	3.40E-02	3.34E-02	1.14E-02	4.53E-02	4.90E-02	4.03E+00	3.42E-02	2.70E-02
	0.78%	0.77%	0.17%	1.03%	1.30%	32.78%	0.78%	0.32%
VEGET	1.26E+00	1.26E+00	3.12E+00	1.26E+00	7.76E-01	2.02E+00	1.24E+00	1.24E+00
	28.85%	28.95%	46.56%	28.70%	20.62%	16.42%	28.24%	14.86%
COW MILK	2.75E-01	2.69E-01	5.76E-01	2.81E-01	1.62E-01	3.40E+00	2.67E-01	2.67E-01
	6.31%	6.18%	8.61%	6.42%	4.32%	27.65%	6.09%	3.20%
MEAT	8.37E-02	8.40E-02	2.80E-01	8.38E-02	6.41E-02	1.33E-01	8.34E-02	8.34E-02
	1.92%	1.93%	4.18%	1.91%	1.70%	1.08%	1.90%	1.00%
TOTAL	4.36E+00	4.36E+00	6.70E+00	4.38E+00	3.76E+00	1.23E+01	4.40E+00	8.34E+00

Table 6.4

Case No. 2 (Steam valve leak-off collection system)

POPULATION AND INDIVIDUAL DOSE CALCULATIONS FOR HOPE CREEK GENERATING STATION
ALARA ANNUAL INTEGRATED POPULATION DOSE SUMMARY (MANREM)

PATHWAY	T.BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
PLUME	1.28E+00	1.28E+00	1.23E+00	1.28E+00	1.23E+00	1.28E+00	1.32E+00	3.65E+00
	43.25%	43.30%	24.64%	43.08%	54.19%	16.13%	44.18%	68.52%
GROUND	5.09E-02	5.09E-02	5.09E-02	5.09E-02	5.09E-02	5.09E-02	5.09E-02	5.99E-02
	1.71%	1.72%	0.98%	1.71%	2.15%	0.64%	1.70%	1.13%
INHAL	3.13E-02	3.07E-02	6.89E-03	3.78E-02	4.04E-02	2.52E+00	2.93E-02	2.70E-02
	1.05%	1.03%	0.13%	1.27%	1.71%	31.71%	0.98%	0.51%
VEGET	1.25E+00	1.25E+00	3.02E+00	1.25E+00	7.72E-01	1.73E+00	1.24E+00	1.24E+00
	42.01%	42.08%	57.94%	41.91%	32.60%	21.78%	41.43%	23.27%
COW MILK	2.72E-01	2.68E-01	5.70E-01	2.75E-01	1.58E-01	2.25E+00	2.67E-01	2.67E-01
	9.16%	9.05%	10.94%	9.23%	6.66%	28.30%	8.92%	5.01%
MEAT	8.35E-02	8.36E-02	2.80E-01	8.36E-02	6.40E-02	1.15E-01	9.34E-02	8.34E-02
	2.81%	2.82%	5.37%	2.81%	2.70%	1.44%	2.79%	1.57%
TOTAL	2.97E+00	2.96E+00	5.21E+00	2.98E+00	2.37E+00	7.96E+00	2.99E+00	5.33E+00

Table 6.5

CASE No. 3 (Turbine Building Filtration System)

POPULATION AND INDIVIDUAL DOSE CALCULATIONS FOR HOPE CREEK GENERATING STATION
ALARA ANNUAL INTEGRATED POPULATION DOSE SUMMARY (MANREM)

PATHWAY	T.BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
PLUME	2.61E+00	2.61E+00	2.61E+00	2.61E+00	2.61E+00	2.61E+00	2.66E+00	6.60E+00
	60.98%	61.04%	40.13%	60.83%	70.90%	29.38%	61.66%	79.89%
GROUND	3.76E-02	3.76E-02	3.76E-02	3.76E-02	3.76E-02	3.76E-02	3.76E-02	4.44E-02
	0.88%	0.88%	0.58%	0.88%	1.02%	0.42%	0.87%	0.54%
INHAL	3.09E-02	3.02E-02	6.23E-03	3.66E-02	3.93E-02	2.32E+00	2.81E-02	2.70E-02
	0.72%	0.71%	0.10%	0.85%	1.07%	26.15%	0.65%	0.33%
VEGET	1.24E+00	1.24E+00	2.99E+00	1.25E+00	7.71E-01	1.69E+00	1.24E+00	1.24E+00
	29.12%	29.14%	46.12%	29.09%	20.99%	19.12%	28.71%	15.01%
COW MILK	2.71E-01	2.68E-01	5.68E-01	2.74E-01	1.57E-01	2.10E+00	2.67E-01	2.67E-01
	6.35%	6.28%	8.76%	6.40%	4.27%	23.67%	6.18%	3.23%
MEAT	8.35E-02	8.36E-02	2.80E-01	8.36E-02	6.39E-02	1.12E-01	8.34E-02	8.34E-02
	1.95%	1.96%	4.31%	1.95%	1.74%	1.27%	1.93%	1.01%
TOTAL	4.27E+00	4.27E+00	6.49E+00	4.28E+00	3.67E+00	8.87E+00	4.32E+00	8.26E+00

HCGS

Table 6.6

CASE No. 4 (Combination of steam leakoff collection and turbine building filtratio

POPULA[illegible] AND INDIVIDUAL DOSE CALCULATIONS FOR HOPE CREEK GENERATING STATION
ALARA ANNUAL INTEGRATED POPULATION DOSE SUMMARY (MANREM)

PATHWAY	T.BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
PLUME	1.28E+00	1.28E+00	1.28E+00	1.28E+00	1.28E+00	1.28E+00	1.32E+00	3.65E+00
	43.51%	43.57%	24.64%	43.36%	54.59%	17.53%	44.41%	68.72%
GRDUND	3.73E-02	3.73E-02	3.73E-02	3.73E-02	3.73E-02	3.73E-02	3.73E-02	4.39E-02
	1.26%	1.26%	0.72%	1.26%	1.58%	0.51%	1.25%	0.83%
INHAL	3.07E-02	3.00E-02	5.87E-03	3.60E-02	3.85E-02	2.19E+00	2.81E-02	2.70E-02
	1.04%	1.02%	0.11%	1.22%	1.64%	29.92%	0.94%	0.51%
VEGET	1.24E+00	1.24E+00	2.99E+00	1.25E+00	7.71E-01	1.68E+00	1.24E+00	1.24E+00
	42.17%	42.21%	57.92%	42.39%	32.83%	22.93%	41.63%	23.34%
COW MILK	2.71E-01	2.68E-01	5.68E-01	2.74E-01	1.57E-01	2.02E+00	2.67E-01	2.67E-01
	9.19%	9.10%	10.99%	9.25%	6.67%	27.62%	8.97%	5.03%
MEAT	8.35E-02	8.30E-02	2.80E-01	8.35E-02	6.39E-02	1.11E-01	8.34E-02	8.34E-02
	2.83%	2.84%	5.[illegible]%	2.82%	2.72%	1.52%	2.80%	1.57%
TOTAL	2.95E+00	2.95E+00	5.17E+00	2.96E+00	2.35E+00	7.32E+00	2.98E+00	5.31E+00

HCGS

Table 6.7

OVERSIZE DOCUMENT PAGE PULLED

SEE APERTURE CARDS

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The Energy People

DBL/PSB

RESPONSE TO REQUIREMENTS OF
APPENDIX I TO 10CFR50
FOR HOPE CREEK GENERATING
STATION Rev. 1
DOCKET NOS. 50-354
50-355

ENCLOSURE TWO

8-30-76

App E locations

HOPE CREEK GENERATING STATION

50 - 354

50 - 355

INFORMATION SUPPLIED

IN RESPONSE TO ENCLOSURE

2 OF NRC LETTER DATED

FEBRUARY 19, 1976 (GUIDANCE

FOR MEETING THE REQUIREMENTS

OF APPENDIX I TO 10 CFR 50)

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Appendix A (Response to Appendix D of Reg. Guide 1.CC) A1

Appendix B (Meteorological Data) B1

ENCLOSURE 2

Additional Information Needed from Holders of Permits or Licenses to Construct or Operate Light-Water-Cooled Reactors for Which Application was Filed Prior to January 2, 1971

1. Provide the information requested in Appendix D of Draft Regulatory Guide 1.BB or 1.CC, as appropriate.

2. Provide, in tabular form, the distance from the centerline of the first nuclear unit to the following for each of the 22-1/2 degree radial sectors centered on the 16 cardinal compass directions.

   a) nearest milk cow (to a distance of 5 miles)

   b) nearest meat animal (to a distance of 5 miles)

   c) nearest milk goat (to a distance of 5 miles)

   d) nearest residence (to a distance of 5 miles)

   e) nearest vegetable garden greater than 500 ft^2 (to a distance of 5 miles)

   f) nearest site boundary

   For radioactivity releases from stacks which qualify as elevated releases as defined in Draft Regulatory Guide 1.DD, identify the locations of all milk cows, milk goats, meat animals, residences, and vegetable gardens, in a similar manner, out to a distance of 3 miles for each radial sector.

3. Based on considerations in Draft Regulatory Guide 1.DD, provide estimates of relative concentration (X/Q) and deposition (D/Q) at locations specified in response to item 2 above for each release point specified in response to item 1 above.

4. Provide a detailed description of the meteorological data, models and parameters used to determine the X/Q and D/Q values. Include information concerning the validity and accuracy of the models and assumptions for your site and the representativeness of the meteorological data used.

5. If an onsite program commensurate with the recommendations and intent of Regulatory Guide 1.23 exists:

   a) Provide representative annual and monthly, if available, joint frequency distributions of wind speed and direction by atmospheric stability class covering at least the most recent one year period of record, preferably two or more years of record. Wind speed and direction should be measured at levels applicable to release point elevations and stability should be determined from the vertical temperature gradient between measurement levels that represent conditions into which the effluent is released.

   b) Describe the representativeness of the available data with respect to expected long-term conditions at the site.

6. If recent onsite meteorological data are not available, or if the meteorological measurements program does not meet the recommendations and intent of Regulatory Guide 1.23.

   a) Provide the best available meteorological data in the format described in item 5.a above.

b) Describe the representativeness of the available data with respect to onsite and near site atmospheric transport and diffusion conditions, and with respect to expected long term conditions at and near the site.

c) Provide a description of the meteorological measurements used for collection of the data presented. This description should include the location of the sensors with respect to the power plant(s) and other prominent topographic features (including buildings) and accuracy of the instrumentation.

d) Provide a commitment to establish a program to meet the recommendations and intent of Regulatory Guide 1.23, or provide sufficient justification to allow the present program to remain unchanged.

7. Describe airflow trajectory regimes of importance in transporting effluents to the locations for which dose calculations are made.

8. Provide a map showing the detailed topographical features (as modified by the plant, on a large scale, within a 10-mile radius of the plant and a plot of the maximum topographic elevation versus distance from the center of the plant in each of the sixteen 22-1/2 degree cardinal compass point sectors (centered on true north), radiating from the center of the plant, to a distance of 10 miles.

9. Provide the dates and times of radioactivity releases from intermittant sources by source location based on actual plant operation and, if available, appropriate hourly meteorological data (i.e., wind direction and speed, and atmospheric stability) during each period of release.

PARAMETERS NEEDED TO CALCULATE ANTICIPATED RELEASES FROM HOPE CREEK GENERATING STATION USING THE REGULATORY GUIDE 1.CC CODE

PARAMETER	UNITS
Maximun Thermal Power Load (SAR/ER)	3.440×10^3 MWt - Design 3.293×10^3 MWt - Rated
Total Steam Flow Rate	14×10^6 lbs/hr
Mass of Water in Reactor Vessel	$.6 \times 10^6$ lbs
Primary Coolant Flow Rate Through Reactor Coolant Cleanup System Demineralizers	0.13×10^6 lbs/hr
Number of Demineralizers of Type: Deep Bed - 7 per unit/6 operate continuously and 1 on standby Ultrasonically Cleaned - Yes Filter Demineralizer (Powdex) - none utilized for condensate treatment	
Fraction of Feed Water Through Condensate Demineralizer	100%
Average Flow of Diluent Added to Liquid Radioactive Waste Discharge	24×10^3 gpm
Steam Flow to Turbine Gland Seal (If seal steam is clean, enter 0; if main steam is used, enter 0.001 of Main Steam Flow)	-0 lbs/hr
Mass of Steam in Reactor Vessel	0.02×10^6 lbs
Design Holdup for Gases Vented from Gland Seal Condenser (Steam Packing Condenser)	None hrs - Gases are non-radioactive
Design Holdup for Offgases from Main Condenser Air Ejectors Prior To Processing through the Offgas Treatment System	30 min.
Containment Building Releases Charcoal Adsorbers Used to Treat Ventilation Exhaust Air	No
HEPA Filters Used to Treat Ventilation Exhaust	Yes
Turbine Building Releases Are Charcoal Adsorbers Used to Treat Ventilation Exhaust Air?	No
Are HEPA Filters Used to Treat Ventilation Exhaust?	No
Are Clean Steam or Other Design Features Included to Reduce Steam Leakage at Valves ≥ 2-1/2 inches?	No

PARAMETER	UNITS
Turbine Gland Seal Condenser Vent - vents to Turbine Bldg. Ventilation System	
Are Noncondensables Released Without Treatment?	Yes
Are Noncondensables Processed Through Charcoal (minimum 90% Efficiency)?	No
Condenser Air Ejectors Offgas Treatment System	
Cryogenic Distillation System	Yes
Auxiliary Building Releases	
Are Charcoal Adsorbers Used to Treat Ventilation Exhaust Air?	No
Are HEPA Filters Used to Treat Ventilation Exhaust?	Yes
Radwaste Building Releases	
Are Charcoal Adsorption Used to Treat Ventilation Exhaust Air?	Radwaste Storage tank vents only
Are HEPA Filters Used to Treat Ventilation Exhaust?	Yes
Condenser Air Ejector Offgas Treatment System	
Utilizes Cryogenic Distillation	Yes
If Charcoal Delay System Is Used:	Not Applicable
Is Onsite Laundry Present	Yes
Are Detergent Releases Treated	Yes
If yes, What is DF Across Cartridge Filter	1

TABLE 1

		High Purity Waste	Low Purity Waste	Chemical Waste	Detergent	Regenerant
a)	Flow Rate of Inlet Stream	121,440(gpd)	20,088(gpd)	.35gpm	900gpd	10,000(gpd)
b)	Fraction of PCA	.09	3.4×10^{-5}	.16	N/A	.25
c)	DF for Iodine	100	100	100	1	1,000
d)	DF for Cs & Rb	10	2	100	1	10,000
e)	DF (Others)	100	100	100	1	10,000
f)	Waste Collection Time	5.7 - 1.4 hrs	17.9 - 6.1 hrs	8 Days	1 Day	4 hrs
	Waste Processing and Discharge Time	330 - 180 min	305 - 250 min	13.3 hrs	36 min	10.4 min
h)	Fraction Discharge	0	.50	1	1	0

Response to Question 2.A

Table 2.A

LOCATION OF NEAREST MILK COW (TO A DISTANCE OF 5 MILES)

Direction	Distance[1] in Miles
N	—
NNE	4.8
NE	—
ENE	—
E	—
ESE	—
SE	—
SSE	—
S	—
SSW	—
SW	—
WSW	—
W	5.0
WNW	—
NW	—
NNW	—

[1]SEE PAGE 10.0 FOR EXPLANATION OF FOOTNOTE.

Response to Question 2.B

Animals observed around the Salem County site include rabbits, deer and pheasant. The rabbit is the most abundant species in terms of pounds and numbers. The State of New Jersey does not summarize data on a county basis and since the Salem area is relatively small and atypical, county data from Salem County would not be meaningful. The muskrat is often estimated as being trapped in higher quantities and pounds than the other species quoted above, however it should be noted that the muskrat is not truly a game species. It is trapped primarily for its fur although it's meat is also valued for consumption by individuals around the immediate area of the site.

The location of the closest beef animals has been tabulated and is presented below.

Table 2.B

NEAREST BEEF ANIMALS* WITHIN 5 MILES OF ARTIFICIAL ISLAND

Direction	Distance in Miles
N	-
NNW	4.2
NE	4.0
ENE	-
E	-
ESE	-
SE	-
SSE	-
S	-
SSW	-
SW	-
WSW	4.4
W	4.4
WNW	4.1
NW	3.9
NNW	-

*Any bovine livestock including dairy animals.

Response to Question 2.C

There are no milk goats around the Artificial Island (to a distance of 5 miles).

Response to Question 2.D

Table 2.D

LOCATION OF NEAREST RESIDENCE (TO A DISTANCE OF 5 MILES).

Direction	Distance[1] in Miles
N	— 1.3 (Simms via Boegli)
NNE	4.2
NE	4.1
ENE	3.5
E	—
ESE	—
SE	—
SSE	—
S	4.0
SSW	3.6
SW	4.3
WSW	3.7
W	3.4
WNW	3.7 Bay View Road = 3.2
NW	3.5
NNW	4.5 Delaware Bay

[1] SEE PAGE 10.0 FOR EXPLANATION OF FOOTNOTE.

Response to Question 2.F

TABLE 2.F

DISTANCE TO NEAREST SITE BOUNDARY

Sector	Distance[1] (Miles)
N	.55
NNE	.62
NE	.86
ENE	1.07
E	.93
ESE - Waterbound	1.11
SE "	.56
SSE "	.46
S "	.31
SSW "	.21
SW "	.18
WSW "	.18
W "	.20
WNW "	.26
NW "	.41
NNW	.57

[1] SEE PAGE 10.0 FOR EXPLANATION ON FOOTNOTE.

Response to Question 2.E

Table 2.E

LOCATION OF NEAREST VEGETABLE garden FARM GREATER THAN 500 FT^2 (TO A DISTANCE OF 5 MILES).

Direction	Distance[1] in Miles
N	—
NNE	4.2
NE	4.0
ENE	—
E	—
ESE	—
SE	—
SSE	—
S	4.2
SSW	3.8
SW	4.4
WSW	4.4
W	3.8
WNW	4.0
NW	3.9
NNW	4.4

[1]SEE PAGE 10.0 FOR EXPLANATION OF FOOTNOTE.

Response to Question 3.A

Table 3.A

RELATIVE CONCENTRATION X/Q AND DEPOSITION D/Q AT LOCATIONS OF NEAREST MILK COWS.

Direction	Distance in miles	Undepleted X/Q (sec/m^3)	Depleted X/Q (sec/m^3)	Depleted D/Q ($1/m^2$)
N	-----			
NNE	4.8	2.94E-8	1.02E-8	1.02E-10
NE	-----			
ENE	-----			
E	-----			
ESE	-----			
SE	-----			
SSE	-----			
S	-----			
SSW	-----			
SW	-----			
WSW	-----			
W	5.0	2.40E-8	5.68E-9	5.68E-11
WNW	-----			
NW	-----			
NNW	-----			

[1]See Page 10.0 for explanation of footnote

Response to Question 3.B

Other than local farm animals such as fowl and beef, the Hope Creek area does not contain large areas where animals are raised for consumption. Animals such as deer, pheasent and rabbits are relatively abundant in the area. Since they may habitat at any location, specific dispersion coefficients were not calculated.

Response to Question 3.C

There are no milk goats around the Artificial Island (to a distance of 5 miles), therefore no dispersion values are calculated.

Response to Question 3.D

Table 3.D

RELATIVE CONCENTRATION X/Q AND DEPOSITION D/Q AT LOCATIONS OF THE NEAREST RESIDENCE

Direction	Distance[1] in Miles	Undepleted X/Q (sec/m^3)	Depleted X/Q (sec/m^3)	Depleted D/Q ($1/m^2$)
N	--*			
NNE	4.2	3.68E-8	1.32E-8	1.32E-10
NE	4.1	4.45E-8	1.54E-8	1.54E-10
ENE	3.5	5.74E-8	1.85E-8	1.85E-10
E	--*			
ESE	--*			
SE	--*			
SSE	--*			
S	4.0	5.12E-8	1.60E-8	1.60E-10
SSW	3.6	5.33E-8	1.44E-8	1.44E-10
SW	4.3	3.43E-8	9.98E-9	9.98E-11
WSW	3.7	3.13E-8	8.66E-9	8.66E-11
W	3.4	4.59E-8	1.22E-8	1.22E-10
WNW	3.7	3.02E-8	7.10E-9	7.10E-11
NW	3.5	5.43E-8	1.72E-8	1.72E-10
NNW	4.5	4.65E-8	1.60E-8	1.60E-10

*No residence within five miles of site in this sector.

[1]SEE PAGE 10.0 FOR EXPLANATION OF FOOTNOTE.

Response to Question 3.E

TABLE 3.E

RELATIVE CONCENTRATION X/Q AND DEPOSITION D/Q AT LOCATIONS OF THE NEAREST (5-MILE) VEGETABLE GARDENS (WITHIN 5 MILES).

Direction	Distance[1] miles	Undepleted X/Q (sec/m3)	Depleted X/Q (sec/m3)	Depleted D/Q (1/m2)
N	---			
NNE	4.2	3.84E-8	1.47E-8	1.47E-10
NE	4.0	4.64E-8	1.62E-8	1.62E-10
ENE	---			
E	---			
ESE	---			
SE	---			
SSE	---			
S	4.2	4.72E-8	1.45E-8	1.45E-10
SSW	3.8	4.87E-8	1.28E-8	1.29E-10
SW	4.4	3.30E-8	9.54E-9	9.54E-11
WSW	4.4	2.34E-8	6.12E-9	6.12E-11
W	3.8	3.82E-8	9.82E-9	9.82E-11
WNW	4.0	2.66E-8	6.08E-9	6.08E-11
NW	3.9	4.54E-8	1.40E-8	1.40E-10
NNW	4.4	4.83E-8	1.67E-8	1.67E-10

[1]SEE PAGE 10.0 FOR EXPLANATION OF FOOTNOTE.

Response to Question 3.F

TABLE 3.F

DISTANCE TO NEAREST SITE BOUNDARY

Sector	Distance[1] (Miles)	Undepleted X/Q_3 (sec/m^3)	Depleted X/Q_3 sec/m^3	D/Q_2 ($1/m^2$)
N	.55	1.2E-6	7.0E-7	7.0E-9
NNE	.62	6.5E-7	3.7E-7	3.7E-9
NE	.86	5.0E-7	2.5E-7	2.5E-9
ENE	1.07	3.3E-7	1.6E-7	1.6E-9
E	.93	5.6E-7	3.0E-7	3.0E-9
ESE - Waterbound	1.11			
SE "	.56			
SSE "	.46			
S "	.31			
SSW "	.21			
SW "	.18			
WSW "	.18			
W "	.20			
WNW "	.26			
NW "	.41			
NNW	.57	9.0E-7	4.3E-7	4.3E-9

[1] SEE PAGE 10.0 FOR EXPLANATION ON FOOTNOTE.

Meteorology

From 1969 to 1971 Public Service Electric and Gas Company studied meteorological conditions at the Artificial Island site to determine atmospheric dispersion parameters. Parameters measured included wind speed and direction, ambient temperature, barometric pressure, relative humidity and precipitation. The principal source of data was 300-foot tower which was located north of Salem No. 2 Unit.

The method used to determine atmospheric stability was based upon a system developed by Smith-Singer at the Brookhaven National Laboratory.

Since all evidence suggests that the Gaussian diffusion equations are generally conservative no multiplication factor for "on site or close in" distances was used.

A description of the models employed as well as a description of the meteorological instruments utilized is in the attached report entitled Salem - Meteorology, Appendix B.

For purposes of conforming with Regulatory Guide 1,23, data on joint frequency distributions of wind speed and direction are tabulated according to vertical temperature gradients or lapse rates. Dispersion calculation, however, are based upon the Smith-Singer model.

While it appears as if diffusion rates may be altered in specific cases when air flows from one region to another, such incidents should be evaluated upon a case by case basis. At this time there appears to be no logical method of using independent wind roses for adjusting trajectories.

Representative data of the onsite meteorological data collected during 1969 to 1971 is included.

Response to Question 5.A

A computer card deck and a "hard copy" report (one copy) was transmitted under separate cover with the original submittal to respond to this question. We understand this approach was satisfactory with the regulatory staff.

Response to Question 5.B

The representativeness of the available data with respect to expected long term conditions at the site are discussed on Page B1.4 of Attachment B of this submittal which is entitled Hope Creek - Meteorology, Appendix B.

Response to Question 6

Onsite meteorological data is provided. Therefore, Question 6 is not applicable.

The post-operational meteorlogical data collection program for the Hope Creek Nuclear Generating Station (also located at Artificial Island Site) will meet the recommendation and intent of Regulatory Guide 1.23.

Response to Question 7

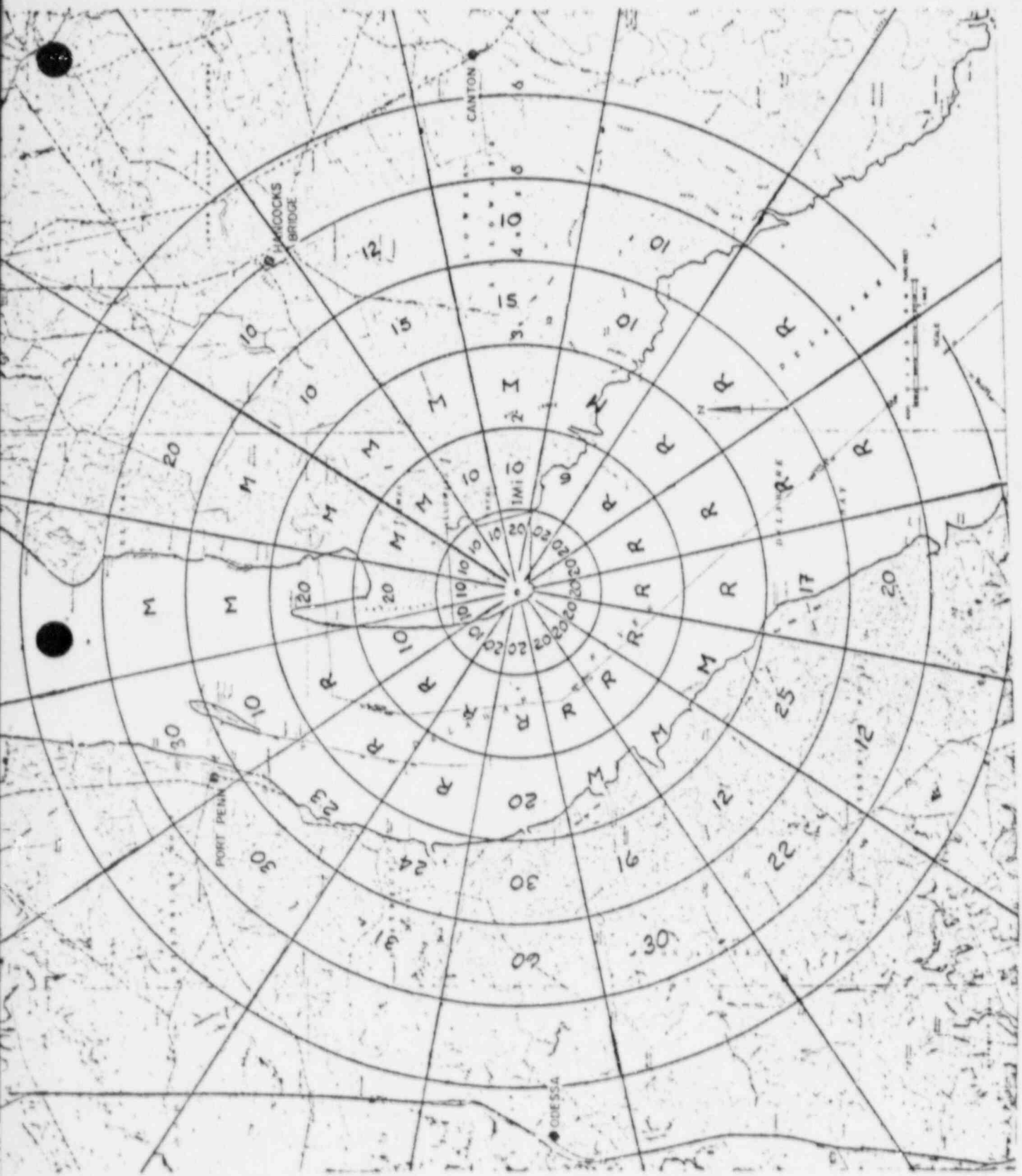
Air flow regimes of importance are discussed on Page B1.3 of the attachment entitled Hope Creek - Meteorology, Appendix B.

Response to Question 8

Two topographical maps are provided of the Artificial Island area.

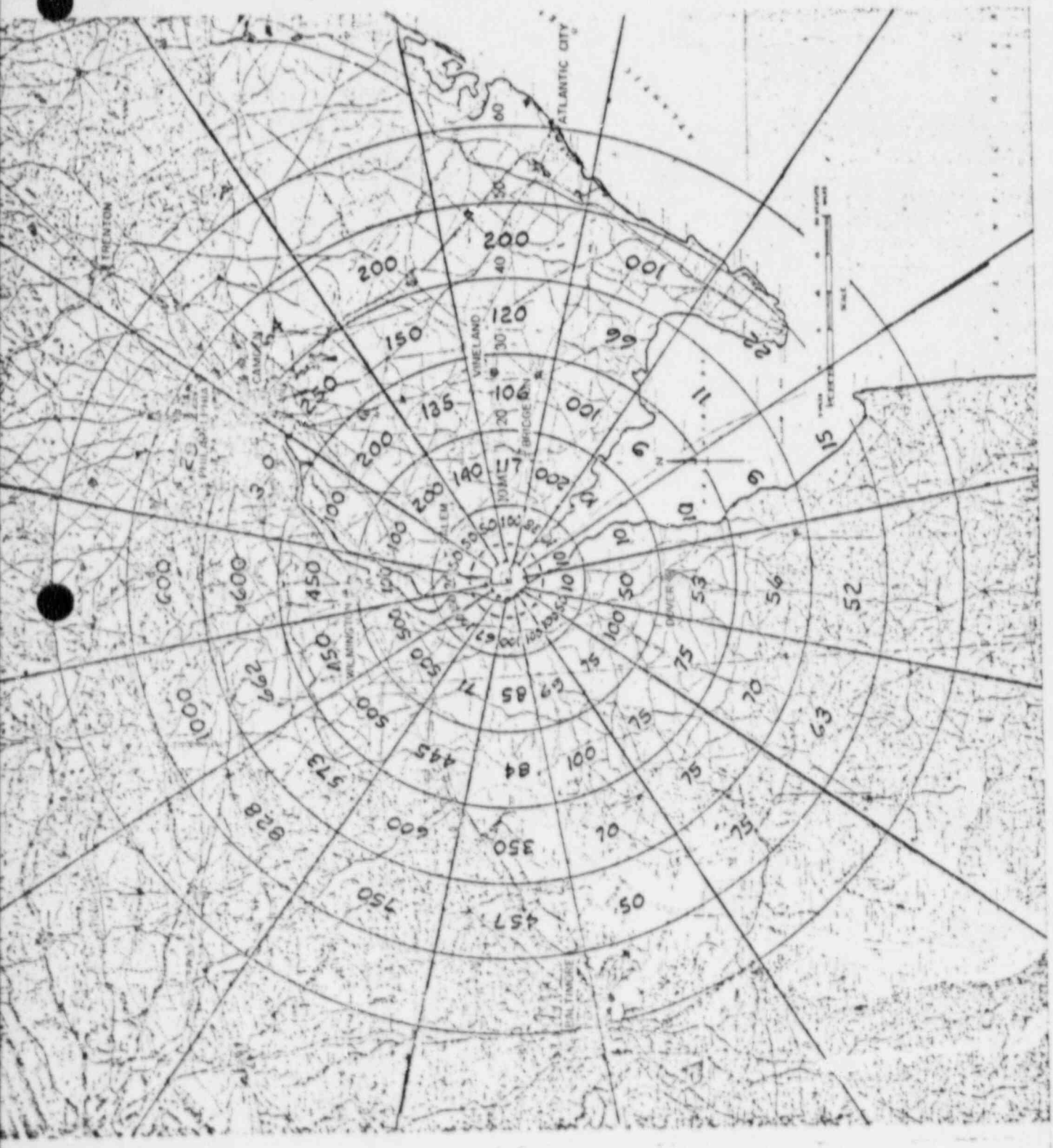
Figure 1 is a detailed map of the Artificial Island area showing topographical features of the site within five miles.

Figure 2 is an expanded map of the Artificial Island area showing topographical features of the site within fifty miles.



Legend All elevations in feet
M = Marsh
R = River

FIGURE 1 Maximum elevations within 5 miles



Legend All evevations in feet
M = Marsh
R = River

FIGURE 2 Maximum elevations within 50 miles

Response to Question 9

The Hope Creek Generating Station is presently under construction.

FOOTNOTE

1. Distances are measured from the center of a line drawn between the respective centroids of the containment buildings of the Salem Units No. 1 and 2, and the reactor buildings of Hope Creek Units No. 1 and 2. Distances to the site boundary (Table 2.F) are tabulated from the mid-point of the Hope Creek reactor buildings.

Measured to what in sector?
Center, shortest point?
Appears to be center of sector!

APPENDIX A

DATA NEEDED FOR RADIOACTIVE SOURCE TERM CALCULATIONS

This section contains questions raised by the Nuclear Regulatory Commission as presented in Draft Regulation Guide 1.CC along with Public Service Electric and Gas Co of New Jersey response.

RESPONSE TO DRAFT
REGULATORY GUIDE 1.CC
APPENDIX D FOR HOPE CREEK
GENERATING STATION

Data needed for radioactive source term calculations for boiling water reactors

1. General

1.a. The maximum core thermal power evaluated for safety considerations in the PSAR is 3440 mwt. (Ref. PSAR page 1.1-1).

1.b. The total mass of uranium and plutonium in the equilibrium core is approximately 300,000 lbs.

The percent enrichment of uranium in the reload fuel shall be 2.663 w/o and 2.453 w/o.

No permits have been received for the loading of plutonium fuel.

1.c. The GALE code as presented in draft Regulatory Guide 1.CC was used to calculate the source terms in the primary coolant.

1.d. The quantity of tritium released from the Hope Creek reactor is calculated to be 43 Ci from gaseous effluents and 43 Ci from liquid effluents.

Regulatory Guide 1.CC (draft) was used as a basis for the amount of tritium produced. The Guide assumes that 0.25 Ci of tritium is produced per megawatt. It was also assumed that the plant capacity factor is 0.80. and that thenoble gas isotopic release rate is 60,000 uCi/sec. The plant shall use Zircaloy-2 tubes and the activity concentrations expected in the primary coolant is presented in Table 2.2 of the Appendix I Enclosure 1 submittal.

2. Nuclear Steam Supply System

2.a. The total steam flow rate is $14 * 10^6$ lbs/hr. (Ref. PSAR Figure 1.5-4a)

2.b. The mass of reactor coolant (lbs) and steam (lbs) in the reactor vessel at full power is:

$0.6*10^6$ lbs of water
$.02*10^6$ lbs of steam (Ref. Suppl. E.R. Page 6-8)

3. Reactor Coolant Cleanup System

3.a. The average flow rate is $0.13*10^6$ lbs/hr. (Ref. PSAR Fig. 1.5-4a)

3.b. Powdex demineralizers are used.

3.c. The regeneration frequency for each demineralizer is one backwash every 6.8 days. Since there are two demineralizers in each unit, there will be one backwash per unit every 3.4 days.

3.d. Regenerant volume (gal/event) and activity:

Volume	- 1000 gal/backwash
Normal liquid activity	- 1.71×10^{-2} µCi/cc
Maximum liquid activity	- 2.59 µCi/cc
Normal solid activity	- 5.22×10^{7} µCi/batch
Maximum solid activity	- 4.52×10^{9} µCi/batch

4. Condensate Demineralizers

4.a. The average flow rate is $14*10^6$ lbs/hr. (Ref. Fig. 1.5-4a PSAR)

4.b. There are 7 demineralizers in all. 6 operate continuously and 1 operates on standby.

4.c. Number and size (cubic feet) of demineralizers:

Six vessels on line with one on standby.
312 cubic feet bed size each vessel.

4.d. Minimum regeneration frequency (no condenser inleakage) is one demineralizer every 2.5 days. Maximum regeneration frequency is 3-4 demineralizers per day.

4.e. The waste liquid volume generated during a URC cleaning is 16,000 gallons.

4.f. Regenerant volume and activity:

25,000 gal high conductivity waste with normal activity of 1.7×10^{-2} µCi/cc

29,000 gal low conductivity waste with normal activity of 1.2×10^{-2} µCi/cc

5. Liquid Waste Processing Systems

5.a.1 The sources of the various radwaste streams are very briefly described in Section 9.2 of the Hope Creek PSAR. A detailed description of the sources of activity is presented in the piping and instrument drawings. The flow rates and the expected activities are contained in Page 1.3 of Enclosure 2 of the Hope Creek Appendix I submittal.

D. Regenerant Waste Sub-system

1. Tanks (liquid volume)
   a. Waste Neutralizers (2) - 25,000 gals each
   b. Waste Evaporator Distillate Tank (2) - 1000 gals each

2. Process Equipment
   a. Waste Evaporator (full forced circulation) (2) -40 gpm each

3. Pumps
   a. Waste Neutralizer (2) - 176 gpm each
   b. Easte Evaporator Feed (2) - 40 gpm each
   c. Waste Evaporator Recirculation (2) - 90,000 gpm each
   d. Waste Evaporator Distillate Transfer (2) - 50 gpm each

E. Detergent Drain Sub System

1. Tanks (Liquid Volume)
   a. Detergent Drain (2 compartments) - 900 gals. each

2. Process Equipment
   a. Detergent Drain Filter - 25 ft^2

3. Pumps
   a. Detergent Drain (2) - 25 gpm each

5.a.4 The decontamination factor for each process step are as described draft Reg. Guide 1.CC.

5.a.5 The fraction of each process stream expected to be discharged are described on Page 1.3 of Enclosure 2 of the Hope Creek Appendix I submittal.

5.a.6 Waste demineralizers are regenerated once every 52 days and Floor Drain Demineralizer once every 25.1 days (based on GE Process Diagram). Regenerant Volumes per demineralizer: 14,630 gals. (190 cubic feet at 77 gal/cu.ft.) high conductivity waste; 17,670 gals low conductivity waste (190 cu ft at 93 gal/cu ft). High conductivity waste will be processed by evaporation in the Regenerant Waste Sub-system and low conductivity will be processed by filtration and demineralization in the Eq. Drain Subsystem. Since these streams are returned for plant re-use, zero fraction

5.a.2 Effective decay times have been calculated for each stream by consideration of the waste hodup, collection, and processing time. This information is contained in page 1.3 of Enclosure 2 of the Hope Creek Appendix I submittal.

5.a.3 Liquid Radwaste System Capacities

A. Equipment Drain Sub-system

1. Tanks (Liquid Volume)
   a. Waste Collector (2) - 29,000 gals. each
   b. Waste surge - 66,225 gals
   c. Waste Sample (2) - 15,000 gals each

2. Process Equipment
   a. Waste Collector Filter - 182 ft^2
   b. Waste Demineralizer - 190 ft^3

3. Pumps
   a. Waste Collector (2) - 182 gpm each
   b. Waste Surge 182 gpm
   c. Waste Sample (2) - 450 gpm

B. Floor Drain Sub-system

1. Tanks (liquid volume)
   a. Floor Drain Collector (2) - 15,000 gals. each
   b. Floor Drain Sample (2) - 15,000 gals. each

2. Process Equipment
   a. Floor Drain Collector Filter - 176 ft^2
   b. Floor Drain Demineralizer - 190 ft^3

3. Pumps
   a. Floor Drain Collector (2) - 176 gpm each
   b. Floor Drain Sample (2) 176 gpm each

C. Chemical Waste Sub-system

1. Tanks (liquid volume)
   a. Chemical waste - 40,000 gals
   b. Chemical Waste Sample - 4000 gals

2. Process Equipment
   a. Decontamination Solution Evaporator (Natural Circulation) - 5 gpm

3. Pumps
   a. Chemical Waste - 5 gpm
   b. Chemical Waste Sample Tank - 50gpm

is released to the environs. The high conductivity regenerant waste should have the following activities:

Waste Demineralizer: 4.7 µCi/cc max
1.72×10^{-1} µCi/cc normal

Floor Drain Demineralizer: 2.12×10^{-10} µCi/cc normal
8.35×10^{-9} µCi/cc max

The regeneration frequency is based on an anion exchange capacity of 9 kgrains/cu ft and an average influent conductivity of 30 µmhos/cm for the Waste Demineralizer and 200/ µmhos/cm for the Floor Drain Demineralizer.

5.a.7 The liquid source term is calculated by the Gale Code. (See Table 2.2 of Enclosure 1 to the Appendix I submittal)

5.2 F&ID's are provided

6. Main Condenser and Turbine Gland Seal Air Removal Systems

6.a. The holdup time for offgases from the main condenser air ejector prior to processing by the offgas treatment system is about four seconds. This is the delay prior to entry to the recombiner preheater. Ten minute holdup is provided by a holdup pipe downstream of the recombiner. An additional ninety minutes holdup time is provided in the cryogeni portion of the offgas system before any gases are vented. The delay time used in the computer codes was 30 minutes.

6.b. There are three shells per condenser.

6.c. A charcoal delay system is not used.

6.d. A description of the cryogenic distillation system is provided on Page 9.4-5, 9.4-6 and Fig. 9.4-1 of the PSAR. Further information on the system was previously provided to the NRC as a propietary report. (Reference Page C-110 of draft Regulatory Guide 1.CC reference number 21.)

6.e. Steam flow to the turbine gland seal is 25,000 lbs/hr normally. The source of makeup to the steam seal evaporator is condensate from downstream of the demineralizers.

6.f. Since the steam is not radioactive it is not necesssry to hold up the gases. (Reference Page 9.4-1 PSAR.)

6.g. Piping and instrument drawings are provided.

7. Ventilation and Exhaust Systems

7.a. The provision incorporated to reduce radioactivity releases through the ventilation system is discussed on Page 1.1 of the Hope Creek Appendix I submittal. (Ref. Section 9 of PSAR.)

7.b. The decontamination factors used were taken from Reg. Guide 1.CC.

7.c. The estimated release rates are based upon Table 2.4 of the Appendix I submittal. The basis for these values are the Gale Code.

7.d. The ventilation release point for each unit is an exhaust stack of cross section dimensions 34 ft. by 9 ft. The stack is located above the roof of the auxiliary building and adjacent to the turbine building. The release elevation is 103.5 feet above grade. This is 34 ft. above the auxiliary building roof and 8 ft. above the adjacent turbine building roof.

Discharge stack dimensions: 34 ft. x 9 ft. cross section
Unit 1 stack velocity: 1840 fpm summer/1310 fpm winter
Unit 2 stack velocity: 1350 fpm summer/813 fpm winter

Unit 1 HVAC Sources:

	CFM (Summer)	CFM (Winter)
MG System	88,000	44,000
Oil Storage Rm.	17,500	17,500
Turbine Bldg. Exh.	130,000	53,000
T.B. Compartment Exh.	31,000	31,000
R/W Bldg.	114,000	114,000
Service Bldg.	44,100	44,100
Reactor Bldg.	139,500	96,000
	564,100 (115°F)	399,600 (100°F

Unit 2 HVAC Sources:

MG System	88,000	44,000
Oil Storage Rm.	17,500	17,500
Turbine Bldg. Exh.	130,000	53,000
T.B. Compartment Exh.	31,000	31,000
Service Bldg. (Chem. Lab)	7,280	7,280
Reactor Bldg.	139,500	96,000
	413,280 (120°F)	248,780 (104°F

Maximum winter temperature difference between effluent and ambient: 95°F (Unit 1), 99°F (Unit 2).

Minimum summer temperature difference between effluent and ambient: 21°F (Unit 1), 26°F (Unit 2).

7.e. A description of the containment ventilation system is provided in Section 5.8.4.4 of the FSAR.

Only one purge a year is expected. Draft Reg. Guide 1.CC quotes a duration of purges of 48 hours/year.

8. Solid Waste Processing Systems

Solid Radwaste Inputs	Expected Volume (Cu ft/yr /reactor)	Expected Activity (Ci/yr /reactor)
1. Regenerant Waste Concentrate: 10,825 gals/45 days; 8.5×10^{-1} µCi/cc	5,865	141.
2. Decon. Soln. Concentrate: 4,000 gals/yr; 5.8×10^{-1} µCi/cc	267	4.4
3. Waste Sludge Phase Separator: 8,500 gals/35 days; 6.18×10^{-1} µCi/cc	5,921	103.5
4. RWCU Phase Separator: 2,610 gals/60 days; 3.8×10^{2} µCi/cc	1,061	11,410.
5. Spent Resin: 83.5 cu ft/yr 3.3×10^{-1} µCi/cc	84	0.8
TOTALS	13,200	11,660

8.b. Solid Radwaste storage is located in the auxiliary bldg. at Elev. 102.

1186 drums of HSA and 1170 drums of LSA storage capacities are provided. These relative amounts are adjustable but the total will remain the same.

It is expected that HSA material will be stored a minimum of 180 days and LSA material 30 days.

8.c. Piping and instrument diagrams are provided starting on page A.1.8 of this section)

PIPING AND INSTRUMENT DRAWINGS (P&ID's)

& PROCESS FLOW DIAGRAMS

FIQURE NO.	TITLE
P&ID #M-61-0	LIQUID RADWASTE COLLECTION
P&ID #M-61-1 (sh. 1)	LIQUID RADWASTE COLLECTION
P&ID #M-61-1 (sh. 2)	LIQUID RADWASTE COLLECTION
P&ID #M-62-0 (sh. 1)	LIQUID RADWASTE EQUIPMENT DRAIN PROCESSING
P&ID #M-62-0 (sh. 2)	LIQUID RADWASTE EQUIPMENT DRAIN PROCESSING
P&ID #M-63-0 (sh. 1)	LIQUID RADWASTE FLOOR DRAIN PROCESSING
P&ID #M-63-0 (sh. 2)	LIQUID RADWASTE FLOOR DRAIN PROCESSING
P&ID #M-64-0	LIQUID RADWASTE CHEMICAL WASTE PROCESSING
P&ID #M-65-0 (sh. 1)	LIQUID RADWASTE REGENERANT WASTE PROCESSING
P&ID #M-65-0 (sh. 2)	LIQUID RADWASTE REGENERANT WASTE PROCESSING
P&ID #M-66-0	SOLID RADWASTE COLLECTION
P&ID #M-67-0	SOLID RADWASTE COLLECTION
P&ID #M-69-0	GASEOUS RADWASTE RECOMBINATION
P&ID #M-70-0	GASEOUS RADWASTE COMPRESSOR PACKAGE
P&ID #M-71-0 (sh. 1)	GASEOUS RADWASTE CYROGENIC TREATMENT AND STORAGE
P&ID #M-71-0 (sh. 2)	GASEOUS RADWASTE CYROGENIC TREATMENT AND STORAGE

The two drawings below described the processing of liquid and gaseous effluents.

SIMPLIFIED PROCESS DIAGRAM GASEOUS RADWASTE

RADWASTE SYSTEM DEEP BED-DUAL (Liquid and solid waste process diagram)

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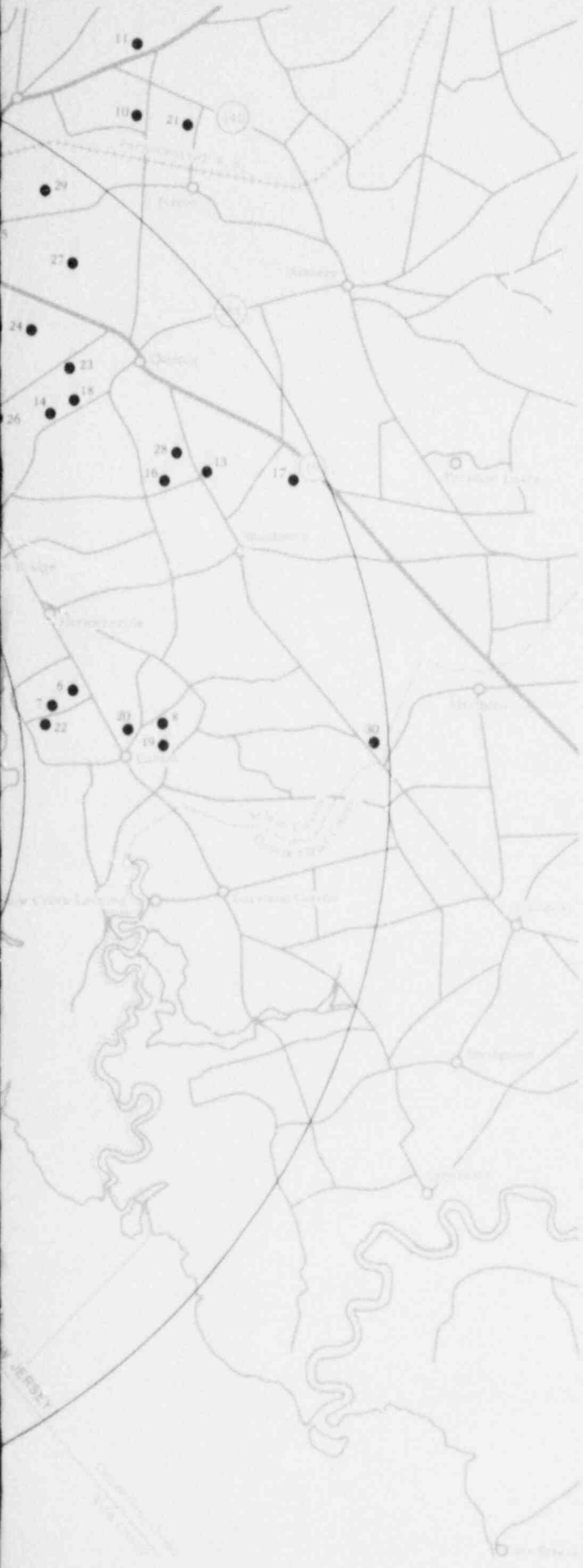
SITE
5 MILE RADIUS
10 MILE RADIUS
DELAWARE RIVER



KEY:

	SALEM COUNTY DAIRY HERDS	TOTAL NUMBER OF COWS
1	DR. WEBSTER	50
2	A. FARNKAOPF	70
3	L. RICHIE	38
4	B. HAYNES JR.	95
5	F. SCHRIER	35
6	L. FOGG	100
7	W. DIXON	32
8	F. SMITH	34
9	J. H. GRISCOM	99
10	A. GRISCOM JR.	145
11	WALDAC FARMS INC.	207
12	C. HARRIS	15
13	W. GAVINT	58
14	H. STOMS	105
15*	F. SOWERS	3
16	N. JOHNSON	170
17	A. PETERSON	102
18	A. M. BELL	60
19	W. BRADWAY	7
20	N. N. COUNSELLOR	39
21	W. DILLION	86
22	H. HENDERSON, JR.	26
23	R. KEEN	65
24	R. PETTERSON	25
25	V. REITMAN	16
26	B. RIDGWAY	70
27	E. STOMS	65
28	W. K. THOMASKI	50
29	A. WEIGEL	38

	CUMBERLAND COUNTY DAIRY HERDS	
30	A.S. FOGG	110

	NEW CASTLE COUNTY DAIRY HERDS	
31	C. BAXTER	80
32	W. E. BULLEN	100
33	R. CHAMBERS	120
34	W. CLEAVER	120
35	J. COVERDALE	110
36	S. COVERDALE	110
37	R. BURRIS	100
38	S. DEATS	120
39	R. EMERSON	120
40	J. FENNIMORE	100
41	C. D. HAMMAN	125
42	H. VOSHELL	120
43	E. WOOLEYHAM	100
44	L. DEPORTI	100
45*	K. KOX	92
46	E. DEPORTI	120
47	W. PASSMORE	110
48	T. ATKINSON	100
49	C. BLENDT, JR.	100
50	LOYD & DAVID SHEATS	250
51	DAVID REED	110
52*	PHILLIPS	30
53	NOT AVAILABLE	4
54	NOT AVAILABLE	2
55*	MCNATT - MOORE	9
56*	STELLER	2
57*	VOSS	25
58	K. DAVID	1

*DAIRY HERDS 5 MILES OR LESS

SITE VICINITY MAP

SHOWING LOCATION OF DAIRY COWS

8805270103-04

STATUTE MILE

1 0 1 2 3

DAMES & MOORE

SALEM NUCLEAR GENERATING STATION

FSAR - AMENDMENT 27 FIG. 2.5-2

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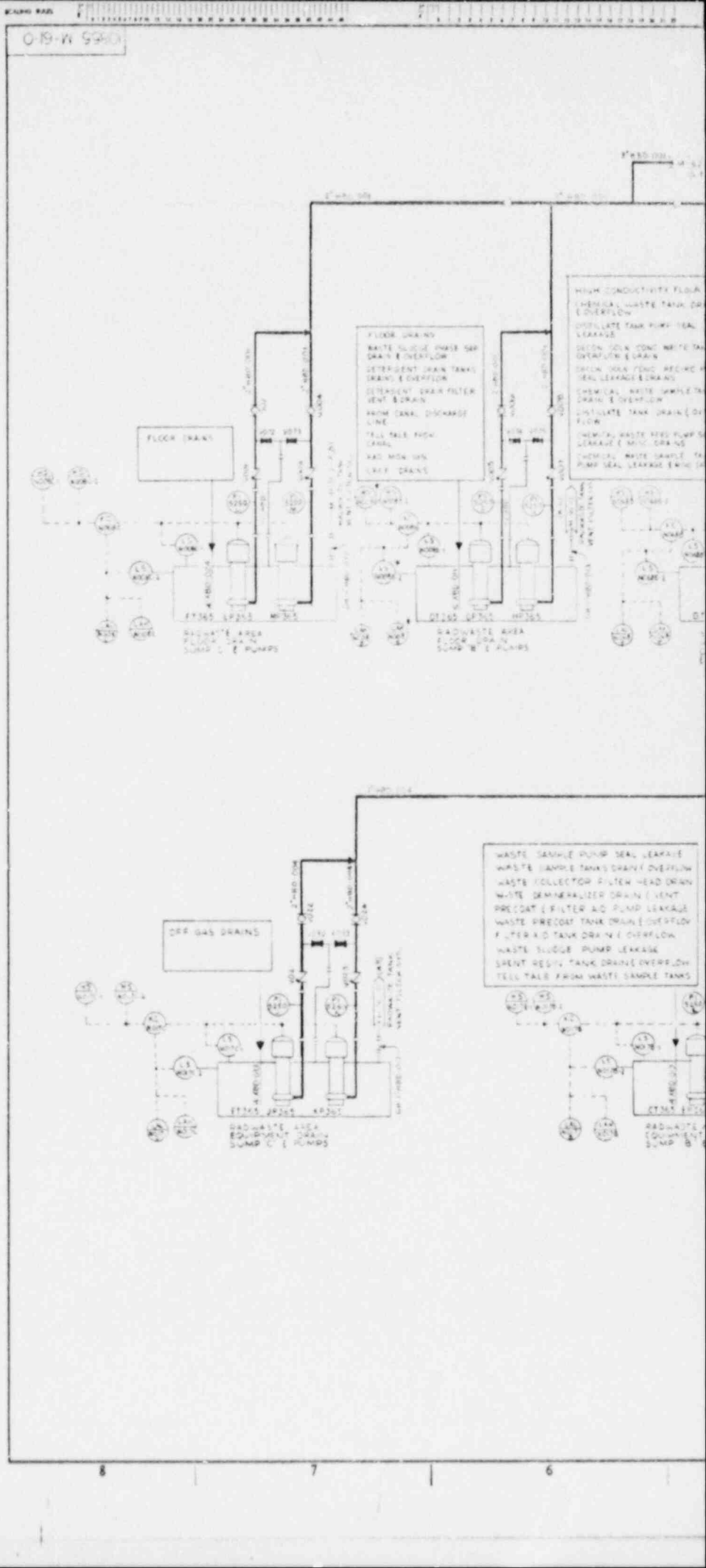
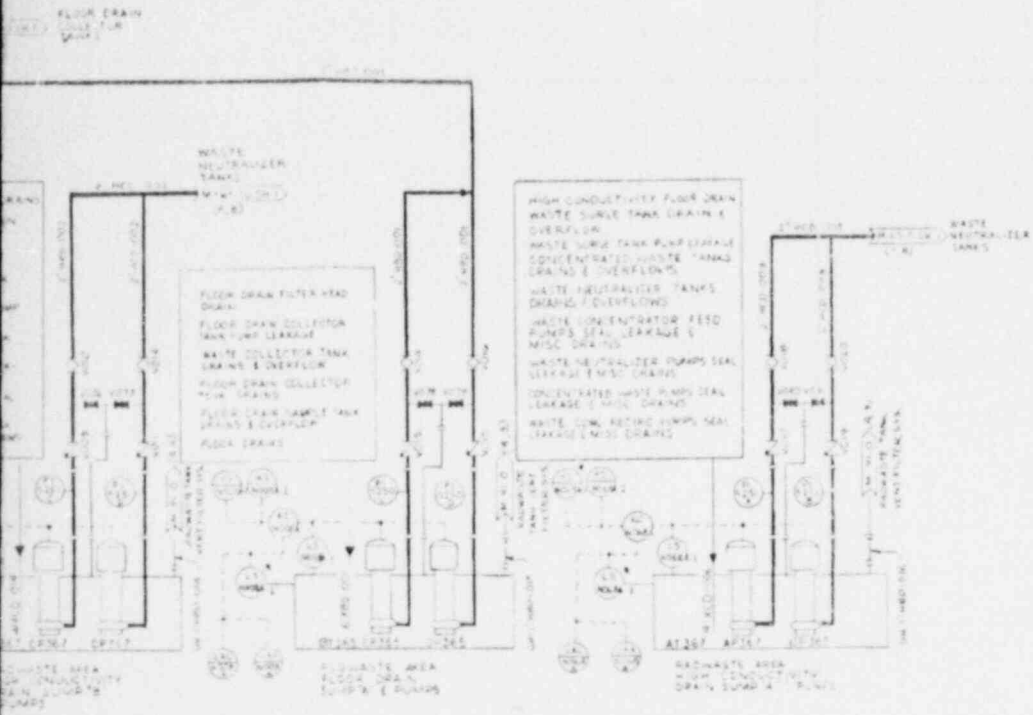
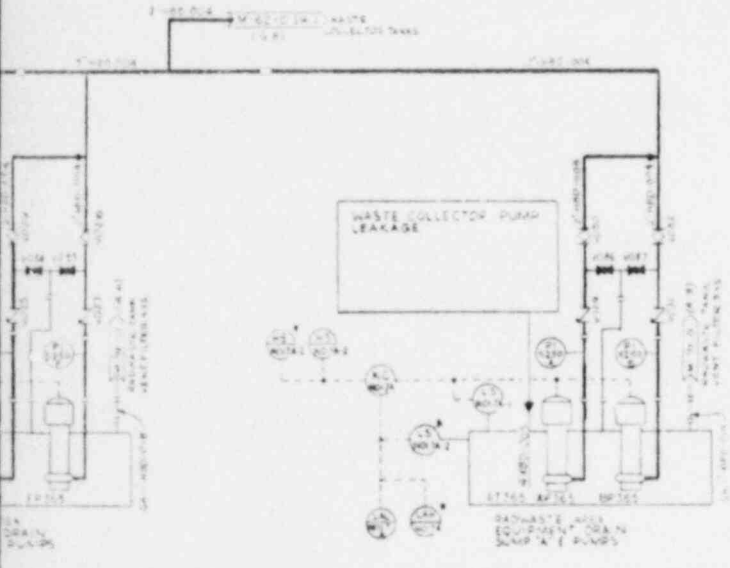

O-19-W 5980
FLOOR DRAINS
FLOOR DRAINS
WASTE SLUDGE PHASE SEP DRAIN & OVERFLOW
DETERGENT DRAIN TANKS DRAINS & OVERFLOW
DETERGENT DRAIN FILTER VENT & DRAIN
FROM CANAL DISCHARGE LINE
TELL TALE FROM CANAL
RAD MON SYS
LAUN DRAINS
RADWASTE AREA FLOOR DRAIN SUMP C & PUMPS
RADWASTE AREA FLOOR DRAIN SUMP B & PUMPS
OFF GAS DRAINS
WASTE SAMPLE PUMP SEAL LEAKAGE
WASTE SAMPLE TANKS DRAINS OVERFLOW
WASTE COLLECTOR FILTER HEAD DRAIN
WASTE DEMINERALIZER DRAIN & VENT
PRECOAT & FILTER AID PUMP LEAKAGE
WASTE PRECOAT TANK DRAIN & OVERFLOW
FILTER AID TANK DRAINS OVERFLOW
WASTE SLUDGE PUMP LEAKAGE
SPENT RESIN TANK DRAINS OVERFLOW
TELL TALE FROM WASTE SAMPLE TANKS
RADWASTE AREA EQUIPMENT DRAIN SUMP C & PUMPS
8
7
6





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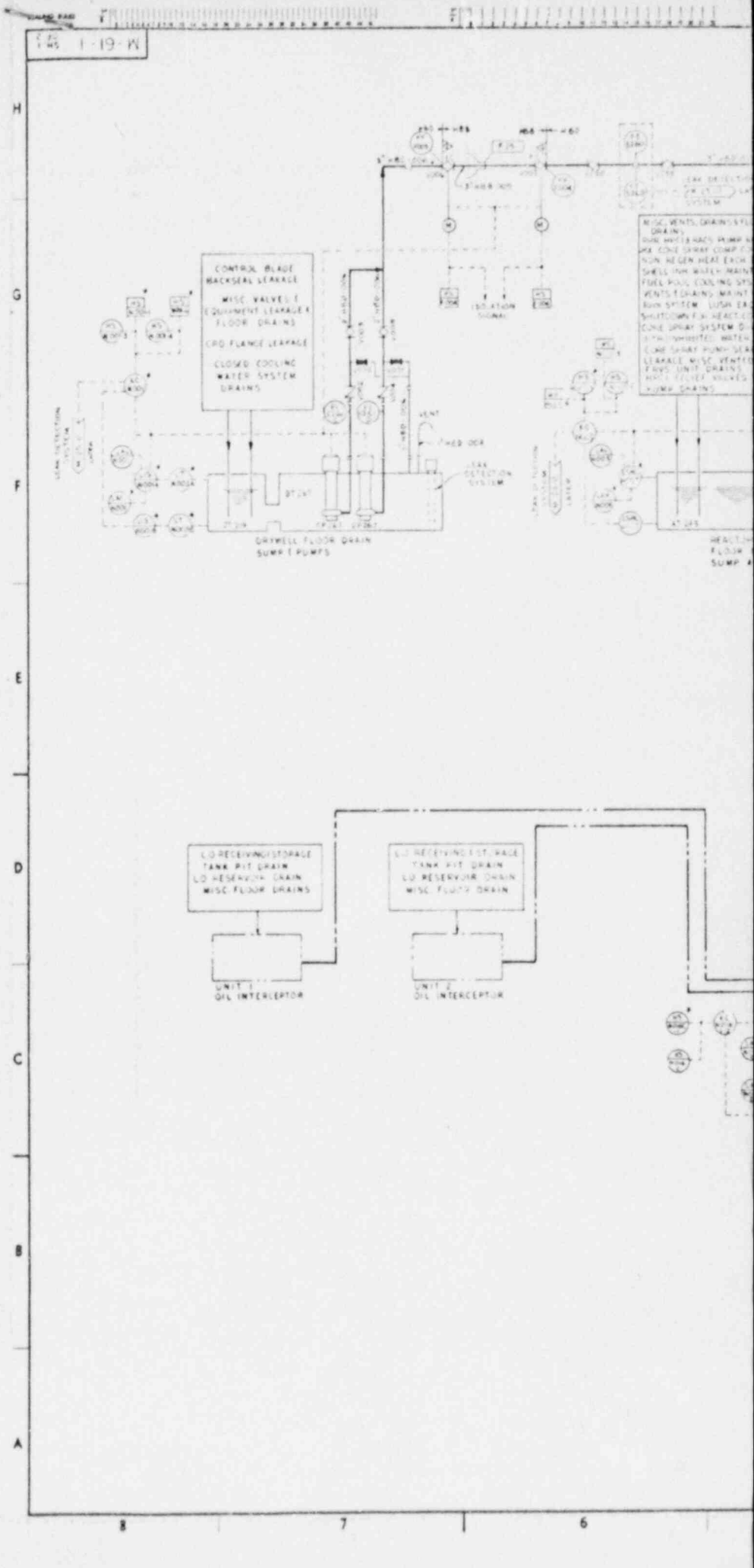
FSAR 1-19-K
CONTROL BLADE BACKSEAL LEAKAGE
MISC. VALVES & EQUIPMENT LEAKAGE & FLOOR DRAINS
CRD FLANGE LEAKAGE
CLOSED COOLING WATER SYSTEM DRAINS
ISOLATION SIGNAL
LEAK DETECTION SYSTEM
DRYWELL FLOOR DRAIN SUMP PUMPS
LO RECEIVING/STORAGE TANK PIT DRAIN
LO RESERVOIR DRAIN
MISC. FLOOR DRAINS
UNIT 1 OIL INTERCEPTOR
LO RECEIVING/STORAGE TANK PIT DRAIN
LO RESERVOIR DRAIN
MISC. FLOOR DRAIN
UNIT 2 OIL INTERCEPTOR
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G
F
E
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C
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A
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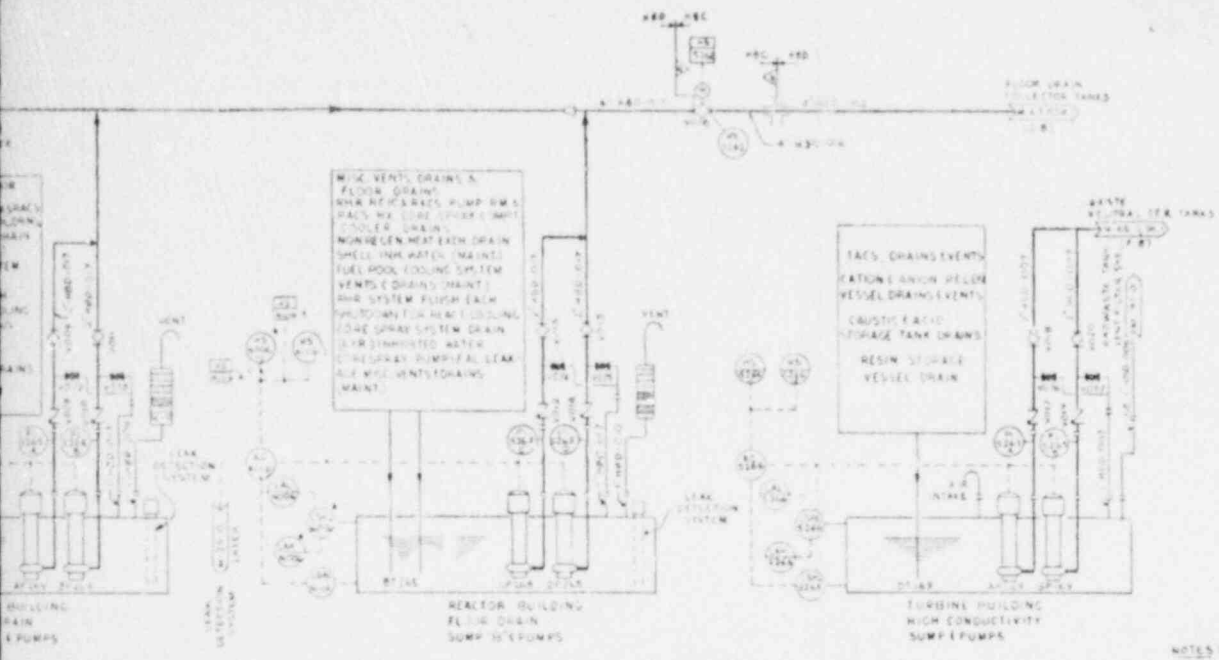

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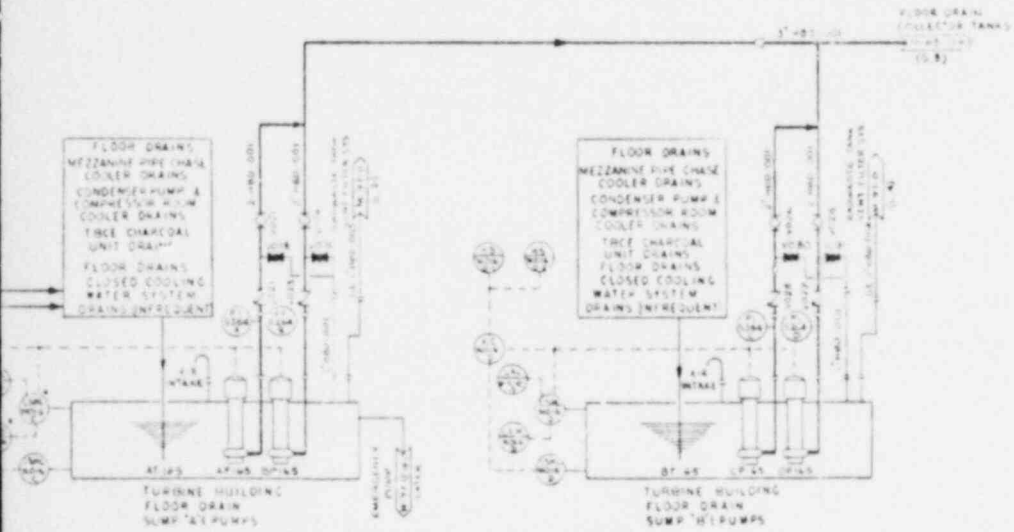

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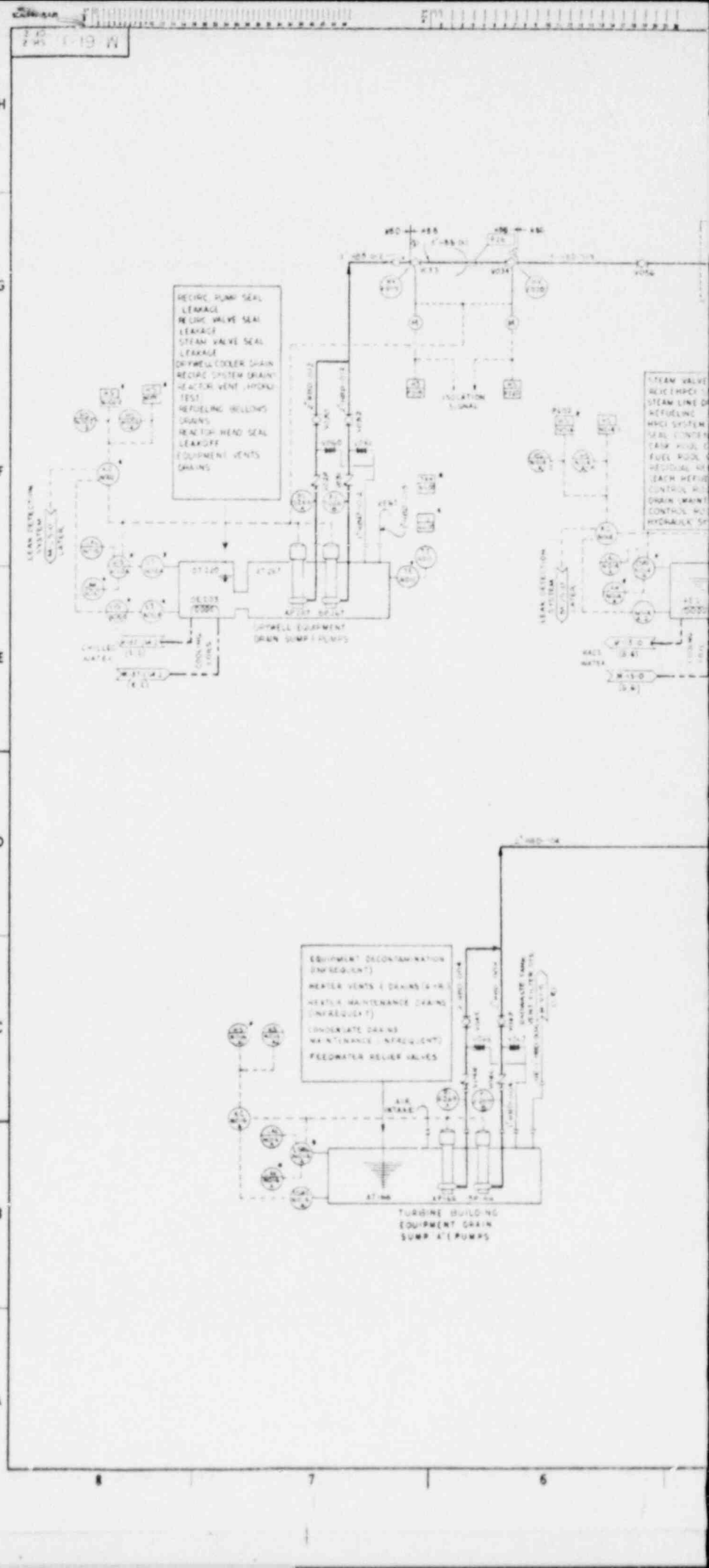
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RECIRC VALVE SEAL LEAKAGE
STEAM VALVE SEAL LEAKAGE
DRYWELL COOLER DRAIN
RECIRC SYSTEM DRAIN
REACTOR VENT (HYDRO TEST)
REFUELING BELLOWS DRAINS
REACTOR HEAD SEAL LEAKOFF
EQUIPMENT VENTS DRAINS
EQUIPMENT DECONTAMINATION (INFREQUENT)
HEATER VENTS & DRAINS (INFREQUENT)
HEATER MAINTENANCE DRAINS (INFREQUENT)
CONDENSATE DRAINS MAINTENANCE (INFREQUENT)
FEEDWATER RELIEF VALVES
AIR INTAKE
TURBINE BUILDING EQUIPMENT DRAIN SUMP A (PUMPS)
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G
F
E
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C
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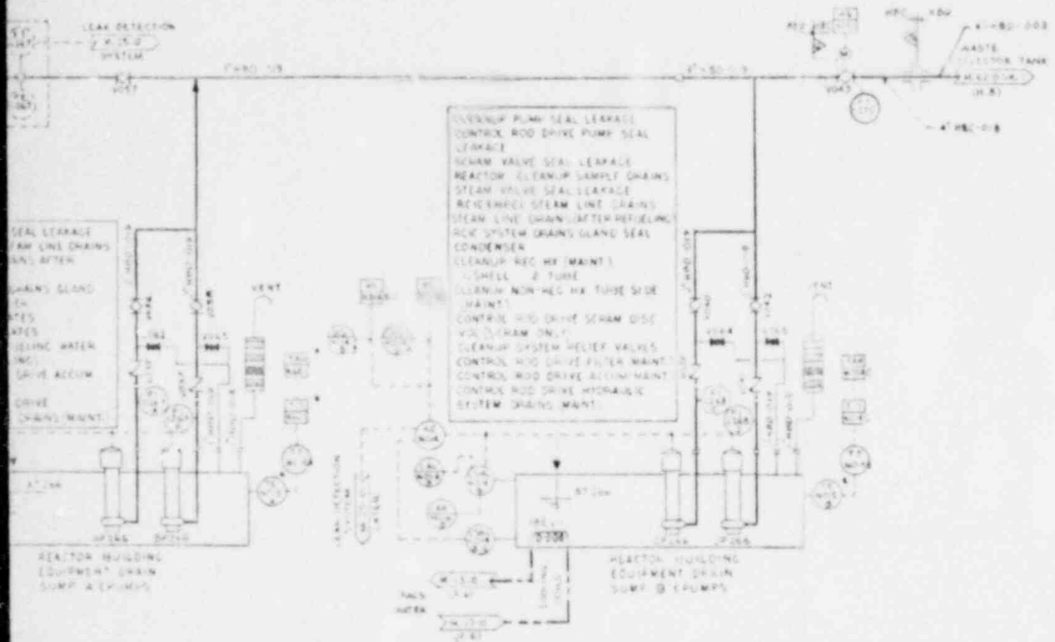

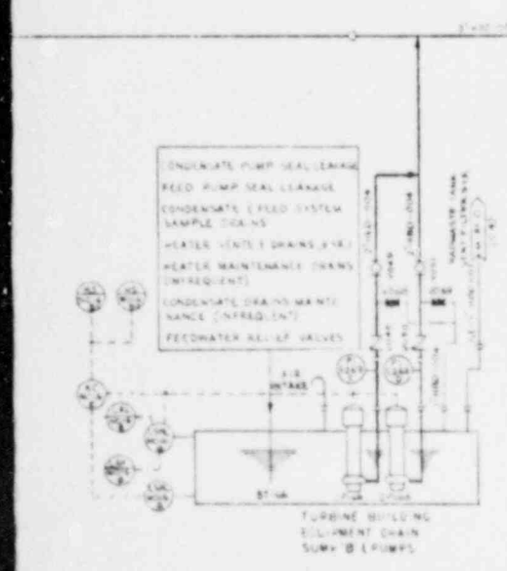

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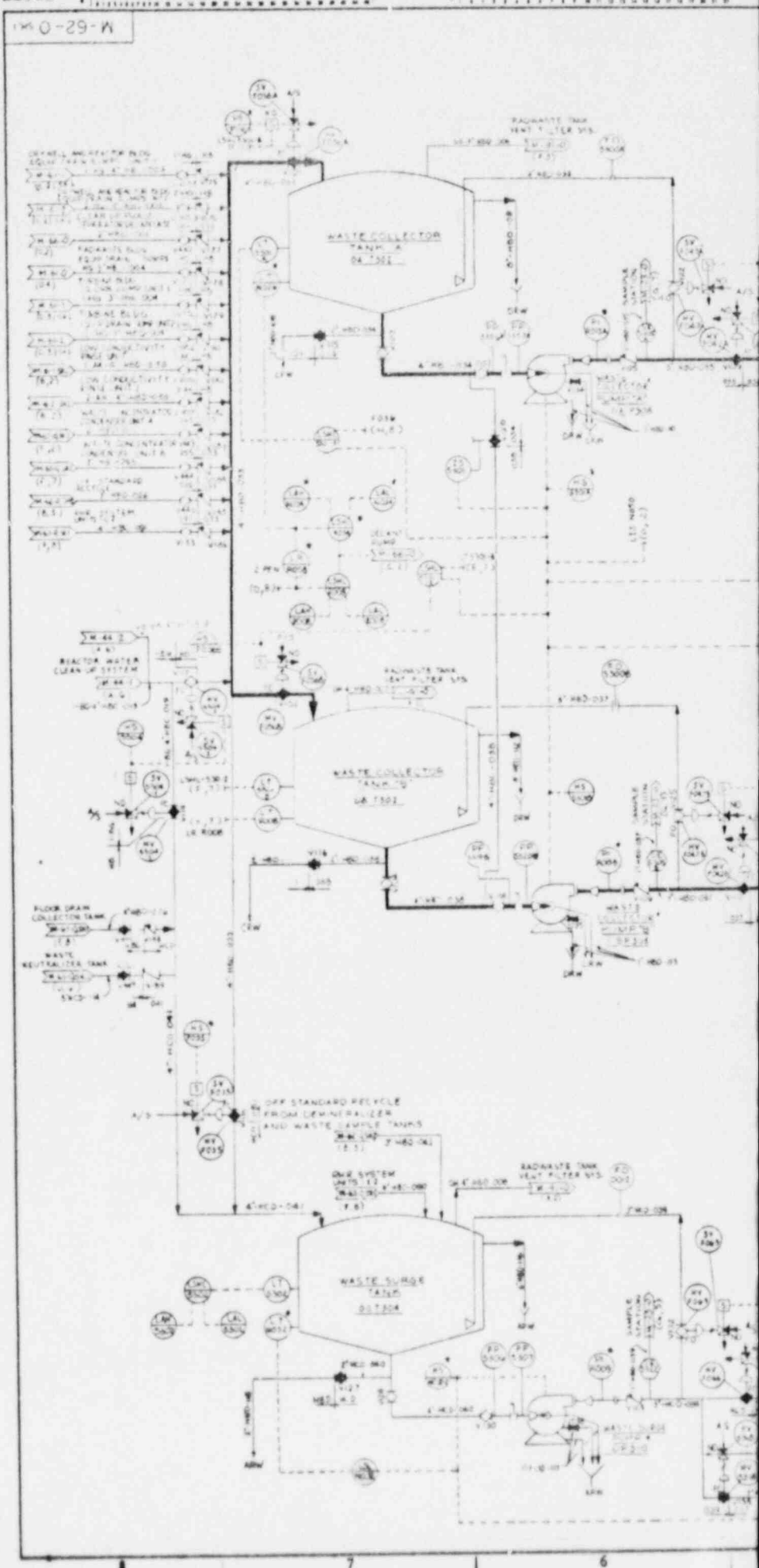
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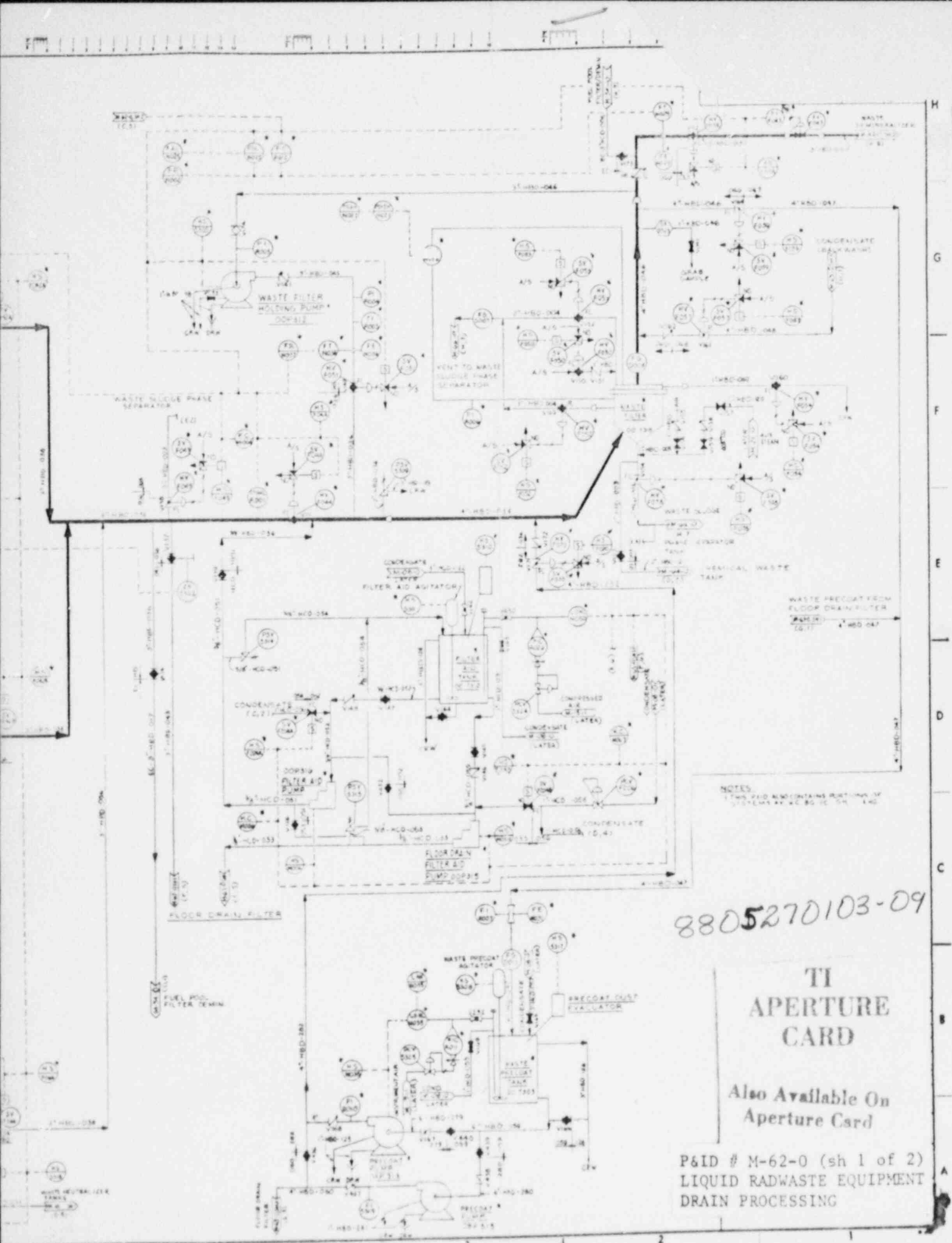
WASTE COLLECTOR TANK A
04 T02
WASTE COLLECTOR TANK B
04 T03
WASTE SURGE TANK
03 T204
RADWASTE TANK VENT FILTER SYS.
REACTOR WATER CLEAN UP SYSTEM
FLOOR DRAIN COLLECTION TANK
WASTE NEUTRALIZER TANK
OFF STANDARD RECYCLE FROM DEMINERALIZER AND WASTE SAMPLE TANKS
7
6



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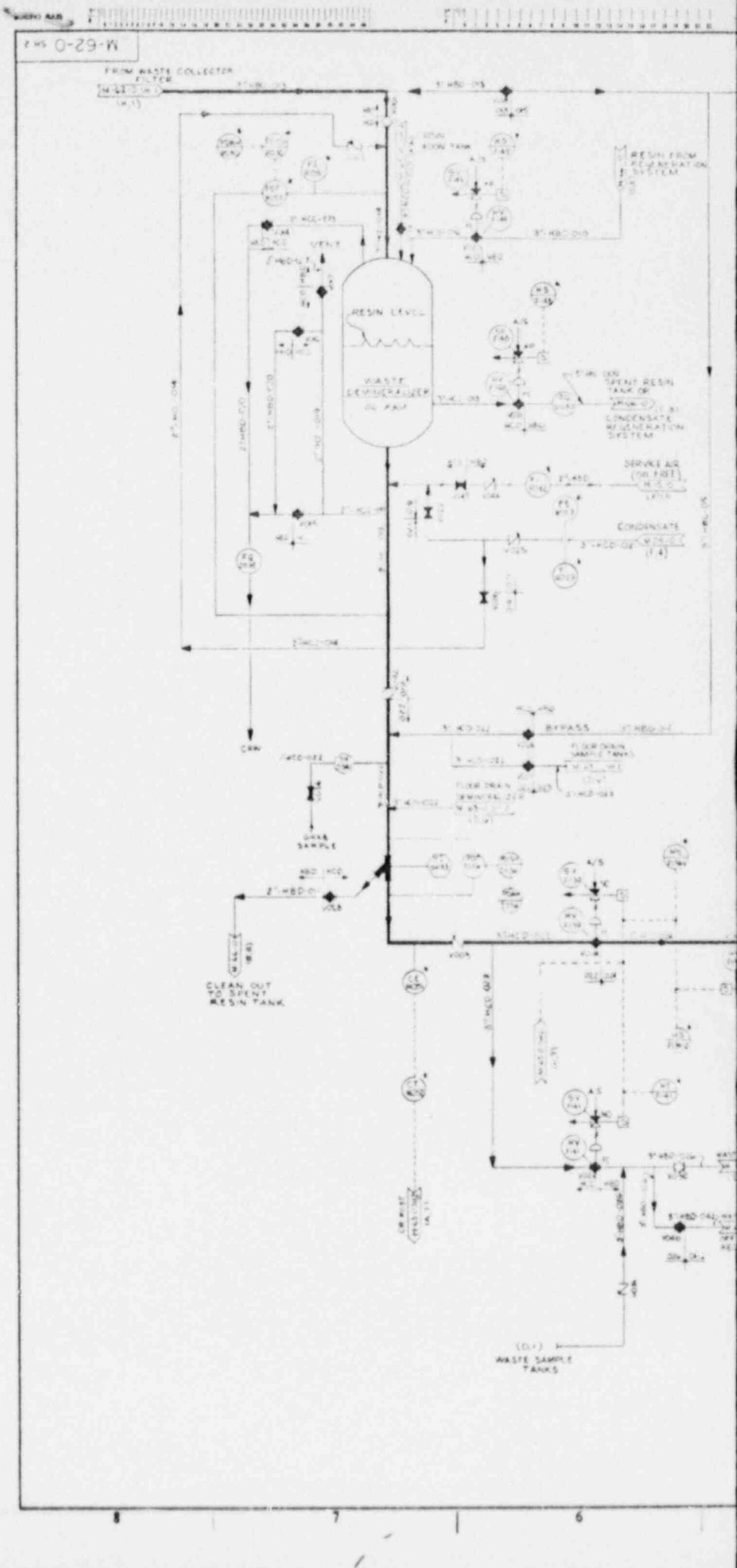
LIQUID RADWASTE EQUIPMENT
DRAIN PROCESSING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FROM WASTE COLLECTOR FILTER
RESIN FROM REGENERATION SYSTEM
VENT
RESIN LEVEL
WASTE DEMINERALIZER
SPENT RESIN TANK OR
CONDENSATE REGENERATION SYSTEM
SERVICE AIR
CONDENSATE
DRAIN
BYPASS
FLOOR DRAIN SAMPLE TANKS
FLOOR DRAIN DEMINERALIZER
SAMPLE
CLEAN OUT TO SPENT RESIN TANK
WASTE SAMPLE TANKS
8
7
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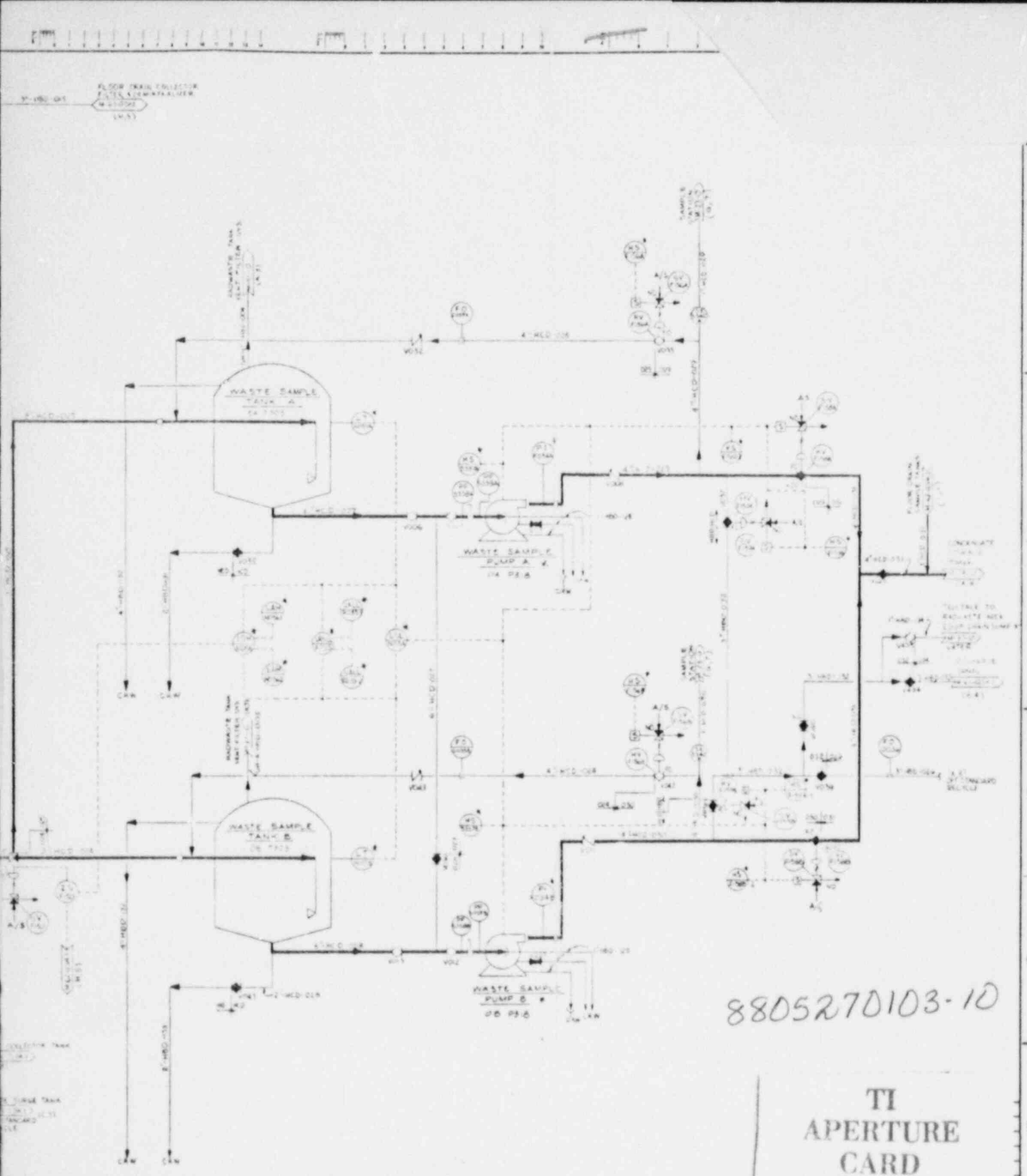

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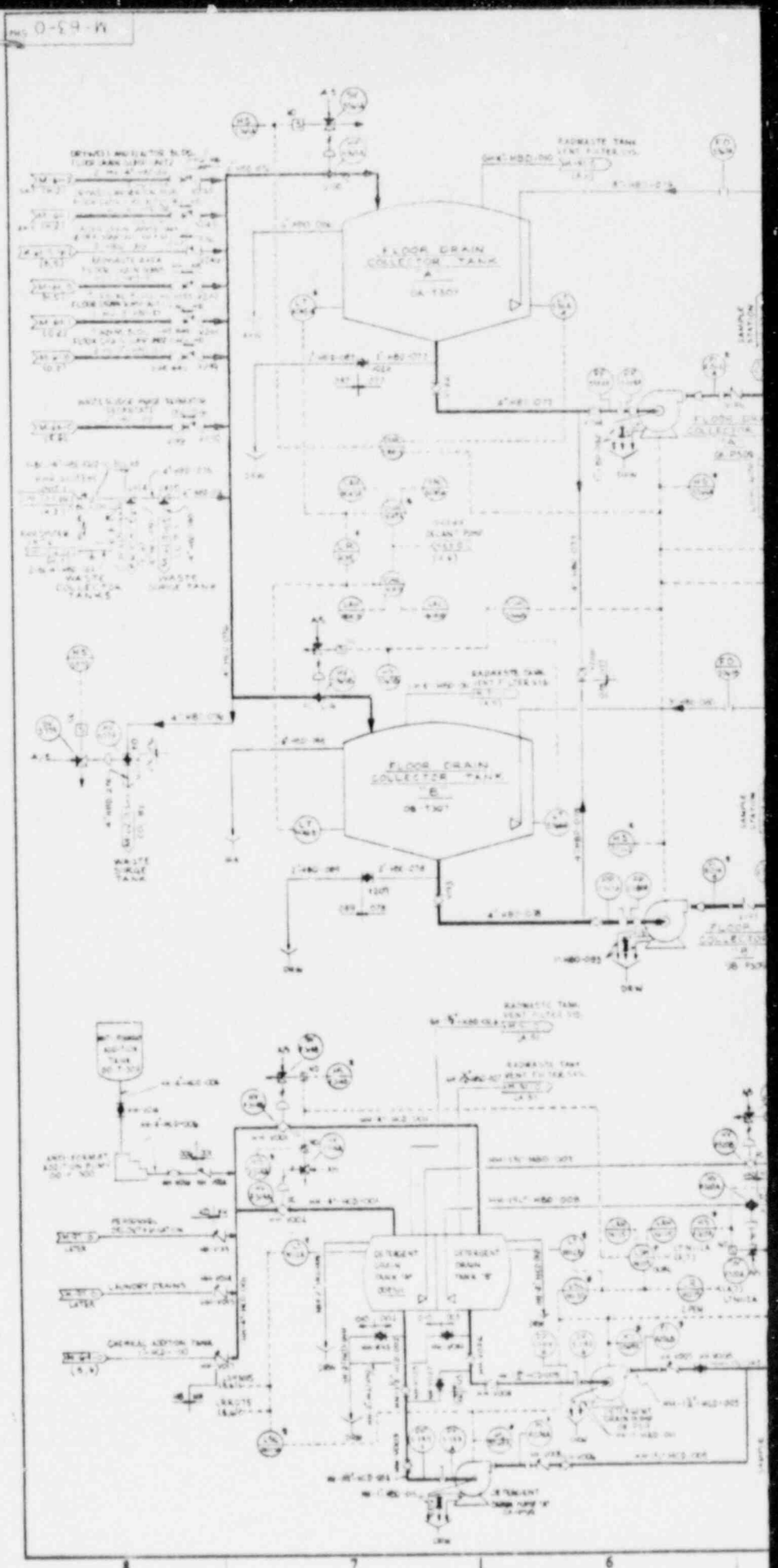
LIQUID RADWASTE EQUIPMENT
DRAIN PROCESSING


M-69-0
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FLOOR DRAIN COLLECTOR TANK B
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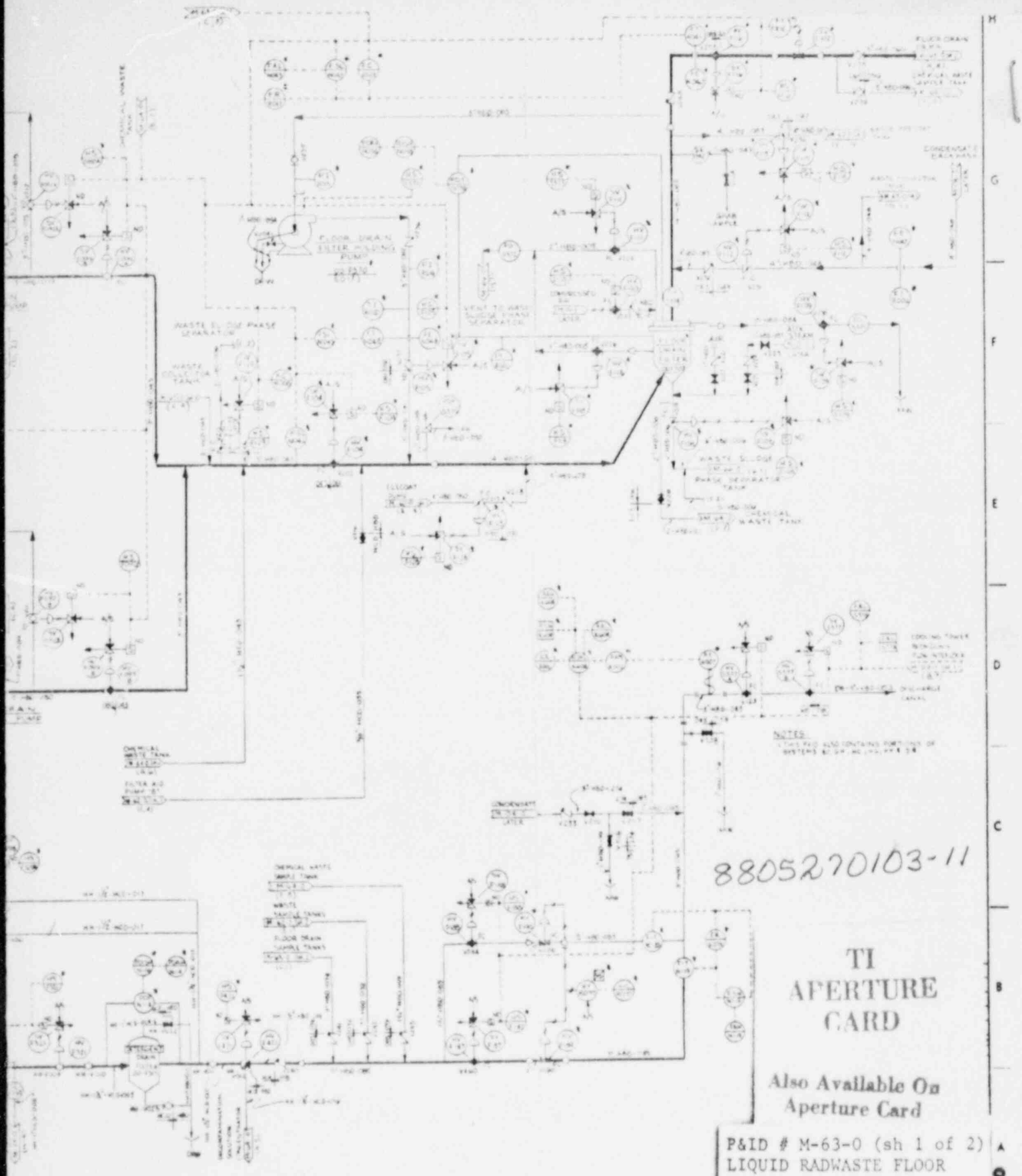
DETERGENT DRAIN TANK "B"
8
7
6



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APERTURE
CARD

Also Available On
Aperture Card

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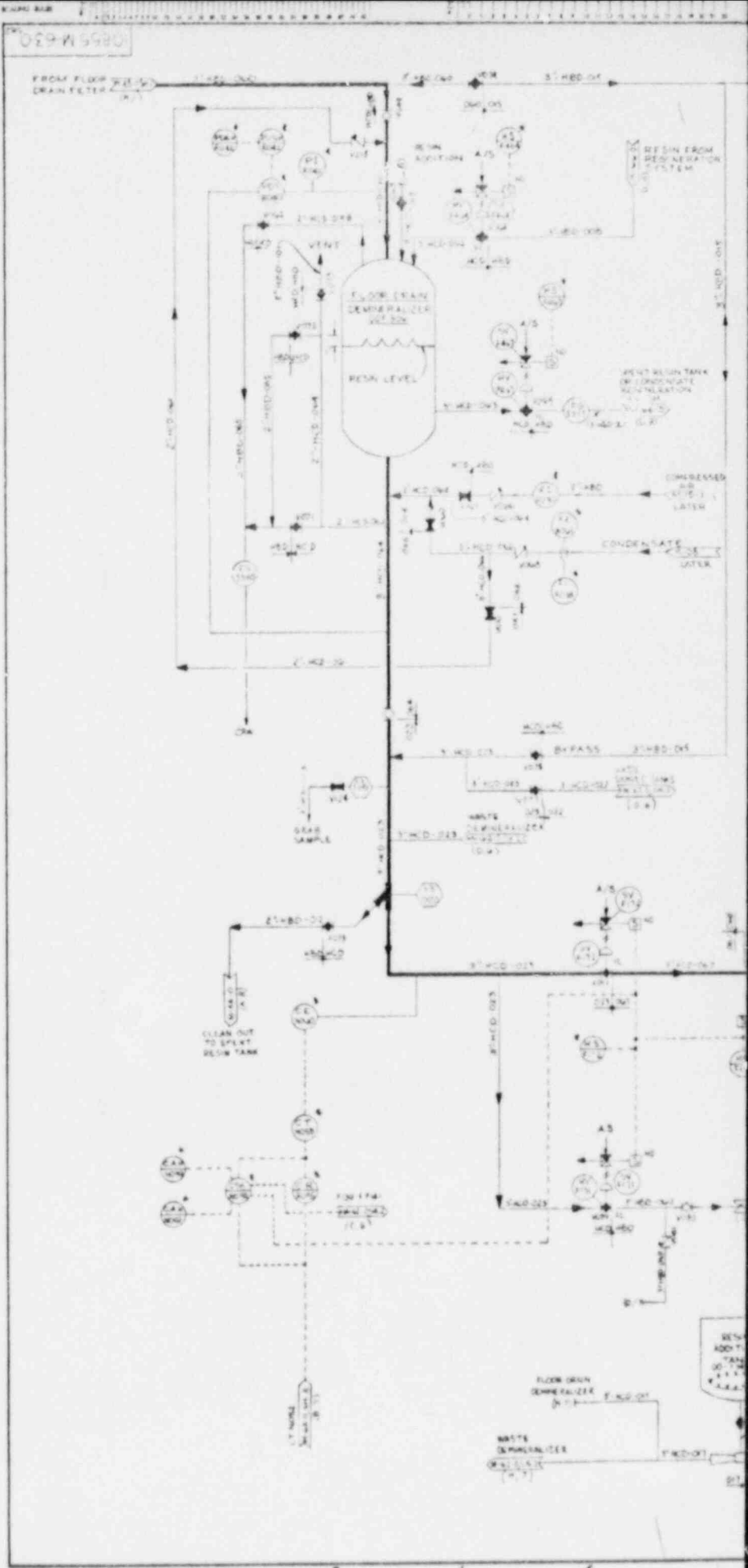
LIQUID RADWASTE FLOOR
DRAIN PROCESSING


FROM FLOOR DRAIN FILTER
RESIN ADDITION
RESIN FROM REGENERATION SYSTEM
VENT
FLOOR DRAIN DEMINERALIZER
RESIN LEVEL
CONDENSATE
LATER
BYPASS
SEAL SAMPLE
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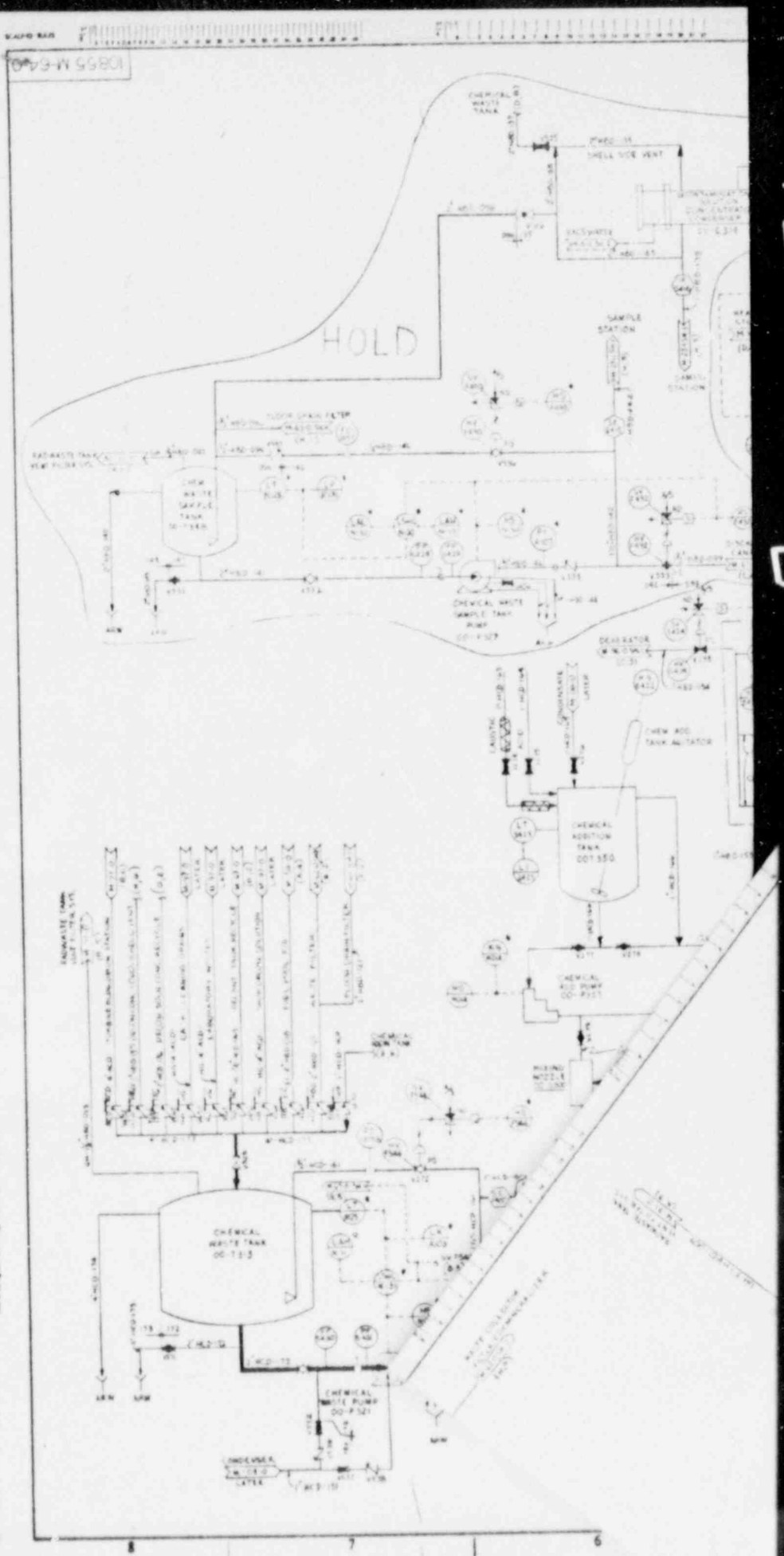
FLOOR DRAIN DEMINERALIZER
WASTE DEMINERALIZER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CHEM WASTE SAMPLE TANK
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DEAERATOR
CHEM ADD TANK AGITATOR
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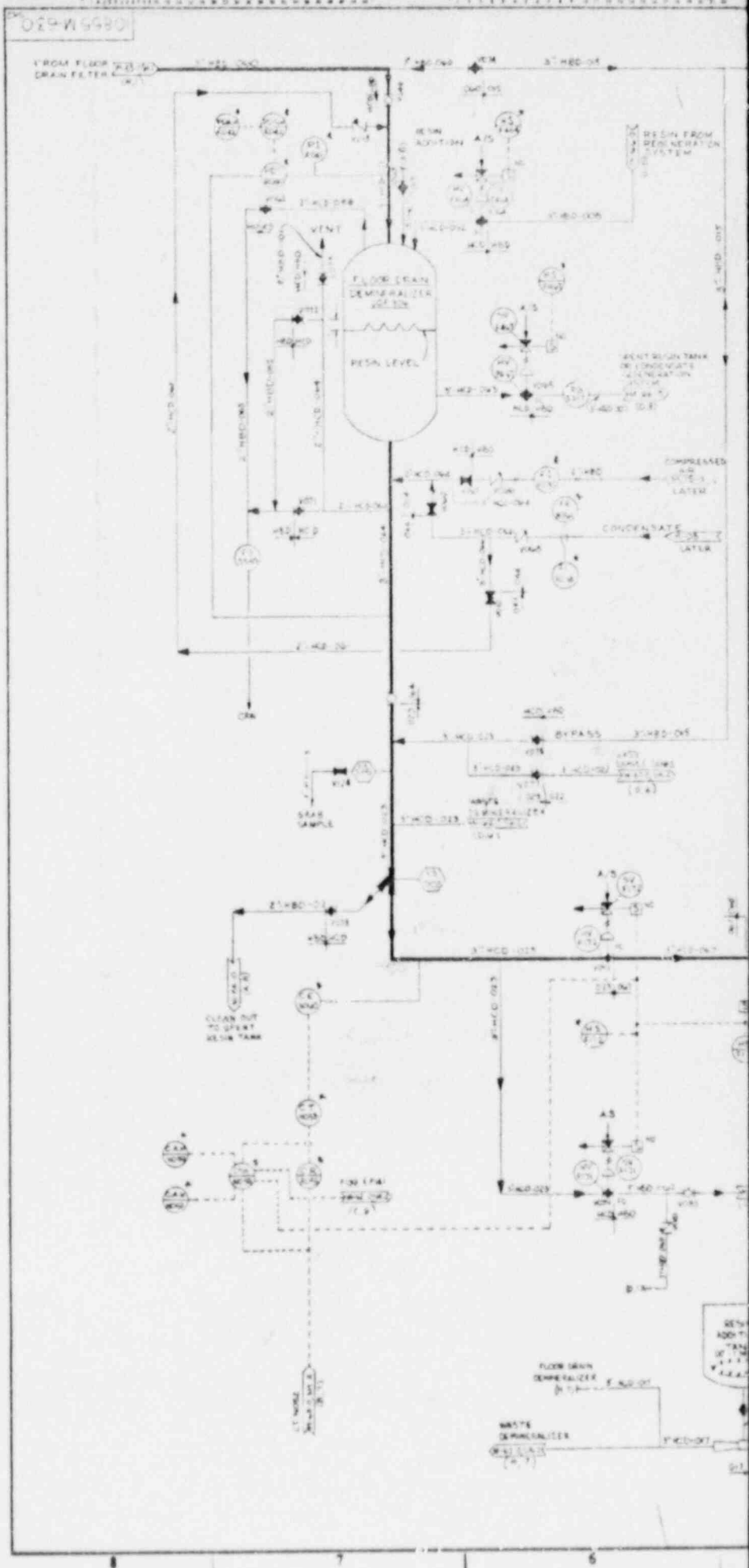
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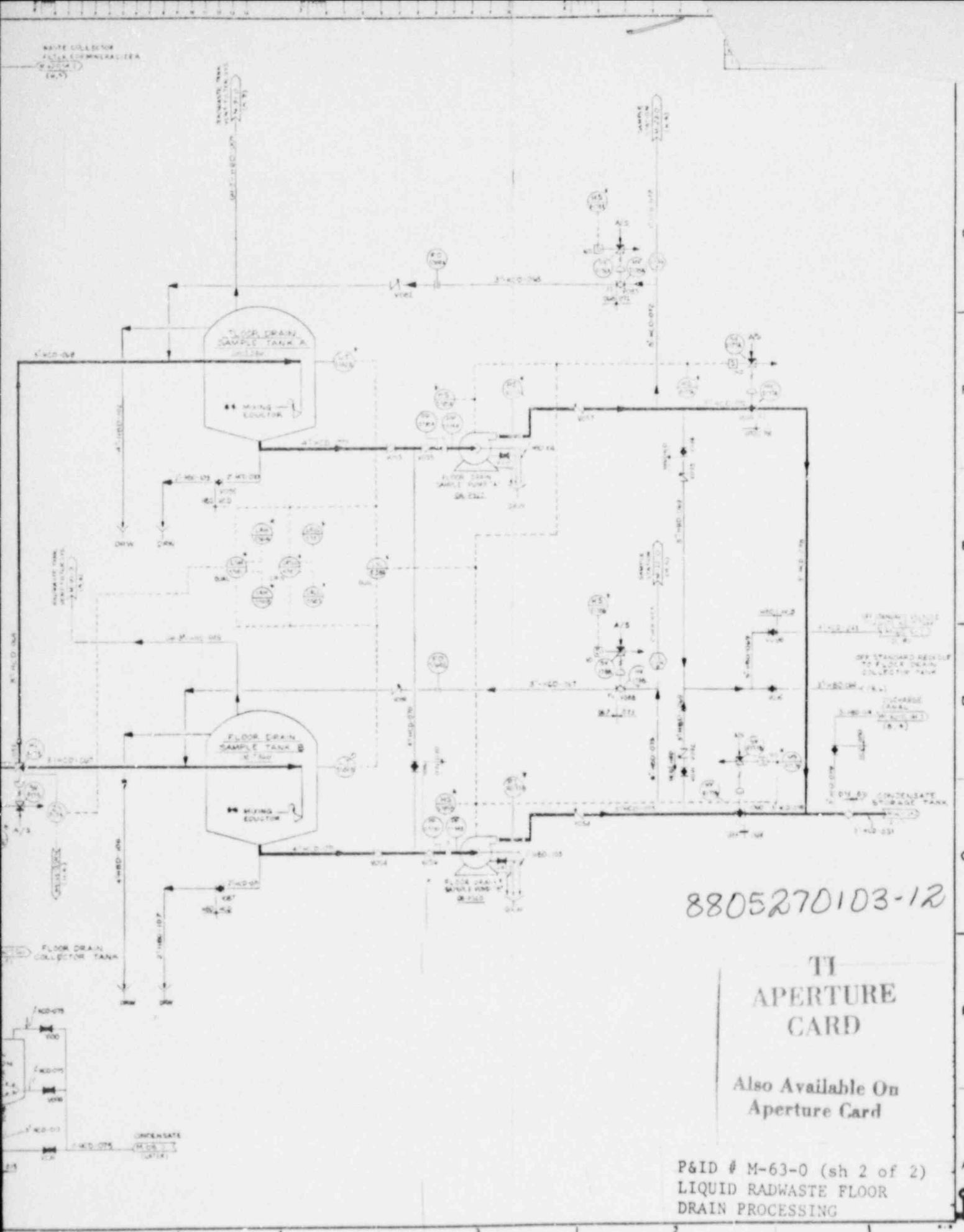
WASTE DEMINERALIZER



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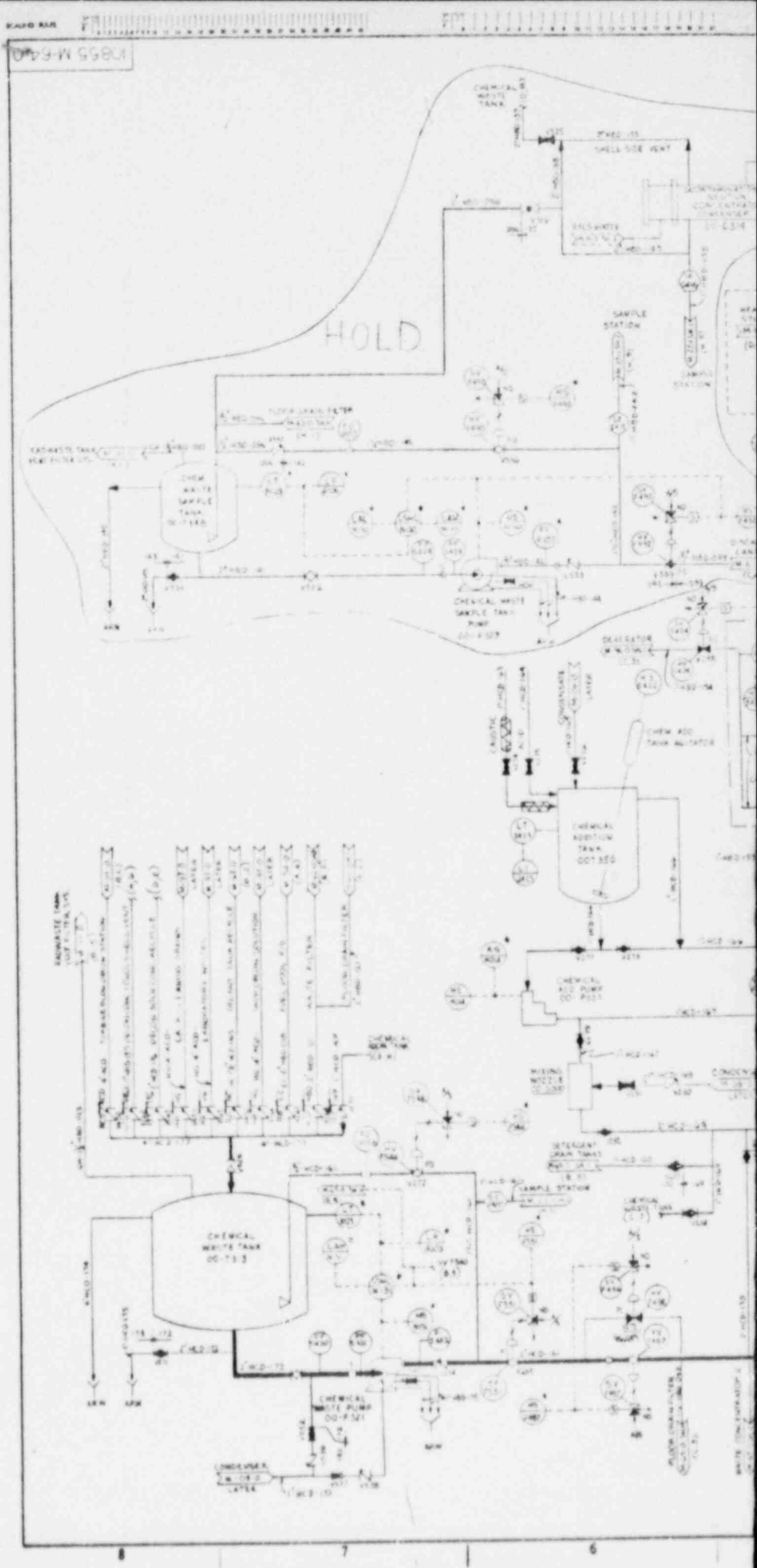
P&ID # M-63-0 (sh 2 of 2)
LIQUID RADWASTE FLOOR
DRAIN PROCESSING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SAMPLE STATION
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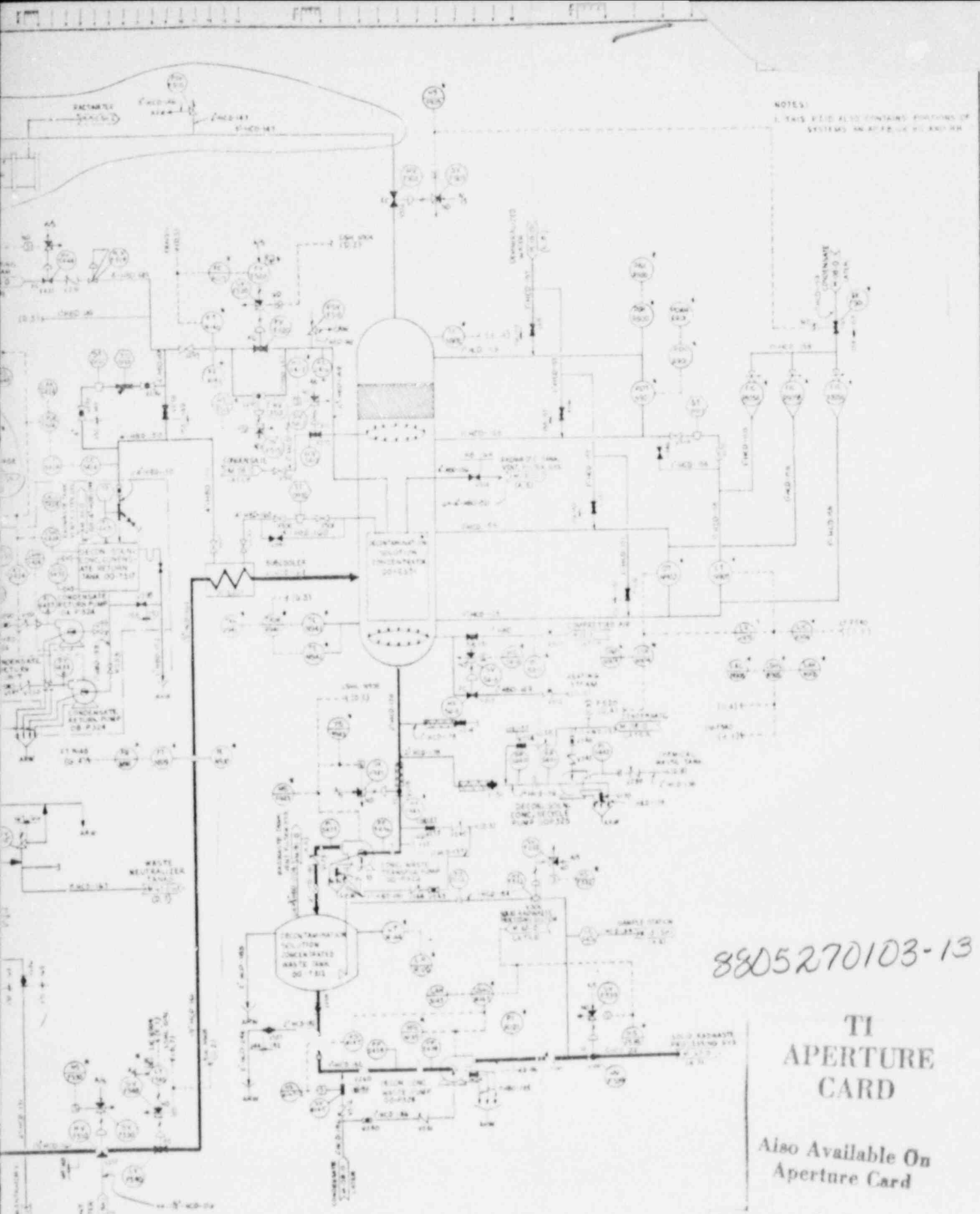

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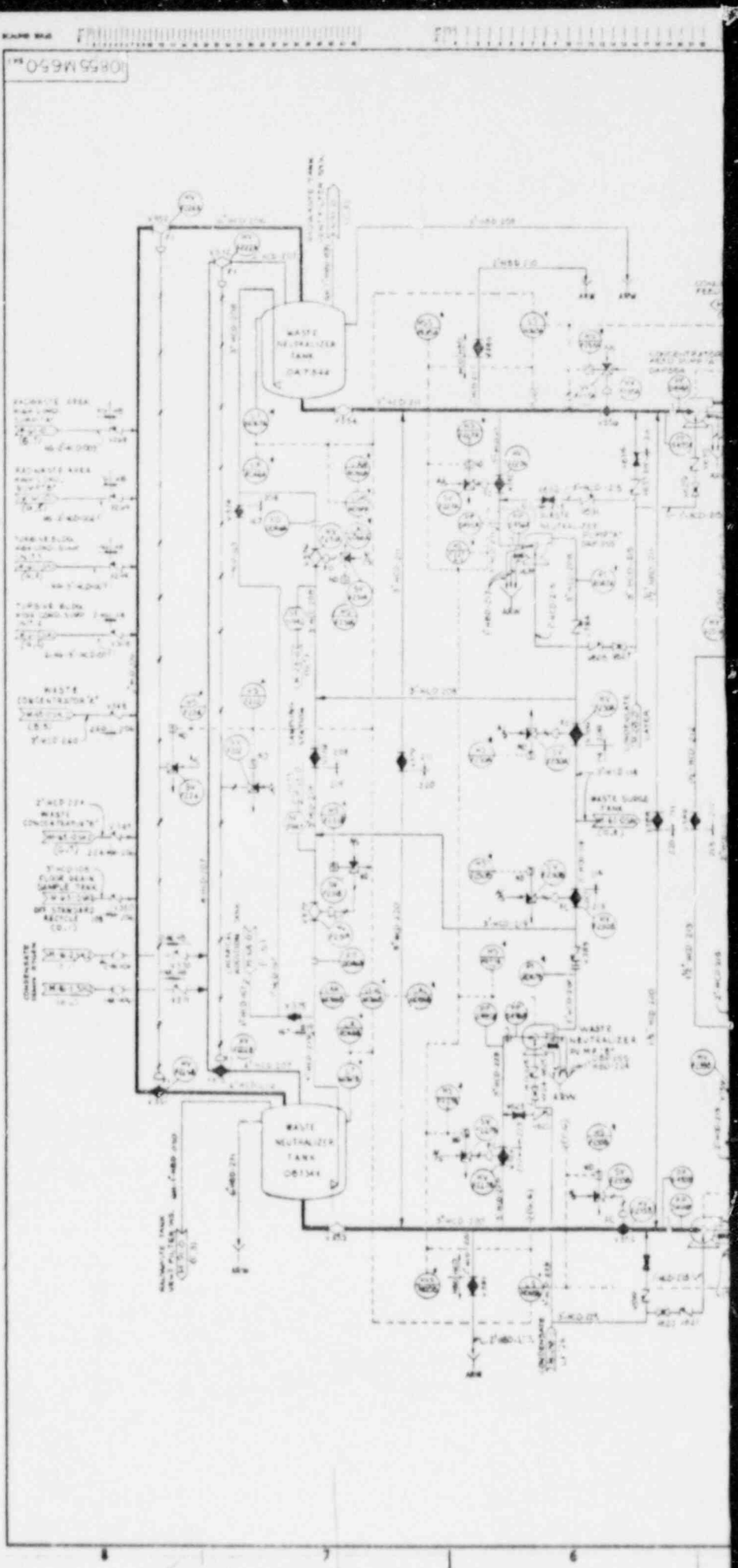
P&ID # M-64-0
LIQUID RADWASTE CHEMICAL
WASTE PROCESSING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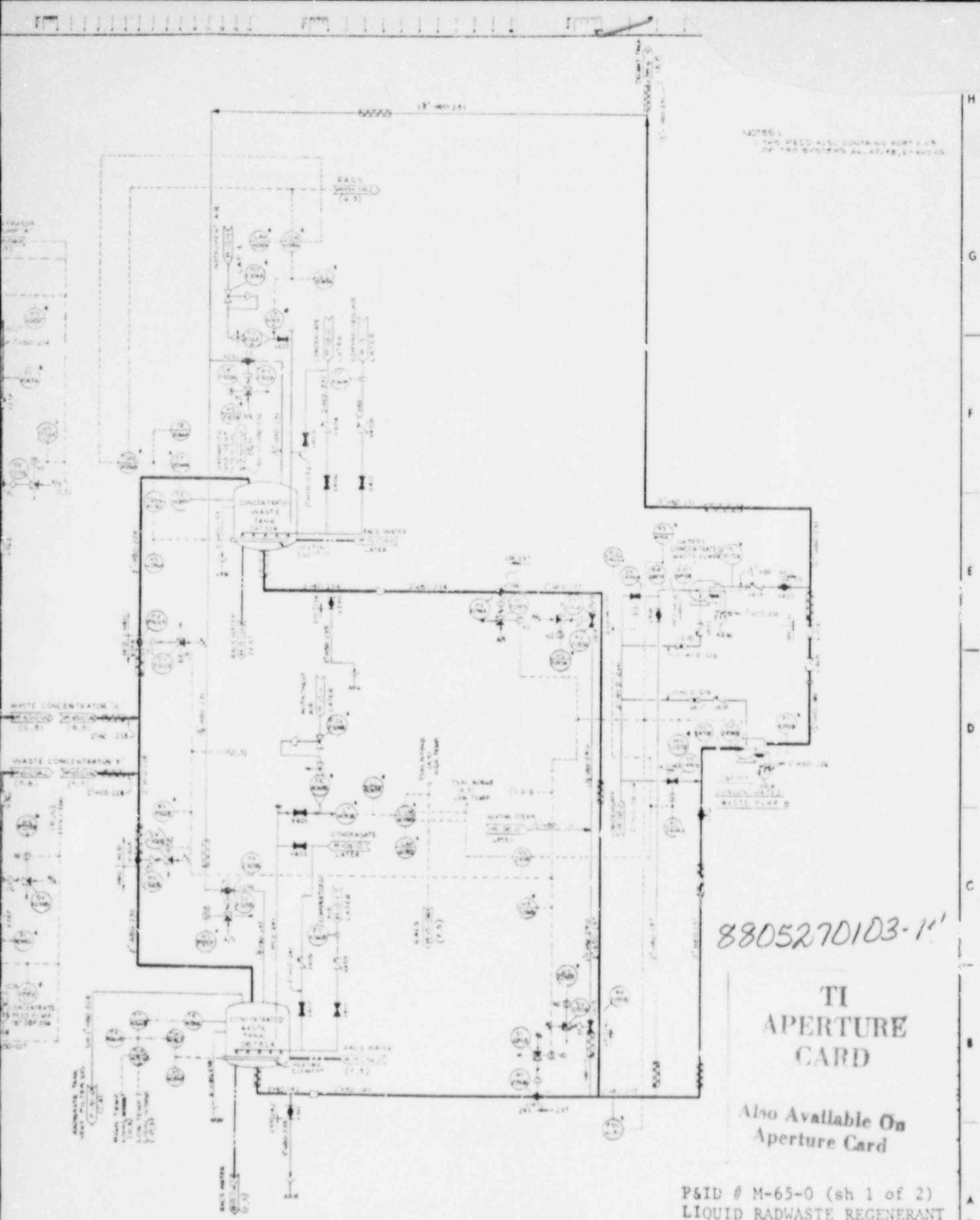

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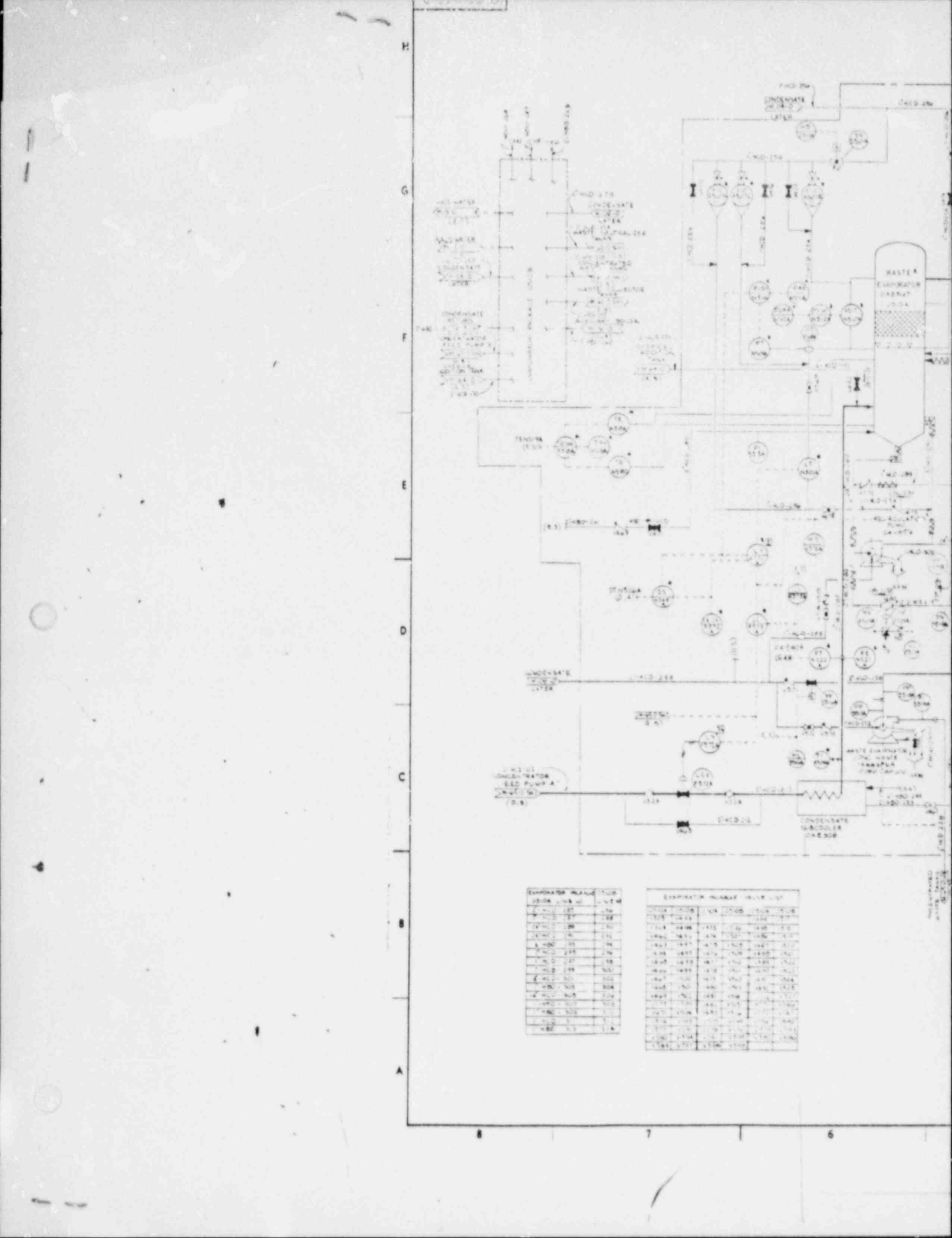
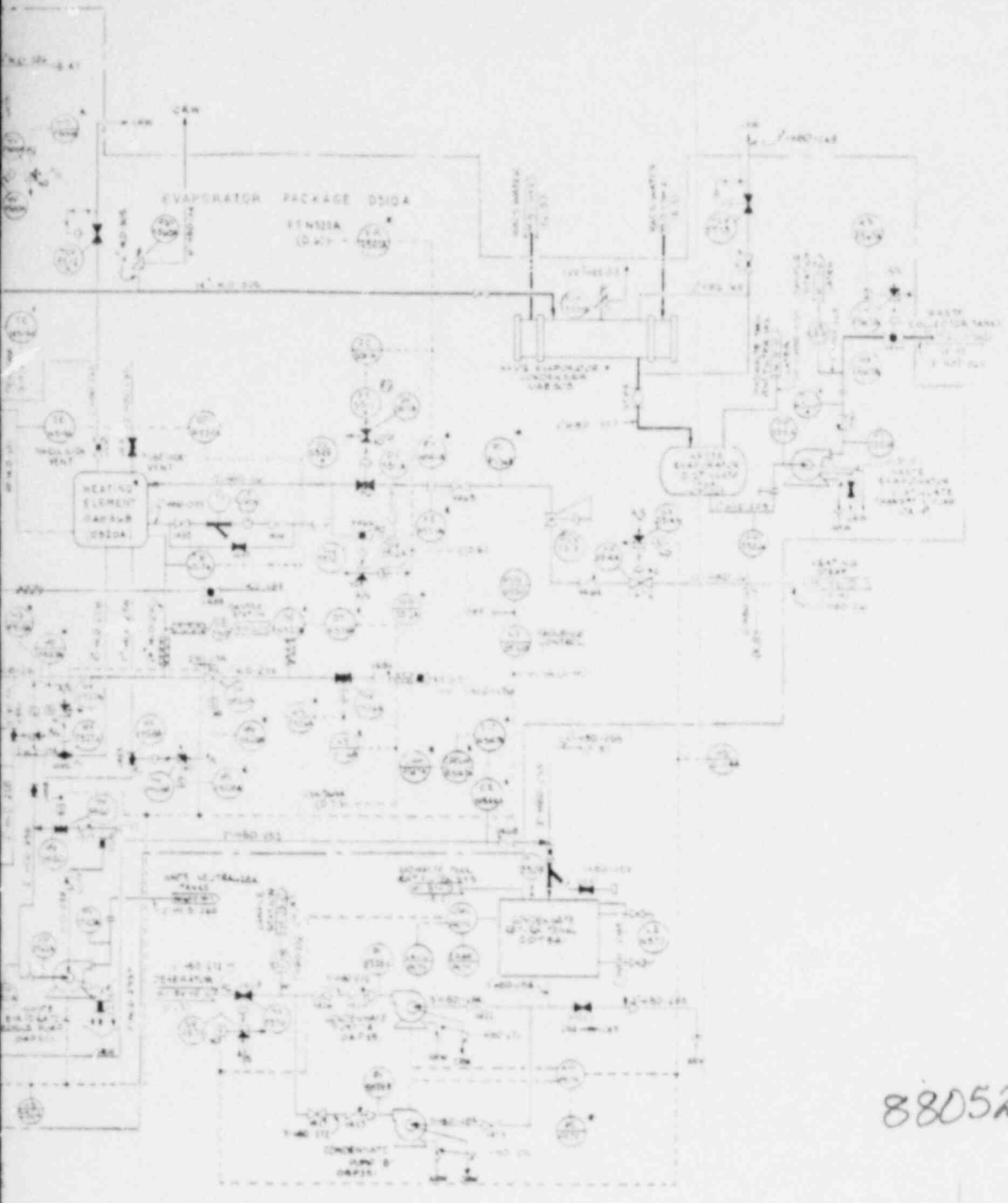
P&ID # M-65-0 (sh 1 of 2)
LIQUID RADWASTE REGENERANT
WASTE PROCESSING





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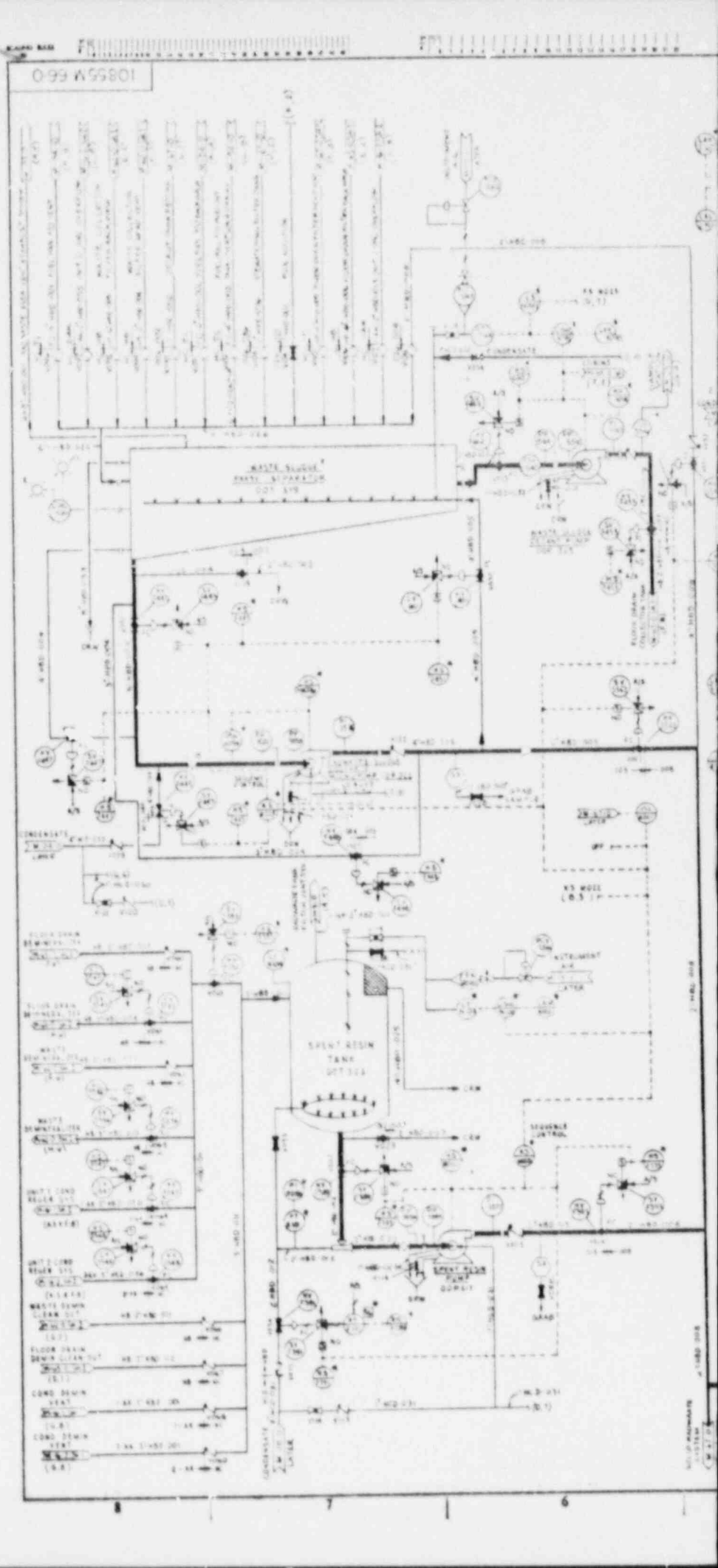
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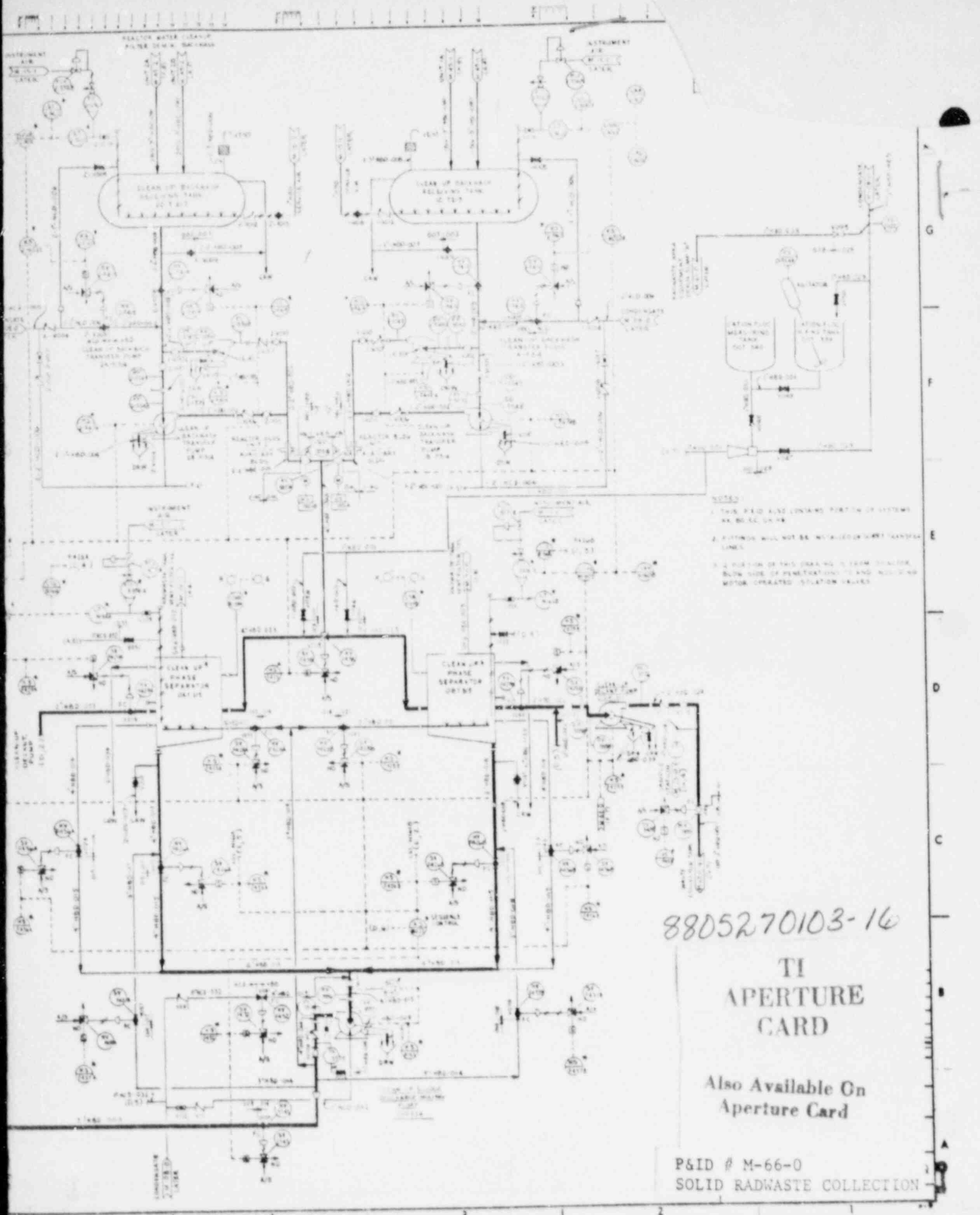

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APERTURE
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Also Available On
Aperture Card

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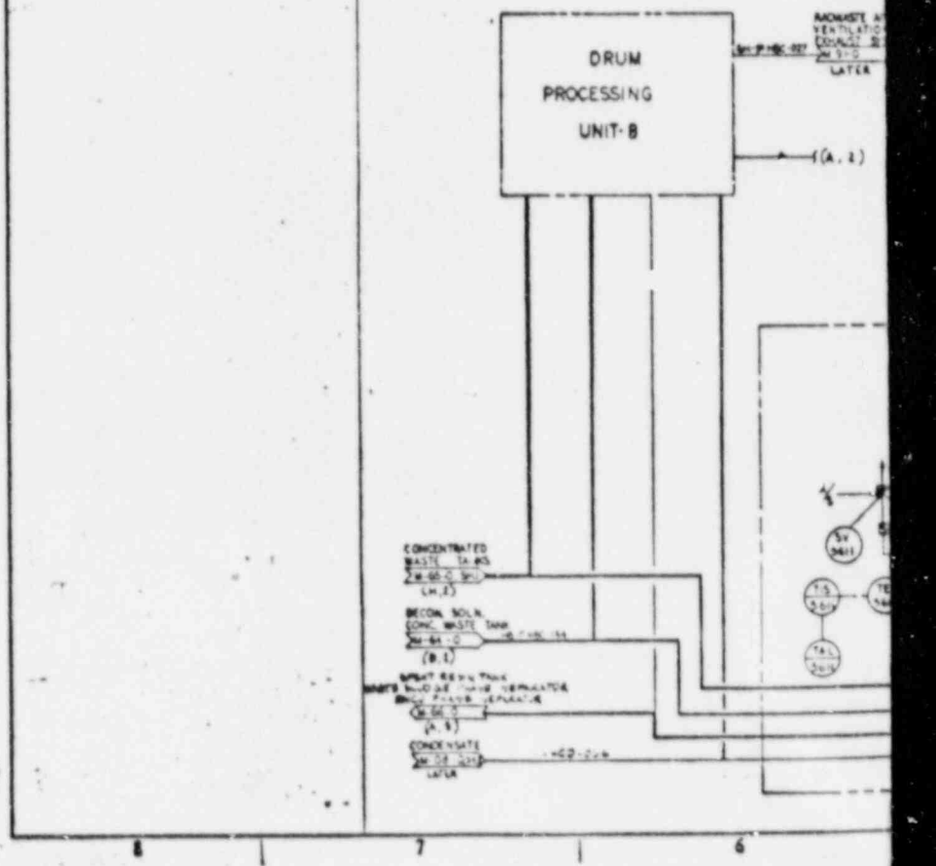
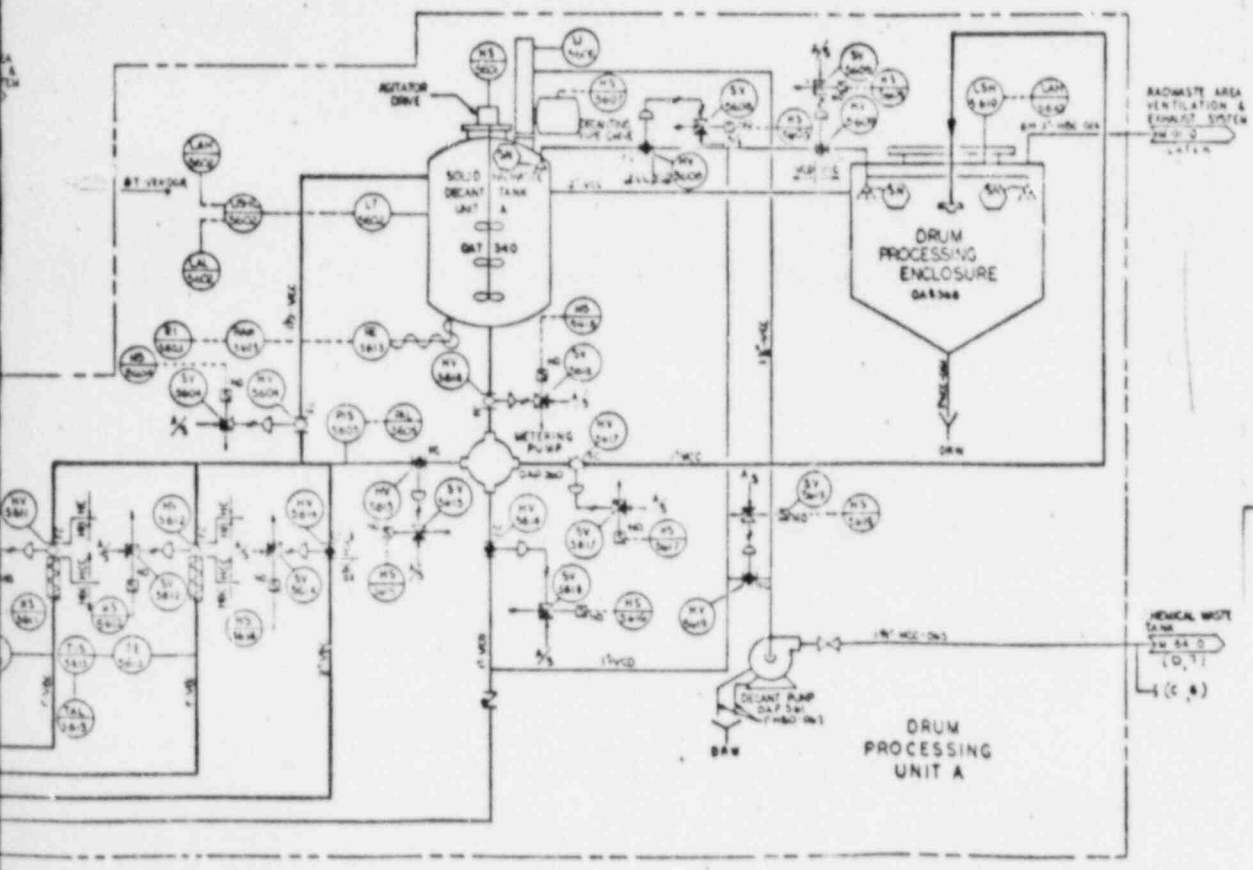

DRUM
PROCESSING
UNIT-B
LATER
(A, 2)
CONCENTRATED
(B, 1)
(A, 3)
LATER
8
7
6

NOTES:
1. THIS P&ID ALSO CONTAINS PORTIONS OF TRD SYSTEMS WB AND GM.

M-67-0

SOLID RADWASTE
PROCESSING



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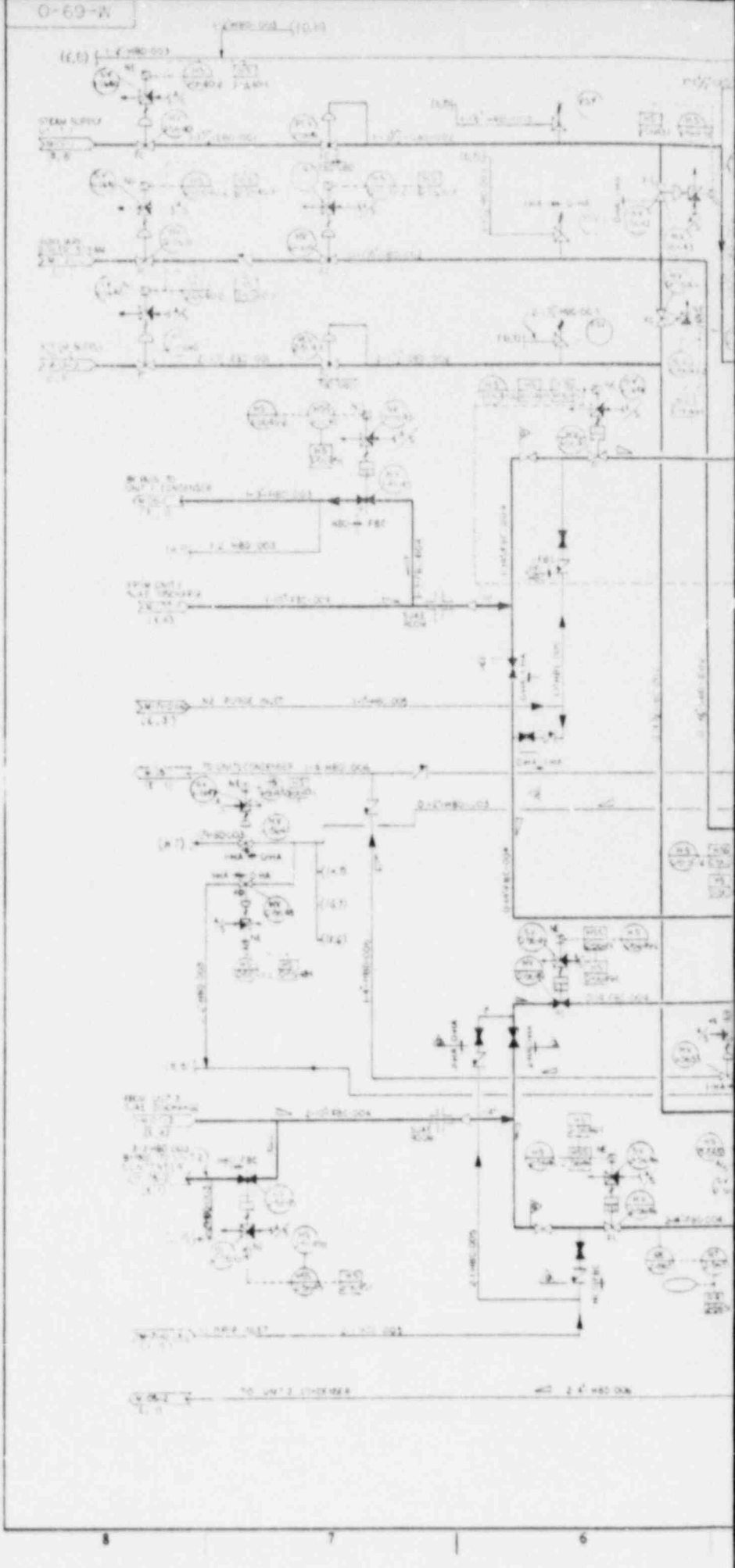
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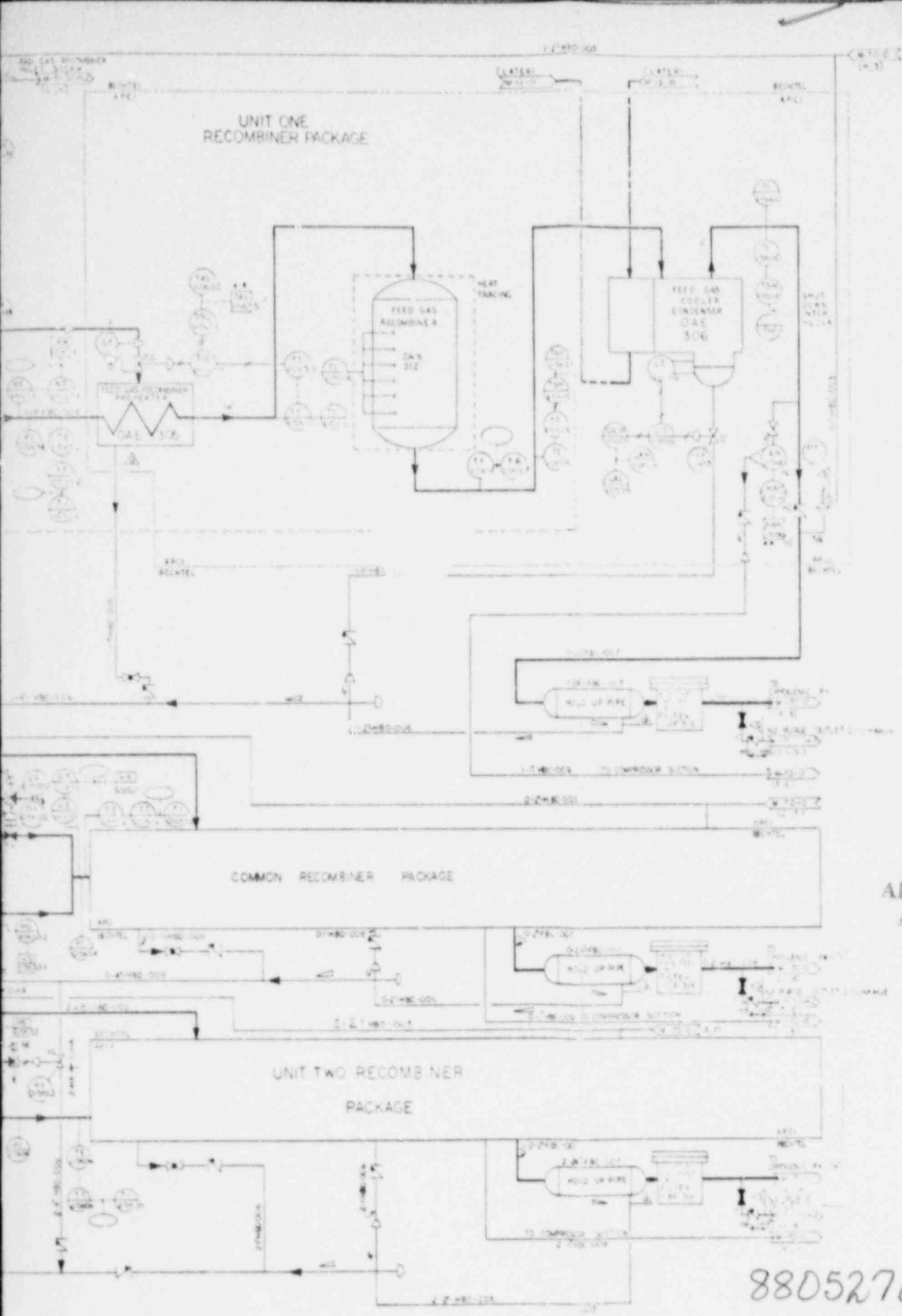

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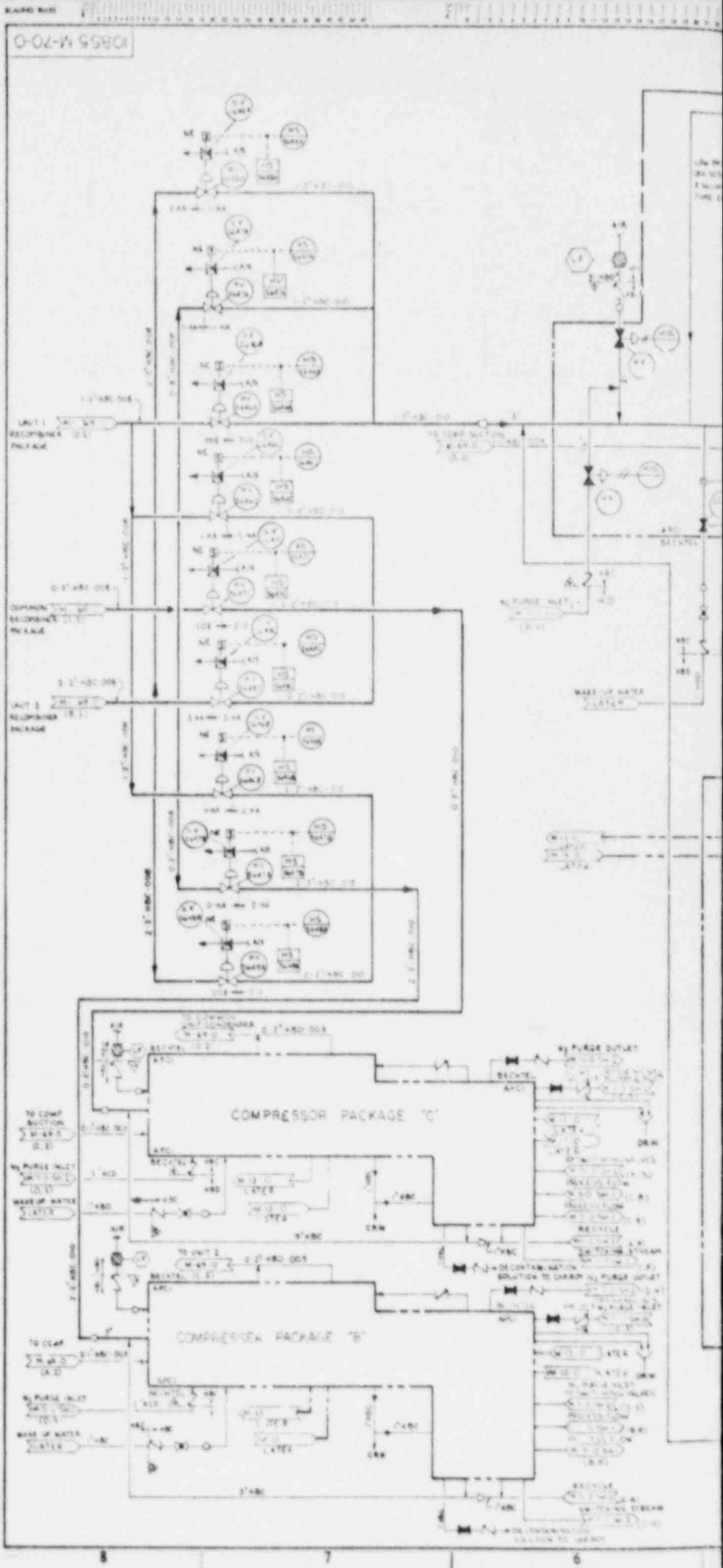
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COMPRESSOR PACKAGE "B"
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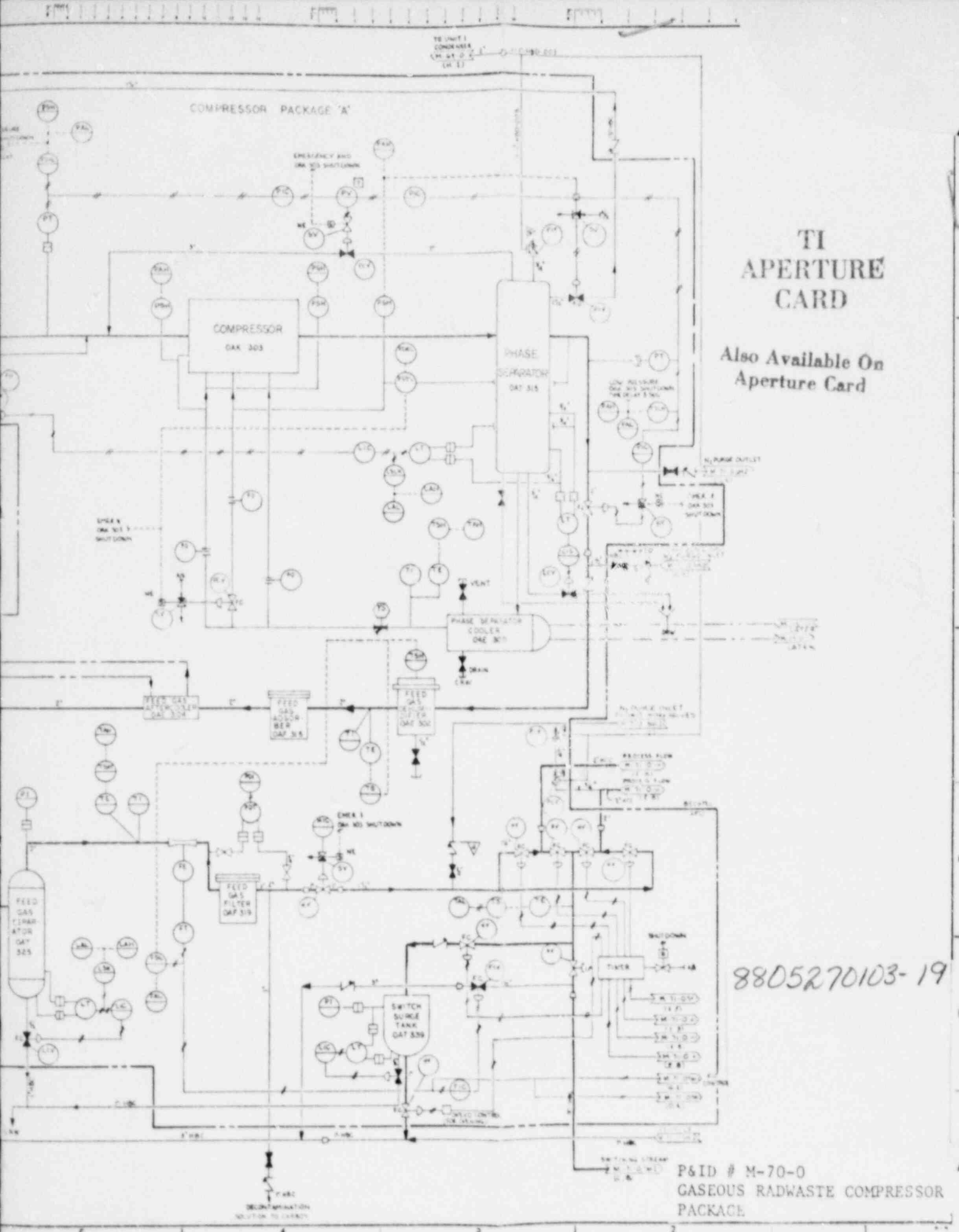

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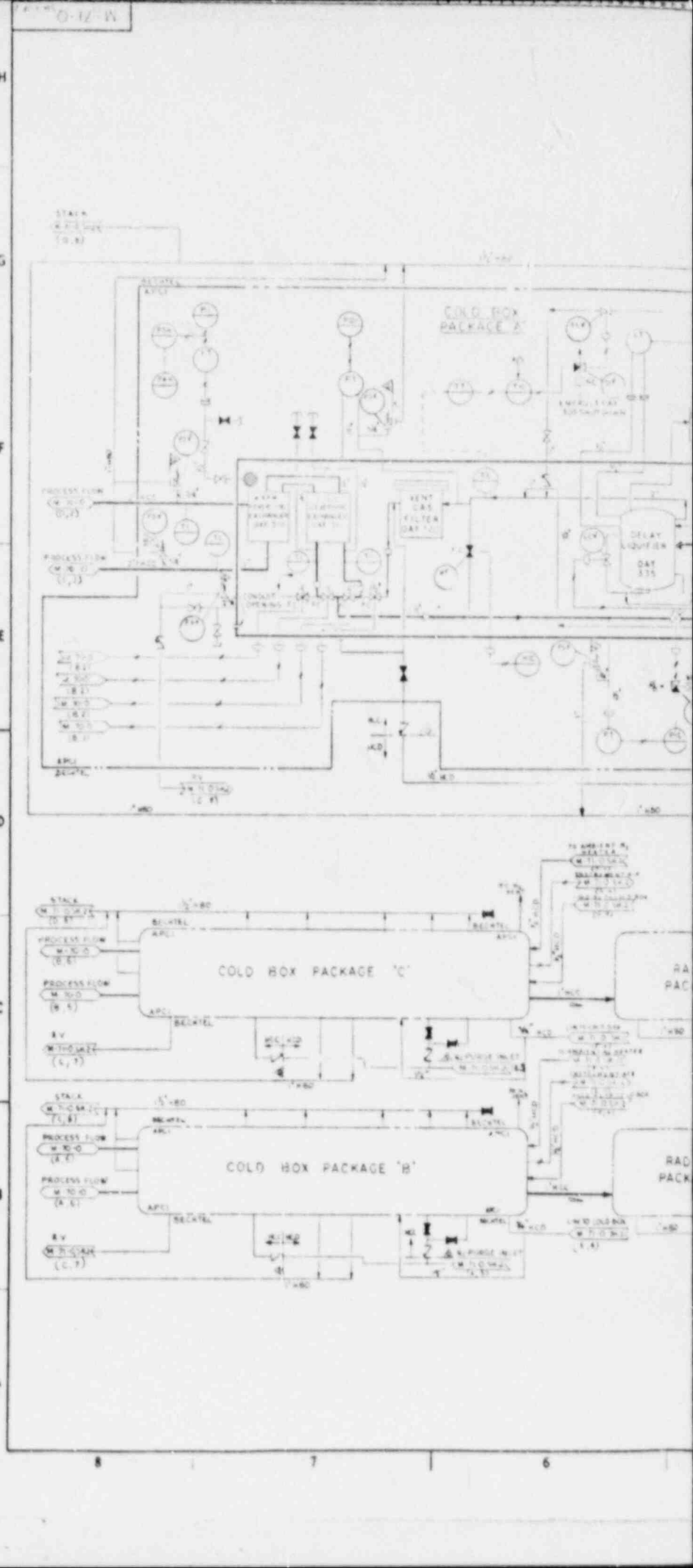
GASEOUS RADWASTE COMPRESSOR
PACKAGE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COLD BOX PACKAGE 'C'
COLD BOX PACKAGE 'B'
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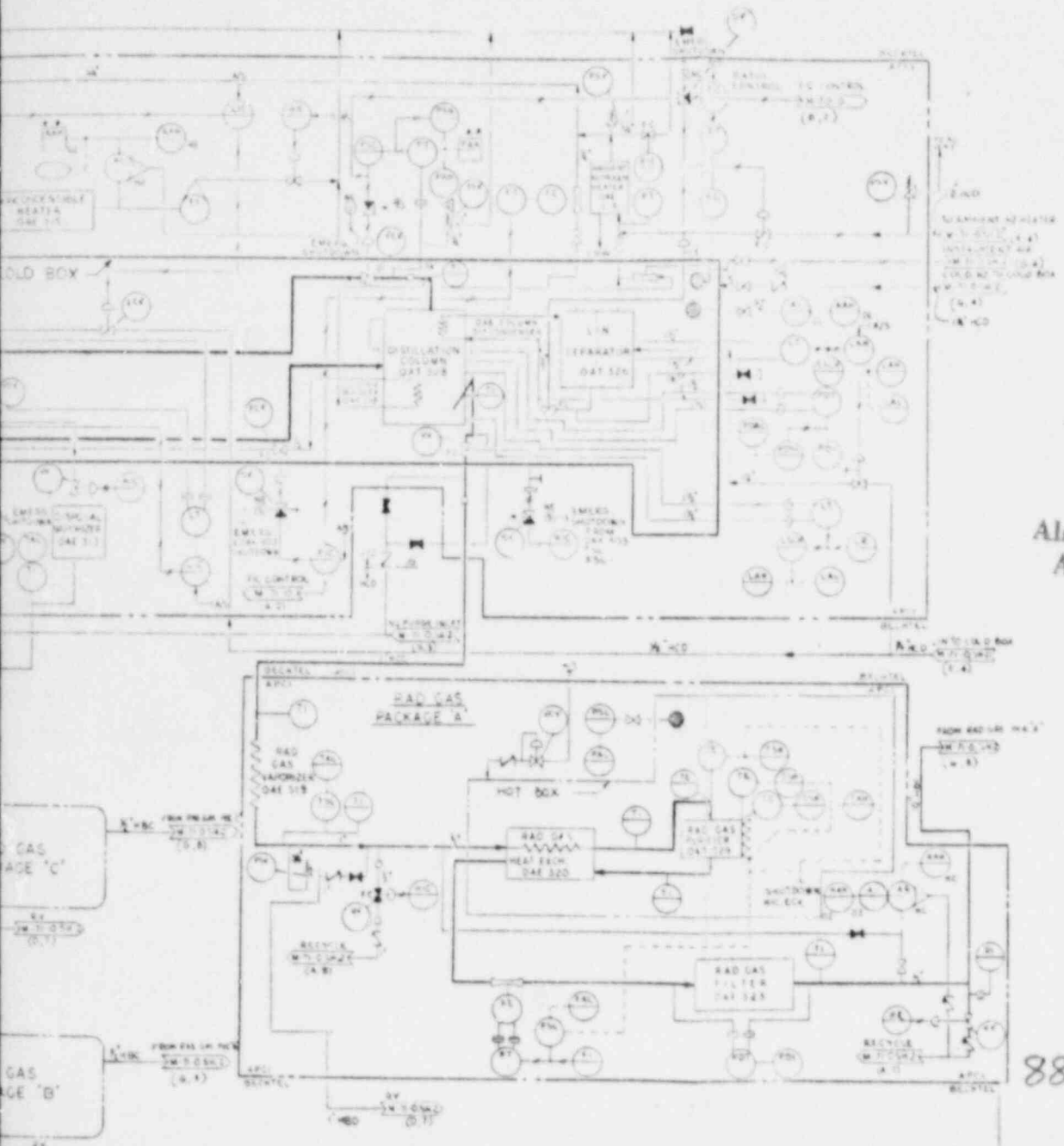

8805270103-20

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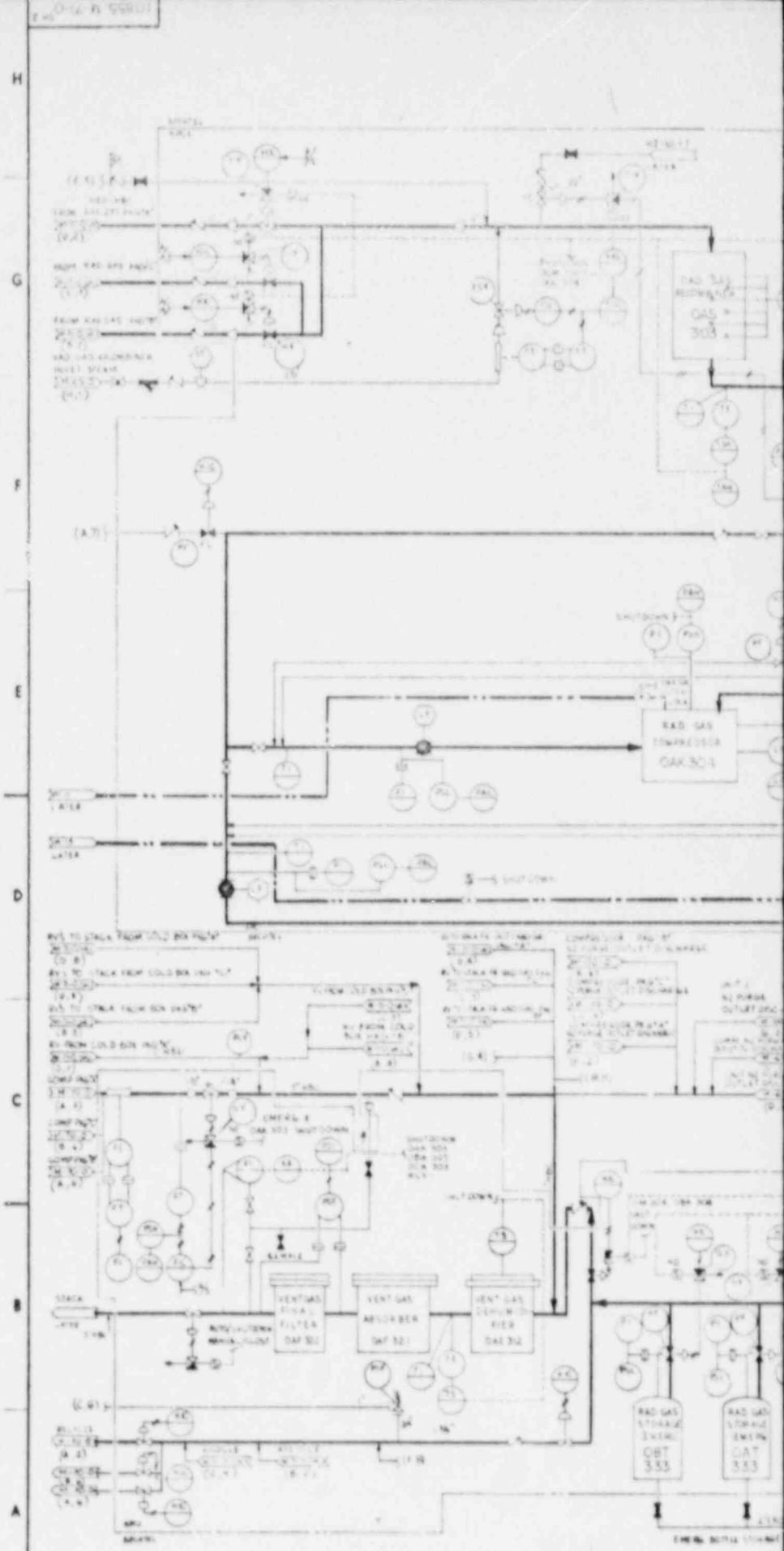
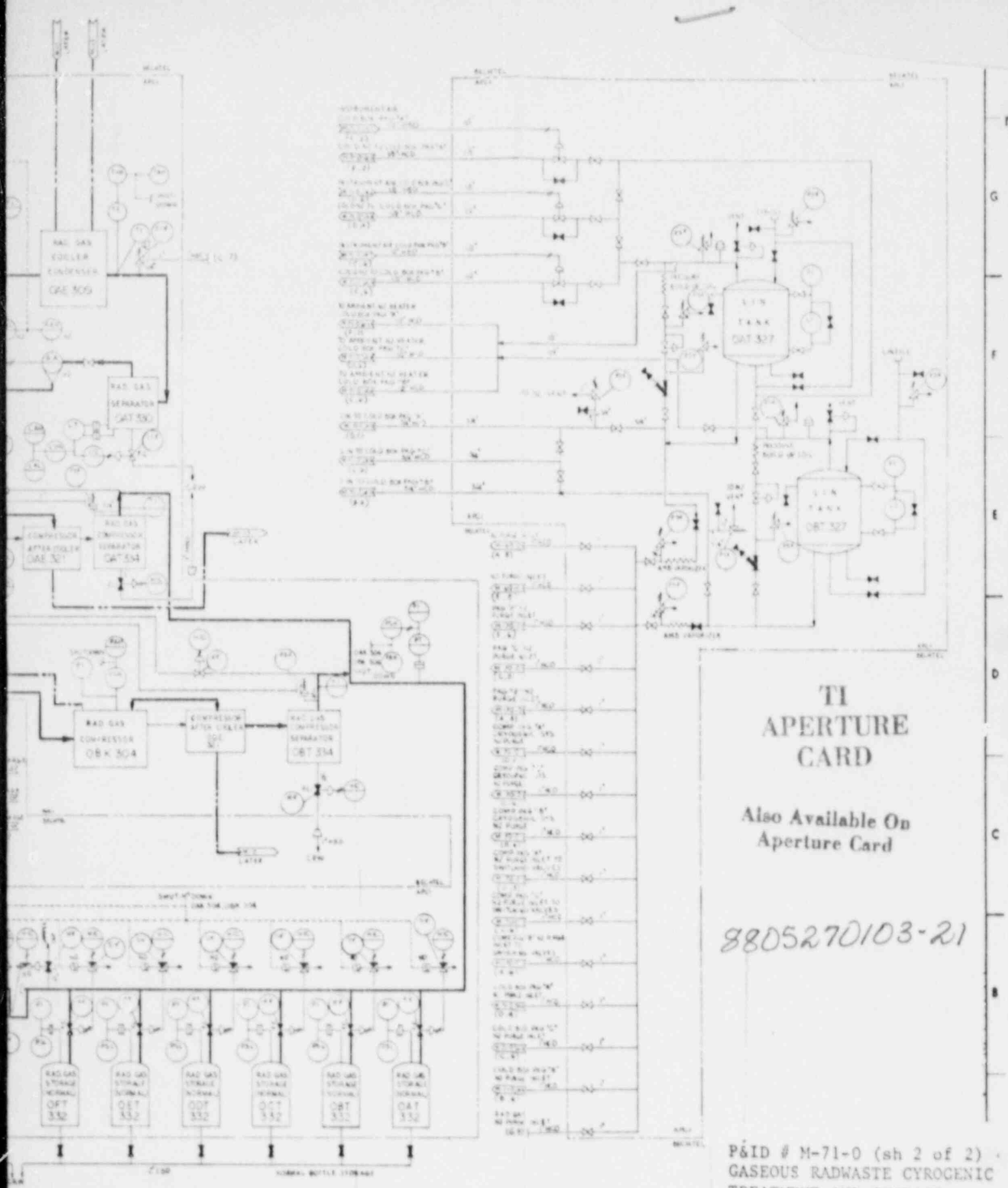
GASEOUS RADWASTE CYROGENIC
TREATMENT AND STORAGE


RAD GAS COMPRESSOR GAK 301
VENT GAS FINAL FILTER GAT 321
VENT GAS ABSORBER GAT 322
VENT GAS CATALYTIC RIER GAK 312
RAD GAS STORAGE GAT 333
RAD GAS STORAGE GAT 333



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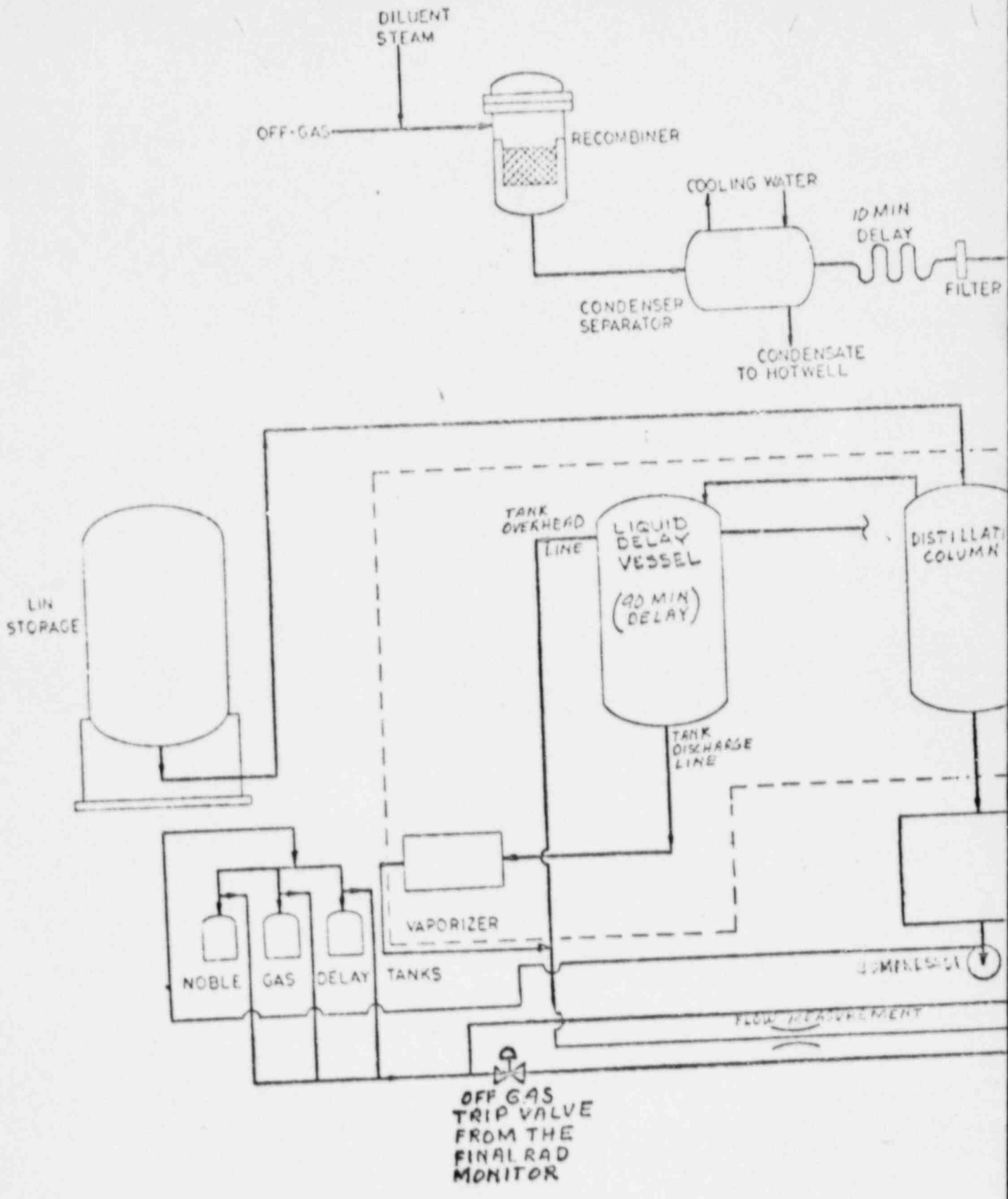
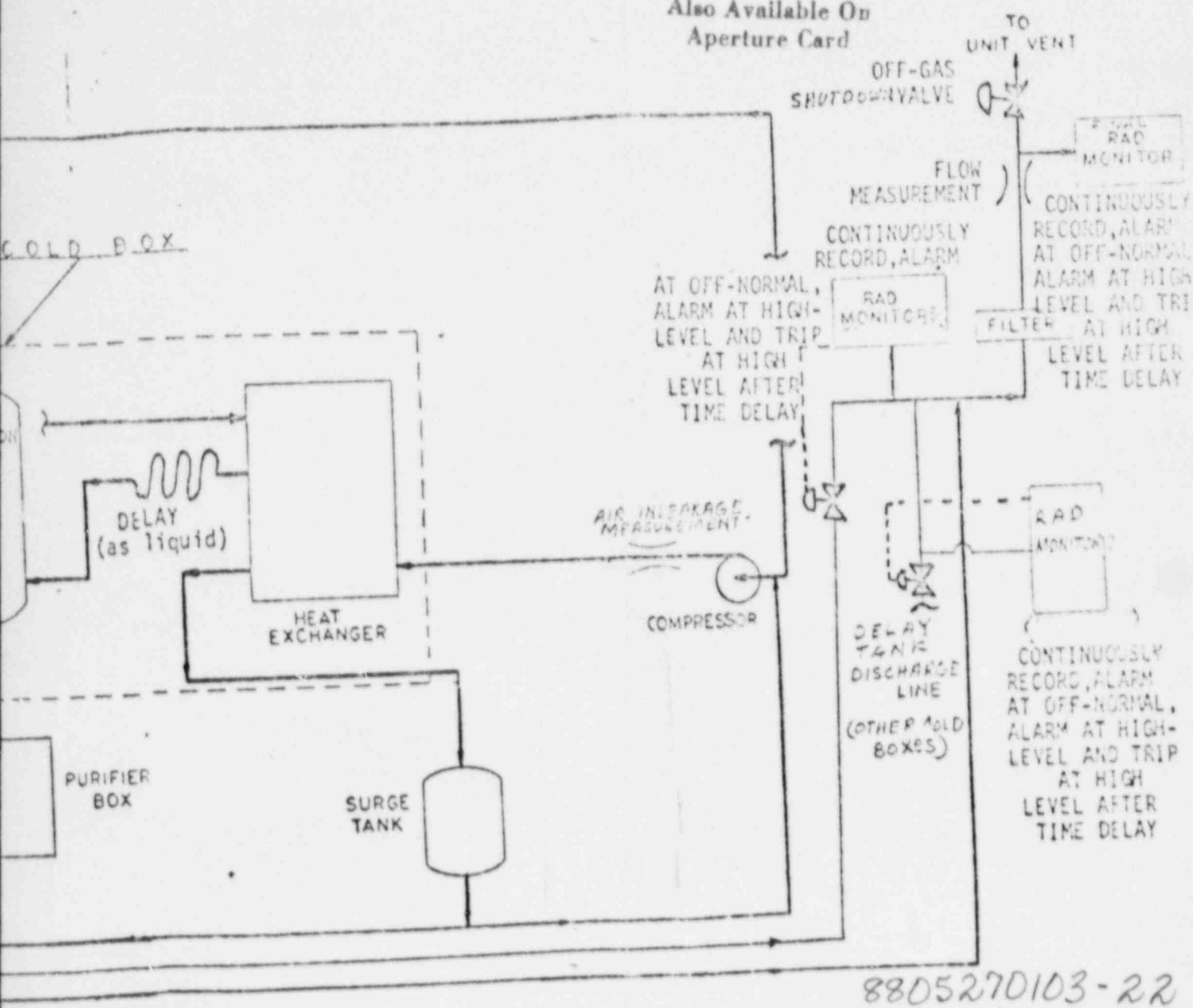
8805270103-21

P&ID # M-71-0 (sh 2 of 2)
GASEOUS RADWASTE CYROGENIC
TREATMENT AND STORAGE


DILUENT STEAM
OFF-GAS
RECOMBINER
COOLING WATER
10 MIN DELAY
FILTER
CONDENSER SEPARATOR
CONDENSATE TO HOTWELL
LIN STORAGE
TANK OVERHEAD LINE
LIQUID DELAY VESSEL
(90 MIN DELAY)
DISTILLATI COLUMN
TANK DISCHARGE LINE
VAPORIZER
NOBLE
GAS
DELAY
TANKS
FLOW MEASUREMENT
OFF GAS TRIP VALVE FROM THE FINAL RAD MONITOR



8805270103-22

Simplified Process Diagram
Gaseous Radwaste

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APPENDIX B

METEOROLOGY

HOPE CREEK - APPENDIX I

APPENDIX B

METEOROLOGY

Request B-1

Provide the following information from the onsite meteorological program:

a. Monthly and annual wind speed and direction data, in joint frequency form, at all heights of measurement representative of wind characteristics for points of effluent release to, and transport within, the atmosphere.

b. Monthly and annual joint frequencies of wind direction and speed by atmospheric stability class at heights and intervals relevant to atmospheric transport of effluents.

c. Total precipitation by month, number of hours with precipitation, rainfall rate distributions and monthly precipitation wind roses.

Note: The information based on onsite meteorological measurements, should include at least one annual cycle of data collection from the onsite program. The information should be fully documented and substantiated as to the validity of its representation of expected long-term conditions at and near the site.

Response B-1

a. Monthly and Annual Joint Frequencies of Wind Speed and Direction

Monthly and annual joint frequency distributions of wind speed and direction for the 30 and 300-foot levels for the period June, 1969 to May, 1971, are provided in Attachment 1.

In all cases calms have been distributed among the various wind sectors in the 0-3 mph category. The first calm hour within the period is placed in the first sector, the second calm hour in the second sector, and so on until all of the calm hours have been distributed. This results in essentially a uniform distribution of calm hours.

b. Monthly and Annual Joint Frequencies of Wind Speed and Direction by Atmospheric Stability

Attachment 1 also provides joint frequencies of wind speed and direction by stability for the 30 and 300-foot levels from June, 1969 to May, 1971. These distributions are based on the Smith-Singer stability categories and the standard NRC lapse rate categories. Again, the calms have been distributed in the manner described above.

c. Precipitation Data

Monthly precipitation data for the period June, 1969 to May, 1971, are provided in Attachment 2. These data include total precipitation, number of hours with precipitation, rainfall rate distributions, and precipitation wind roses.

Provide the following information, concerning regional meteorological conditions characterizing atmospheric transport processes within 50 miles of the plant, for as many relevant stations as practicable or necessary to define these transport processes within the region:

a. Wind speed and direction data at all height(s) at which wind characteristic data are applicable or have been measured;

b. Atmospheric stability data as defined by vertical temperature gradient or other well-documented parameters that have been substantiated by diffusion test data;

c. Monthly mixing height data; and

d. Total precipitation by month, number of hours with precipitation, rainfall rate distributions, and monthly precipitation wind roses.

e. Describe airflow trajectory regimes of importance in transporting effluents to a distance of 50 miles from the plant, including airflow reversals.

Note: The regional meteorological information provided should be based on at least a one-year period of record and should be concurrent for each station with the period of onsite data collection. Both onsite and regional meteorological data should be presented for each hour, and if possible also be available on magnetic tapes to expedite the staff reivew. Sources of meteorological information, in addition to the onsite program, could include available National Weather Service (NWS) stations and other well-maintained and well-exposed (e.g. other nuclear plants, university, private meteorological programs) meteorological facilities.

Response B-2

a. A comparison of wind roses was made for four locations: Artificial Island (6/69-5/71); Wilmington, Delaware; Philadelphia, Pennsylvania; and Baltimore, Maryland (1969-1973), Figures 1-3.

The overall comparison of directions between the site and regional meteorology stations was very good. Wilmington and Artificial Island are separated by approximately 15 miles. Differences in frequency for all sectors for both Artificial Island and Wilmington average 2.2%.

One possible explanation for the small directional differences between the site and other stations is wind shear due to differences in instrument elevation. The height of the instrument at Artificial Island is 91.4m while the instrument heights at the other locations average 17.5m with the instrument at Wilmington being the highest at 23.8m. The largest difference between Artificial Island and Wilmington is in the south and southeastern sectors.

Another possible reason for the directional differences is that the wind directions at Wilmington, Philadelphia, and Baltimore are one minute averages taken hourly; while at Artificial Island the wind direction is an average of the entire hour. At this open flat site the difference in computing average wind directions may account for more of the wind direction variance between stations than anything else.

b. The atmospheric stability distributions as defined by the Star Program for Philadelphia 1967-1971, and Baltimore 1969-1973 are given in Figure 4.

c. Seasonal and annual mixing height data for the Eastern United States and mixing height data for Washington, D. C. are given in Figures 5-10. These data were abstracted from Holzworth[1].

d. Total precipitation by month, number of hours with precipitation and rainfall rate distributions, were extracted from the Climatological Summary for Philadelphia 1951-1960 shown in Figures 11-23.

e. The terrain surrounding Artificial Island is open and extremely flat and the land-sea interaction favors a vigorous wind flow. Examination of the topography shows no terrain which would cause channeling of the winds or unusual flow trajectories. As evidenced by comparing wind roses between the site and nearby National Weather Service Stations, Figures 1-3, the distribution of wind direction is similar throughout the region. This question of the representativeness of the local wind data is important and it appears that the winds at this site are representative of the region.

Request B-4

Provide the following information concerning meteorological data:

a. The identity of the sources of meteorological data used in the atmospheric transport models to assess the dispersion of gaseous effluents from the plant to a distance of 50 miles, and a description of the locations and elevations of all observations and the frequency and duration of the measurements made at each station.

b. A description of the onsite pre-operational and operational meteorological programs including the instruments, performance specifications, calibration and maintenance procedures, data output and recording systems and locations, and data analysis procedures.

c. A detailed description of any model(s) to derive estimates of basic meteorological parameters, such as atmospheric stability, and information concerning the validity and accuracy of the model(s).

Response B-4

a. Onsite Meteorological Measurements

The primary source of meteorological data for the Artificial Island Site was a 300-foot instrumented tower located north of Salem Unit 2. The measured parameters were wind speed and direction, ambient temperature, barometric pressure, relative humidity, and precipitation. The data used in this study cover a period from June, 1969 to May, 1971.

b. Onsite Meteorological Programs

1. Instrumentation

Figure 24 is a plan view of the 300-foot meteorological tower which was located at the Artificial Island Site. Bendix-Friez Model 120 Aerovanes were used to measure wind speed and direction at 30 foot, 150 foot, and 300-foot levels. The data were recorded on Bendix-Friez Model 141 strip chart recorders. Ambient temperatures were measured at 30 foot, 85 foot, 150 foot, and 300 foot using Rosemount Model 1-109MB resistance thermometers. These resistance thermometers were housed in Beckman and Whitley Model M327 aspirated solar radiation shields. The temperatures were recorded continuously on a Bristol Dynamaster multipoint recorder.

Barometric pressure was continuously recorded on a Belfort drum type microbaragraph. Relative humidity was measured by a Casella hygrothermograph and precipitation was measured using a Belfort weighing rain gauge. All instrument performance specifications are provided in Figure 25.

2. Calibration and Maintenance

Data first became available from the 300-foot tower in June of 1969. The meteorological station was inspected at

least once a week by qualified instrument technicians. The charts were removed and records made of any unusual behavior of the instrument. Periodic calibration of all equipment was performed following the manufacturer's suggested maintenance and calibration procedures.

3. Data Analysis

Hourly averages were extracted from the analog strip charts, recorded on data sheets and transferred to punch cards by the Maplewood Laboratory of Public Service Electric and Gas Company. The punched cards and original strip charts were then forwarded to Smith-Singer Meteorologists, Inc. for further checking and analysis. Monthly computer summaries were generated, the data verified, and copied on magnetic tape.

c. Atmospheric Stability Estimates

The system used to determine atmospheric stability at the Artificial Island Site is based on wind gustiness. This system was developed by Smith and Singer at the Brookhaven National Laboratory and is described in detail in a paper entitled, "Relation of Gustiness to Other Meteorological Parameters"[2].

Between 1964 and the present many attempts have been made to develop new stability criteria for evaluating nuclear plants. The most widely used is that developed by Pasquill[3]. The AEC equated Pasquill's stability categories with certain lapse rate groups in Safety Guide 1.23 and this ΔT system is also specified in Safety Guide 1.111.

Smith-Singer has been convinced for some time that the NRC system produces an unrealistically large number of neutral and stable hours occasionally. Figure 26 is a comparison of the groupings produced by the NRC system with those of Smith-Singer.

The wide disparity among the unstable, neutral, and stable hours is very evident. While it is certainly not claimed that the Smith-Singer system is the best method, the differences are too important to ignore.

Our concern about the validity of the NRC stability classifications is based on several different concepts and data sets. First of all, the original Brookhaven National Laboratory studies[2] equated both ΔT and wind gustiness with field diffusion experiments. Here the frequency of the three main stability groups was approximately what one would expect in terms of the corresponding frequencies of sunshine, cloudiness, night and day hours, namely unstable 60%, neutral 5%, and stable 35%.

Secondly, the Brookhaven classification system has been used in many studies of fossil plants with considerable success for the prediction of ground-level concentrations. The most evidence of its value appears in two reports of the Maryland Power Plant Siting Program[4,5]. These studies demonstrated the Smith-Singer system to be superior to those of Pasquill, TVA, and Turner.

Gifford[6] in a recent article examined a wide variety of diffusion typing schemes, and he too made it evident that no system is an authoritative standard at present.

Request B-5

Provide the following information concerning concentration evaluations:

a. Estimates of relative concentrations (X/Q) and/or deposition (D/Q) at points of potential maximum concentrations outside the site boundary, at points estimated maximum individual exposure, and at points within a radial grid of sixteen 22.5 degree sectors (centered on true north, etc.) and extending to a distance of 50 miles from the plant. A set of dat points should be located within each sector at increments of .25 mile to a distance of 1 mile, at increments of .5 mile from a distance of 1 to 5 miles, at increments of 2.5 miles from a distance of 5 to 10 miles, and at increments of 5 miles thereafter to a distance of 50 miles.

b. Estimates of X/Q for noble gas effluents and, if applicable, X/Q depleted by deposition and D/Q for iodine effluents at each of these grid points, as well as averages of these X/Q and/or D/Q values between all adjacent grid points along the radials.

c. A detailed description of the model(s) and the model assumption(s) used to determine the air concentrations and/or deposition, and information concerning the validity and accuracy of the model(s) and assumptions, and the identity of the meteorological data used.

Response B-5

a. X/Q Values

X/Q values for the reactor vent for the annual case are given in Figures 27-30.

b. D/Q Values

D/Q values for the reactor vent for the annual case are given in Figures 31-34.

c. X/Q and D/Q Computations

The diffusion and deposition calculations were based on meteorological data collected from June, 1969 to May, 1971. The following formulas and assumptions were used in deriving the X/Q and D/Q estimates.

1. Plume Rise

Radioactivity will be released from two vent stacks located between the reactor and turbine buildings. The vent stacks are 103 feet above plant grade. The top of the turbine building is 21 feet lower and the top of the reactor building is 87 feet higher than the vent stacks. With moderate to strong winds these nearby structures will cause downwash.

The best guide for evaluation of downwash from these stacks is the field data from Peach Bottom[7]. There is good agreement between Peach Bottom and Hope Creek emission speeds, diameters, and flow rates.

	Hope Creek	Peach Bottom
W_e (m/sec)	7.0	12.2
D (m)	5.3	4.5
Vol (m^3/sec)	155.0	194.0

W_e Vertical efflux velocity at release temperature meters/second

D Diameter, meters

Vol Volume of effluent, meters^3/second

u Mean wind speed at stack height, meters/second

At Peach Bottom the plume rose freely when values of W_e/u from 3.5 to 4.0 were reached. Based on this result and similar work at Millstone[8] total entrapment has been assumed for all values of W_e/u less than 5.0, a conservative assumption. Whenever entrapment occurs, the source height is assumed to be 10 meters above ground and a building correction factor (CA = 2000m^2) has been used. The wind speed as adjusted to the vent stack height was used, and is representative of the average wind speed between the ground and the top of the reactor building.

This approach is in good agreement with observed data and should be conservative. For values of W_e/u greater than or equal to 5.0 plume rise was calculated by the momentum formula in the ASME Guide[9].

$$h_e = h_s + D\left(\frac{W_e}{u}\right)^{1.4}$$

h_e Effective height of the plume, meters

h_s Actual release height, meters

D Diameter of the stack, meters

W_e Vertical efflux velocity at release temperature, meters/second

u Mean wind speed at stack height, meters/second

2. Diffusion Modeling

The Gaussian diffusion equation applicable to 22.5° sectors and corrected for building wake was used for the computations. The stability wind roses for the 300-foot level determined the weight for each stability, speed, and sector group.

The stability classification is that which has been used in previous Smith-Singer evaluations of nuclear plants. The four basic classes are comparable to the Pasquill categories, although the definition is somewhat simpler in both number and definition (Figure 35). The equations expressing the change in σ_z with distance are different for high and low sources as shown in the following table.

	Very Unstable	Unstable	Neutral	Stable
	Sources Higher Than 50 Meters			
σ_z	$.40x^{.91}$	$.33x^{.86}$	$.22x^{.78}$	$.06x^{.71}$
	Sources Lower Than 50 Meters			
σ_z	$.29x^{.91}$	$.25x^{.86}$	$.19x^{.78}$	$.08x^{.71}$

Where: σ_z Vertical standard deviation of the Gaussian plume, meters

x Distance downwind, meters

The terrain is extremely flat and the air flow patterns are simple. Therefore no adjustments have been made to account for terrain effects or air flow trajectories.

3. Wind Speed Profile

Wind speeds from the 300-foot level on the Artificial Island tower were adjusted to release heights according to the formula:

$$u_v = u_t \left(\frac{h_v}{h_t} \right)^q$$

u_v Wind speed at vent height, meters/second

u_t Wind speed at instrument height, meters/second

h_v Vent height, meters

h_t Instrument height, meters

q Ranges from 0.16 to 0.50 and is a function of stability

4. Deposition

One of the most complex problems in reactor safety evaluations is the representation of the deposition of halogens. Considerable evidence exists, however, (Barry[11], Hill[12], Pelletier[10]) to suggest that an average deposition velocity (V_g) of .01 m/sec is often found with active chemical compounds such as iodine. Therefore, reasonable estimates of D/Q should result from the single assumption of a uniform deposition velocity of .01 m/sec. The D/Q estimates are based on this value.

Correction of the X/Q for removal by deposition has been made. The formulas for this plume depletion follow those given in Chamberlain[13].

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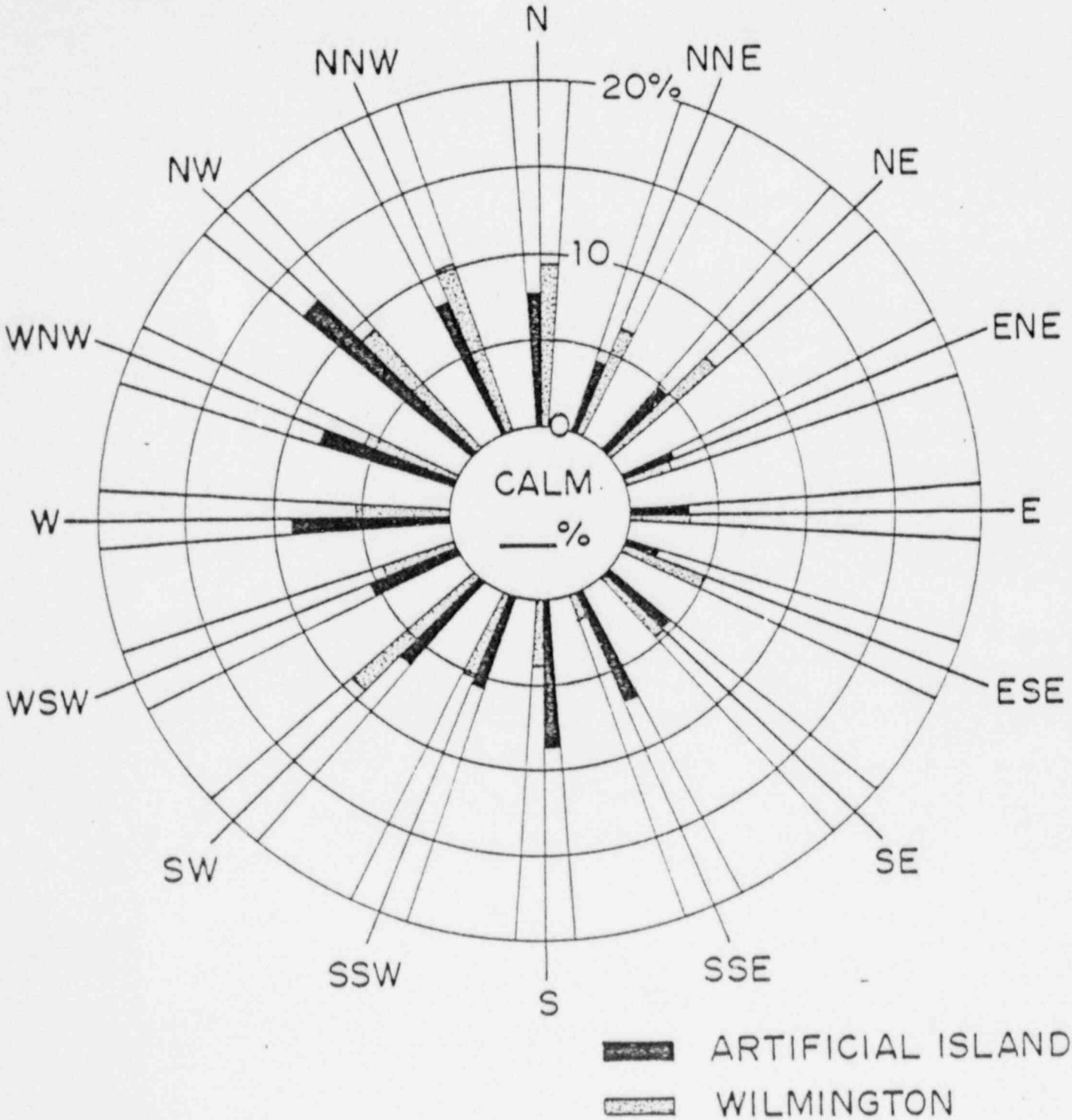
Figure 1

ARTIFICIAL ISLAND VS. WILMINGTON

6/69 – 5/71
HEIGHT 91.4M

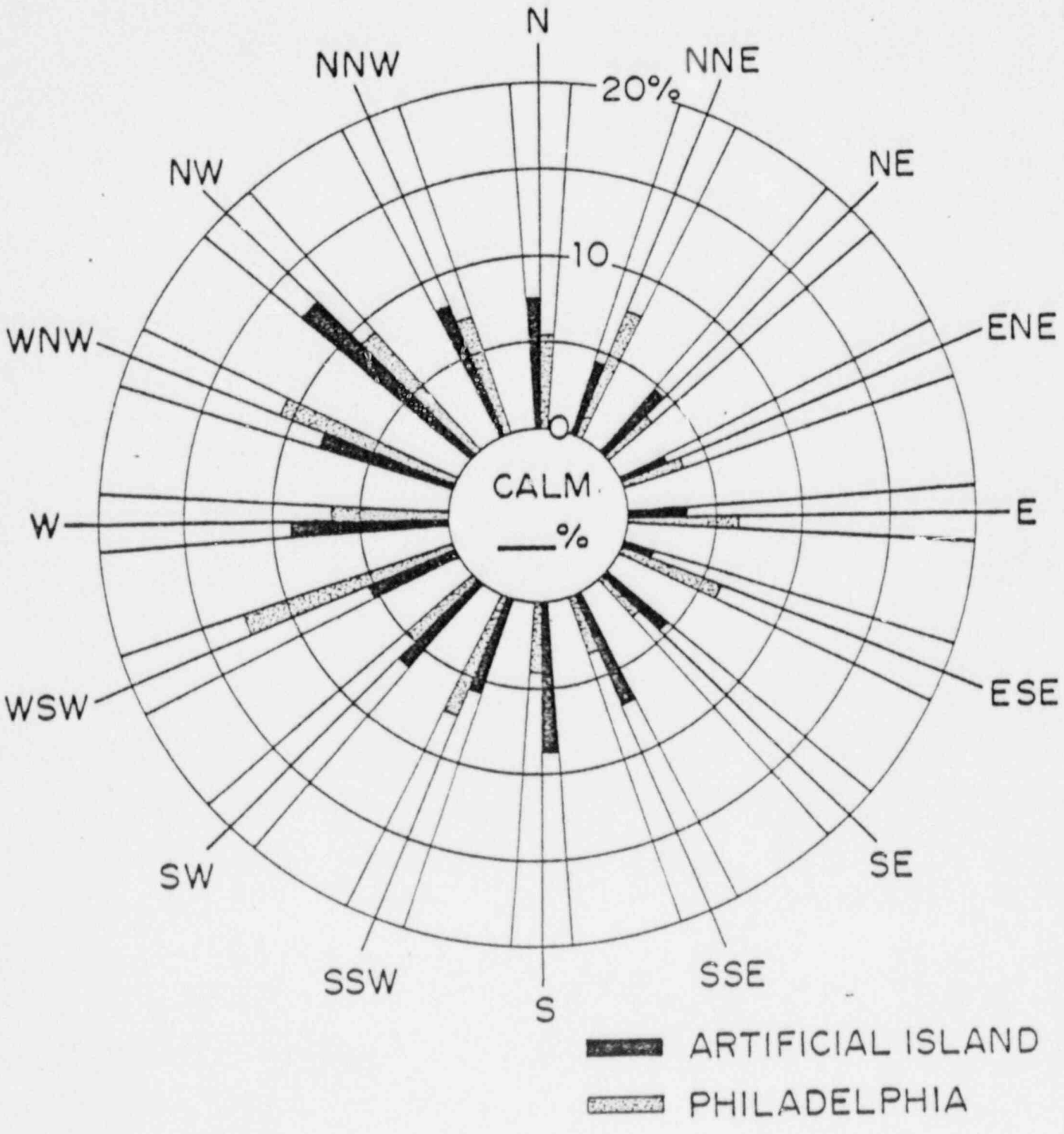
1969-1973
HEIGHT 6.1 M



ARTIFICIAL ISLAND VS. PHILADELPHIA

6/69 – 5/71
HEIGHT 91.4M

1969 – 1973
HEIGHT 6.1 M



ARTIFICIAL ISLAND VS. BALTIMORE

6/69 - 5/71
HEIGHT 91.4M

1969-1973
HEIGHT 6.1 M

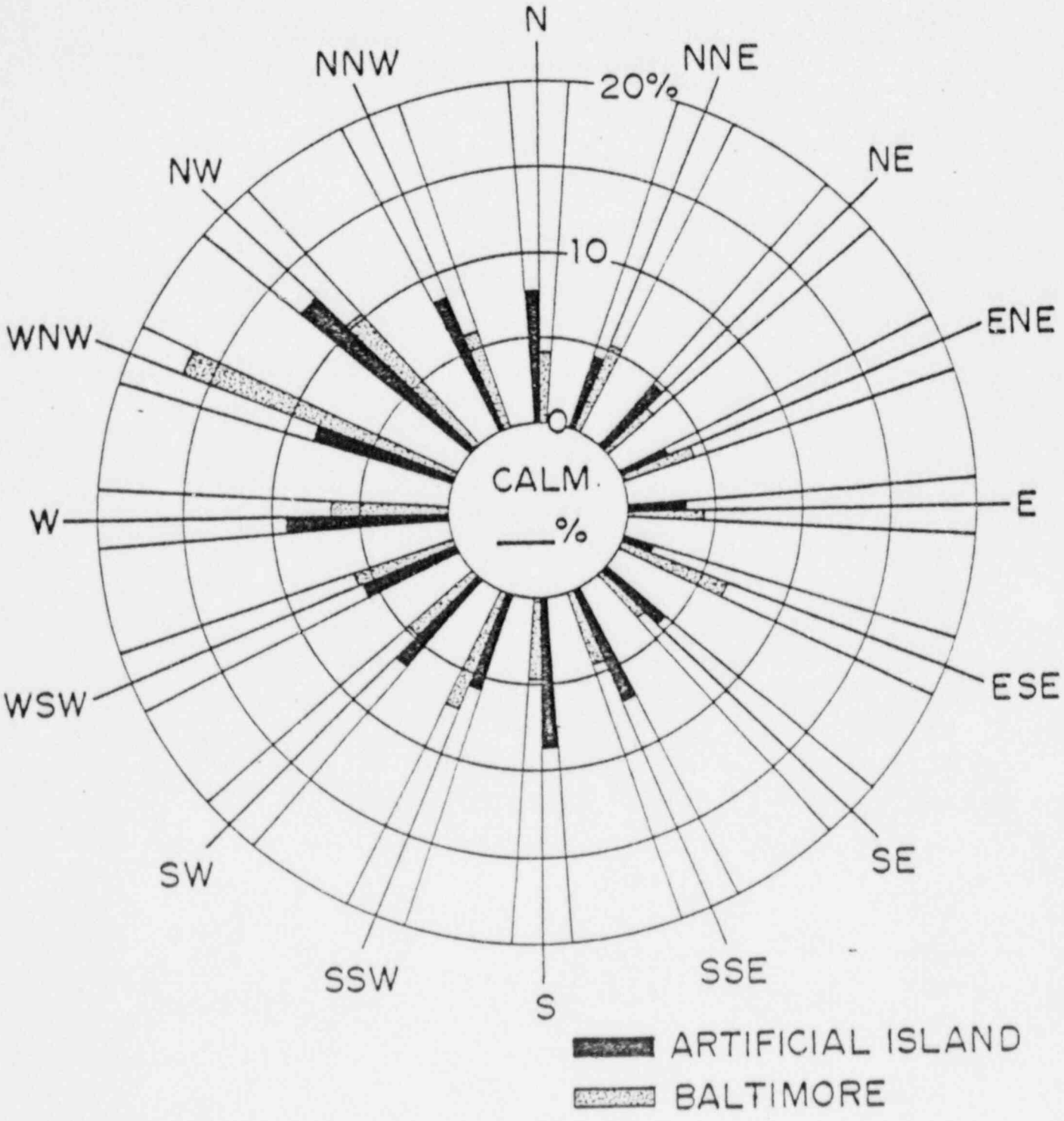


FIGURE 4

STAR PROGRAM

STABILITY DISTRIBUTIONS

(%)

Pasquill		Philadelphia 1967-1971	Baltimore 1969-1973
A	Unstable	.274	.4432
B	Unstable	4.3836	5.1096
C	Unstable	10.1164	11.2740
D	Neutral	57.7945	48.9178
E	Stable	15.1233	14.2808
F	Stable	12.3082	19.9726

Figure 5

MEAN SEASONAL AND ANNUAL VALUES OF MORNING AND AFTERNOON MIXING HEIGHT (m) AND WIND SPEED (m/sec)* FOR WASHINGTON, D.C. 1961 - 1964

	Morning		Afternoon	
	H (m)	u (m/sec)	H (m)	u (m/sec)
Winter	672	6.3	1054	7.3
Spring	585	5.4	1890	7.9
Summer	421	3.4	1924	5.6
Autumn	436	4.4	1412	6.4
Annual	528	4.9	1570	6.8

Values taken from George C. Holzworth, "Mixing Heights, Wind Speeds and Potential for Urban Air Pollution Throughout the Contiguous United States."

* Average wind speed in the mixing height layer.

MEAN ANNUAL MIXING HEIGHTS

(Meters X 10^2)

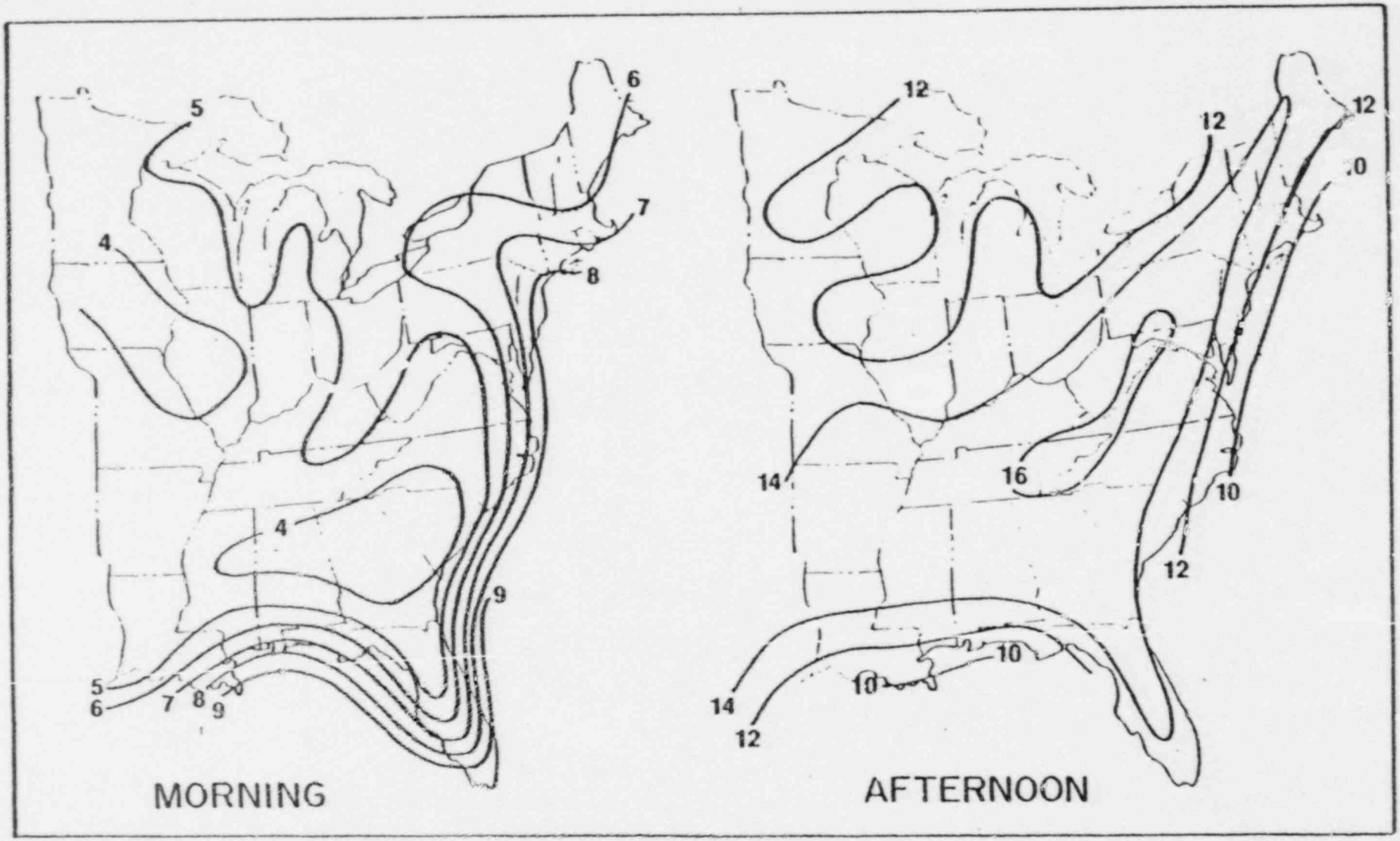


FIGURE 6

MEAN WINTER MIXING HEIGHTS

(Meters X 10^2)

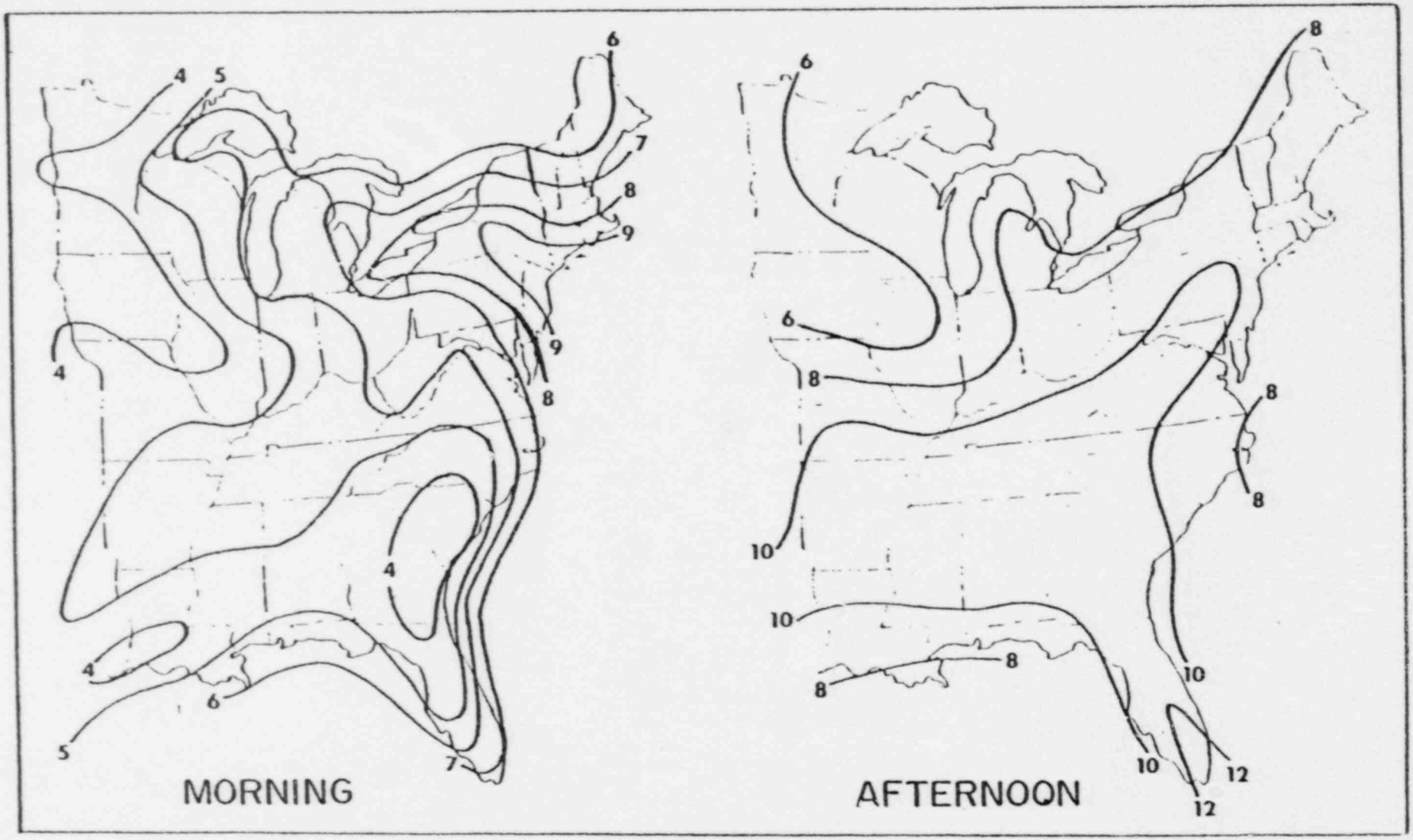


FIGURE 7

MEAN SPRING MIXING HEIGHTS
(Meters X 10^2)

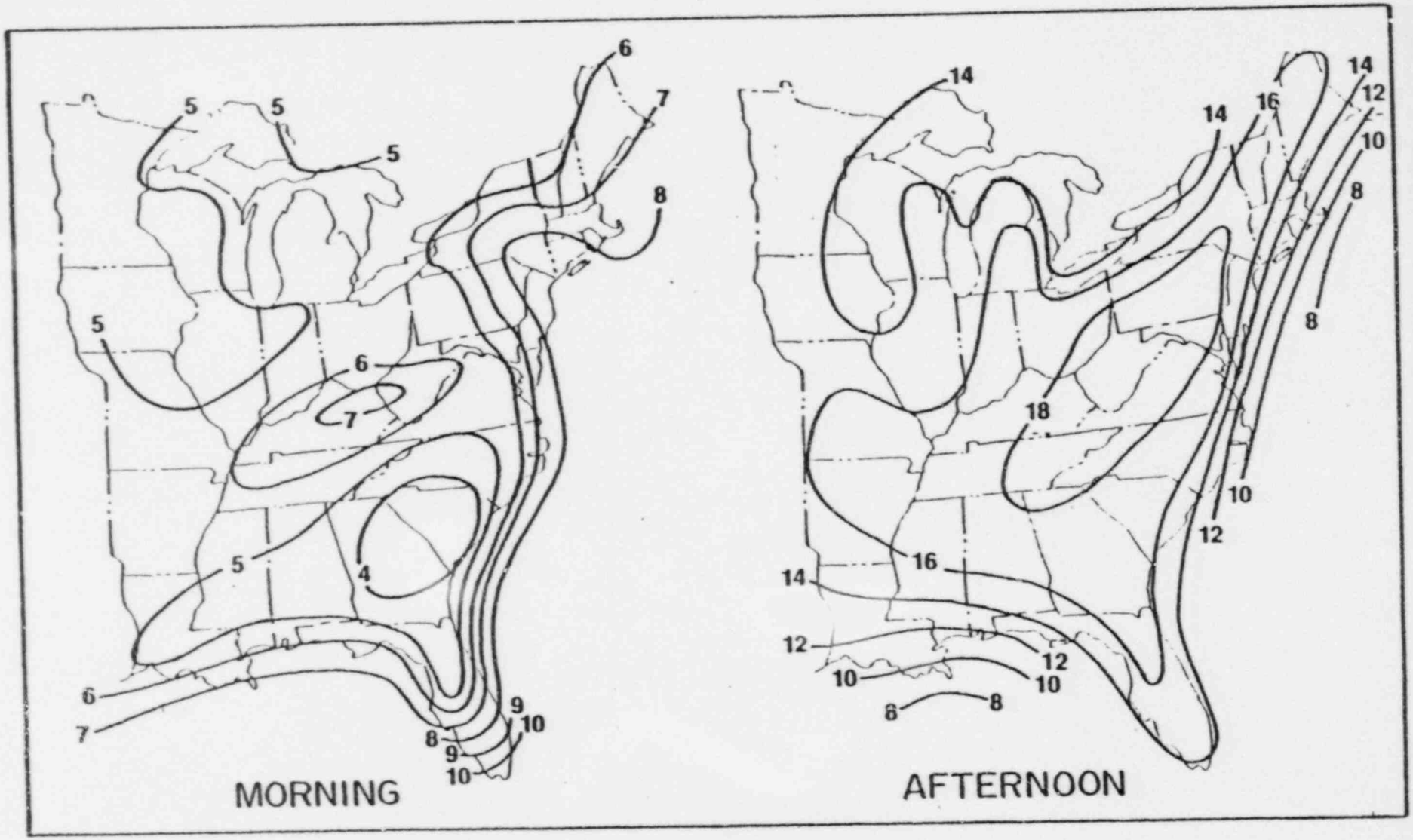


FIGURE 8

MEAN SUMMER MIXING HEIGHTS

(Meters X 10^2)

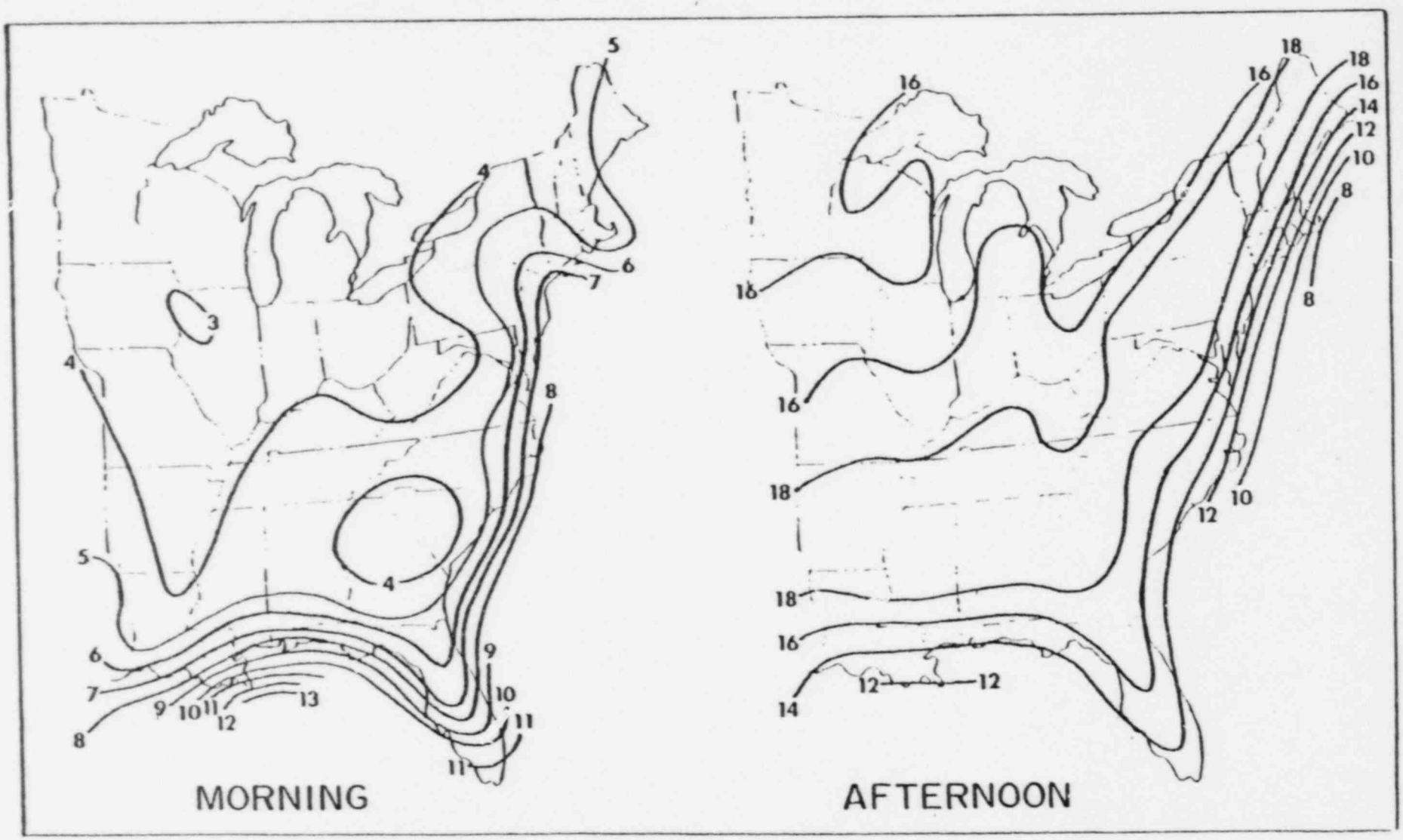


FIGURE 9

MEAN AUTUMN MIXING HEIGHTS

(Meters X 10^2)

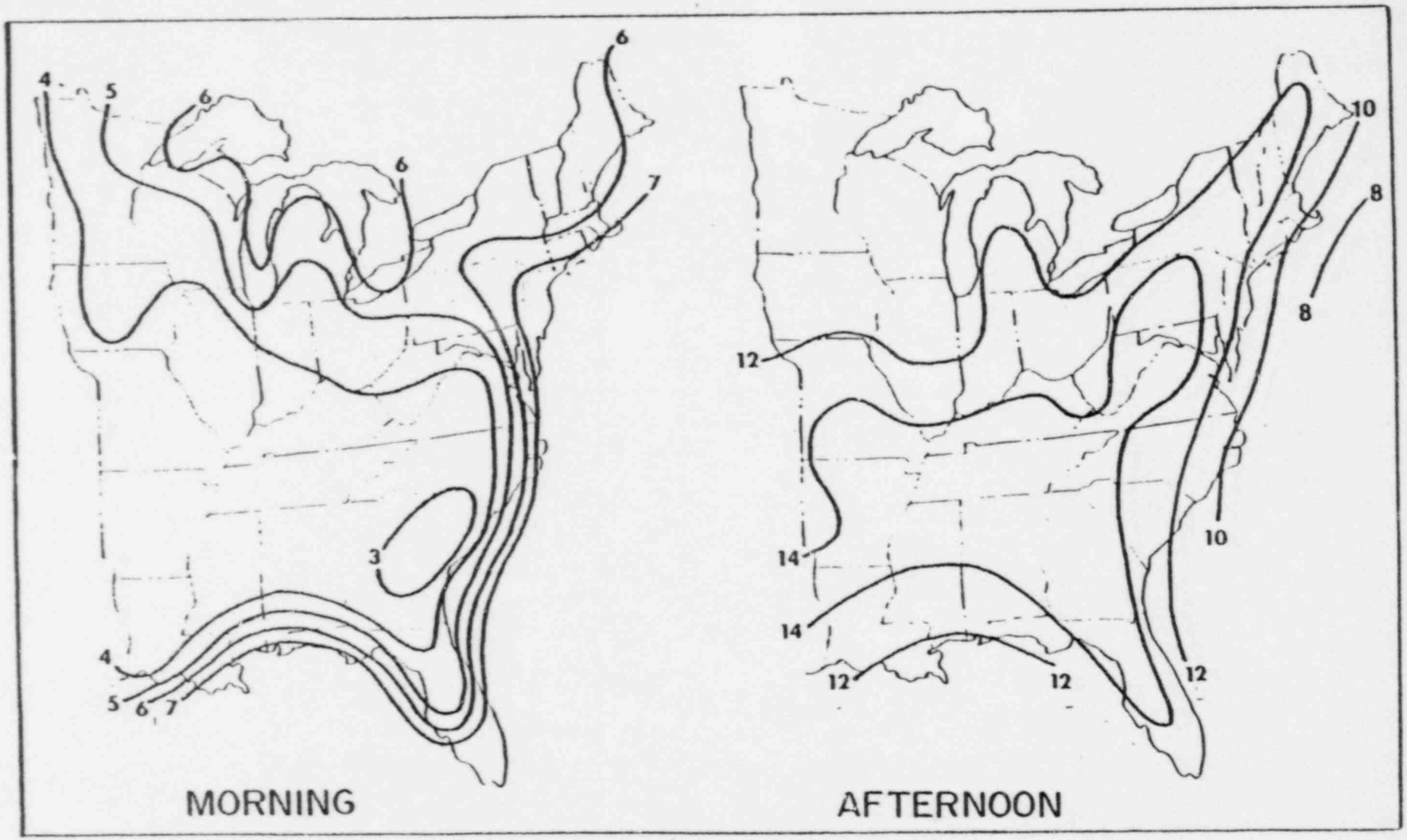


FIGURE 10

PHILADELPHIA, PENNA.
International AP

JANUARY
7440 Obs.

A TEMPERATURE AND WIND SPEED–RELATIVE HUMIDITY OCCURRENCES:

WIND	0-4 M.P.H.						5-14 M.P.H.						15-24 M.P.H.						25 M.P.H. AND OVER						TOTAL OBS.
DIR. / HUMIDITY	0-19%	20-39%	40-59%	60-79%	80-89%	90-100%	0-19%	20-39%	40-59%	60-79%	80-89%	90-100%	0-19%	20-39%	40-59%	60-79%	80-89%	90-100%	0-19%	20-39%	40-59%	60-79%	80-89%	90-100%	
01/ 04									1	2							17	7			1		5	2	35
05/ 08				1					9		13	18		3	10	3	6	15			3	1	1	5	98
09/ 12			1	4	2			7	17	5	13	17		10	12	14	11	15			3	1	1	4	210
13/ 16			3	14	13	5	43		36	48	24	19	8	49	31	11	23	11		2	8	1	8			457
17/ 20			18	27	25	20	14		44	154	64	42	155	1	59	87	28	13	24		4	1		1	4	848
21/ 24		2	19	47	47	39	127	2	136	360	130	164	144		100	124	24	23	60		4	1	1	13	1663
25/ 28			59	105	74	83	69	6	209	482	185	144	142	4	119	140	19	24	18		5	1	1	1	1926
29/ 32			14	62	51	33	16	5	164	321	87	50	29	5	84	114	4	4	4		15	2			1050
33/ 36			2	36	8	24	13	4	125	200	54	19	4	8	51	62	13	1	2		11	1			648
37/ 01			2	25	10	9	6		54	79	50	12	3	4	27	44	5	5			6	1			351
02/ 05			4	5	5	2	3	1	17	39	6	4	6		14	8	1					1			116
06/ 09			1	6	1	1			2	13	2	1			3	1									32
TOTAL		2	120	335	214	252	323	26	794	726	621	543	728	20	516	643	126	150	182		47	24	4	13	7440

B PERCENTAGE FREQUENCIES OF WIND DIRECTION AND SPEED:

DIRECTION	HOURLY OBSERVATIONS OF WIND SPEED (MI. PER HR.)										TOTAL	%
	0-3	4-7	8-12	13-18	19-24	25-31	32-38	39-46	47-54	55 & OVER		
N	4	2	4	4	1	4					12	11.4
NNE	4	1	2	2	4	4					5	11.7
NE	4	1	1	1	4	4	4				5	12.9
ENE	4	1	1	1	1	4	4				4	12.7
E	4	1	1	4	4						3	8.5
ESE	4	1	4	4							2	6.2
SE	4	1	4	4	4	4					2	7.7
SSE	4	1	4	4	4	4					1	7.4
S	4	1	1	4	4	4	4				8	9.0
SSW	4	1	2	1	4	4					9	10.3
SW	4	2	3	1	4	4	4				6	9.7
WSW	4	3	3	1	4	4	4				8	9.4
W	4	2	3	1	4	4					6	9.2
WNW	4	2	4	3	1	4	4				11	12.2
NW	4	2	3	4	1	4	4				11	12.4
NNW	4	2	4	4	1	4	4				11	12.9
CALM	7										7	
TOTAL	11	24	32	25	7	2	1				100	10.3

C OCCURRENCES OF PRECIPITATION AMOUNTS:

HOURS (E.S.T.)	FREQUENCY OF OCCURRENCE FOR EACH HOUR OF THE DAY																								TOTAL OBS.
	A.M. HOUR ENDING AT												P.M. HOUR ENDING AT												
	1	2	3	4	5	6	7	8	9	10	11	MIDN.	1	2	3	4	5	6	7	8	9	10	11	MIDN.	
TRACE	24	25	23	23	30	24	34	44	44	46	39	25	28	32	34	27	30	20	20	24	25	21	21	23	45
0.01 - 0.04	11	8	14	11	10	14	8	10	12	8	6	4	10	6	4	11	3	6	13	8	12	9	8	8	9
0.05 - 0.09	15	23	22	16	15	16	16	16	13	16	13	15	16	15	12	11	16	15	10	11	15	15	12	16	34
0.10 - 0.19	6	5	5	5	5	4	2	3	3	3	3	3	3	2	5	4	1	3	4	4	3	2	3	3	30
0.20 - 0.29		1			1	2	3	2	2	2	1	1	1									1	1	1	20
0.30 - 0.49			1																						18
0.50 - 0.69																									2
0.70 - 0.99																									
1.00 AND OVER																									
TOTAL	56	58	60	55	60	63	72	75	73	70	65	51	53	53	55	53	53	45	47	47	55	52	50	51	168

D PERCENTAGE FREQUENCIES OF CEILING–VISIBILITY:

VISIBILITY (MILES)	CEILING (FEET)										TOTAL
	0	100	200	300	500	1000	1500	2000	2500	3000 OR MORE	
0 TO 1/8	1	0	0	0	0			0	0	0	1
1/4 TO 1/2	0	0	0	0			0	0	0	0	1
3/4 TO 1			0	1	0	0	0	0	0	0	2
1 1/4 TO 2 1/2			0	1	1	1	1	1	1	5	12
3 TO 4				0	2	3	1	3	3	11	23
5 TO 15				0	0	1	2	5	6	46	60
20 TO 30								0	0	0	1
35 OR MORE											
TOTAL	1	1	1	2	3	5	4	9	10	63	100

E PERCENTAGE FREQUENCIES OF SKY COVER, WIND, AND RELATIVE HUMIDITY:

HOUR OF DAY	CLOUDS SCALE 0-10			WIND SPEED (M.P.H.)				RELATIVE HUMIDITY (%)					
	0-3	4-7	8-10	0-3	4-12	13-24	25 & OVER	0-19	20-39	40-59	60-79	80-89	90-100
00	39	8	53	14	55	30	1	13	37	16	18	16	
01	40	8	52	12	61	27	1	12	37	16	16	18	
02	41	7	52	15	55	30	1	11	36	16	15	21	
03	41	8	51	15	60	24	1	10	34	19	15	22	
04	39	6	55	14	59	25	1	9	38	16	13	22	
05	37	8	55	13	60	27	1	7	38	15	18	22	
06	37	8	55	14	60	25	1	8	34	17	17	23	
07	31	12	57	13	59	27	1	7	34	19	19	21	
08	29	11	60	13	59	26	2	9	35	17	19	19	
09	29	11	60	14	53	30	3	15	35	15	17	18	
10	27	12	61	12	47	36	5	21	38	15	12	14	
11	24	14	60	10	45	39	5	29	37	11	9	13	
12	23	19	58	9	46	42	4	34	34	13	7	12	
13	22	16	62	6	45	45	3	37	34	7	9	11	
14	22	21	58	7	48	42	3	39	33	8	8	10	
15	26	17	57	5	45	45	4	41	33	6	9	9	
16	28	15	56	6	55	38	2	37	34	8	8	11	
17	33	15	53	7	63	28	2	25	43	10	9	12	
18	38	9	53	8	66	24	2	22	43	12	11	12	
19	37	9	54	6	67	25	1	18	44	13	11	14	
20	36	10	54	11	64	24	1	15	44	14	14	13	
21	40	7	53	11	63	25	1	14	40	17	13	15	
22	37	10	53	13	63	24	0	14	41	15	14	17	
23	40	6	55	12	60	27	1	14	37	15	16	17	
AVG	33	13	56	11	57	31	2	19	37	14	13	16	

FIGURE 11

HCGS

B.1.27

REV. 1

PHILADELPHIA PENNA.
International AP

FEBRUARY
6793 Obs.

A TEMPERATURE AND WIND SPEED–RELATIVE HUMIDITY OCCURRENCES

WIND / TEMP °F	0-4 MPH						5-14 MPH						15-24 MPH						25 MPH AND OVER						TOTAL OBS
	0-10%	11-30%	31-50%	51-70%	71-90%	91-100%	0-10%	11-30%	31-50%	51-70%	71-90%	91-100%	0-10%	11-30%	31-50%	51-70%	71-90%	91-100%	0-10%	11-30%	31-50%	51-70%	71-90%	91-100%	
76/ 70																									16
69/ 65																									13
64/ 60																									60
59/ 55																									139
54/ 50																									354
49/ 45																									623
44/ 40																									1162
39/ 35																									1509
34/ 30																									1449
29/ 25																									683
24/ 20																									380
19/ 15																									261
14/ 10																									91
09/ 05																									38
TOTAL																									7292

B PERCENTAGE FREQUENCIES OF WIND DIRECTION AND SPEED:

DIRECTION	HOURLY OBSERVATIONS OF WIND SPEED (MPH)										MEAN SPEED (MPH)
	0-3	4-7	8-12	13-18	19-24	25-31	32-38	39-46	47-54	55-63	
N	*	2	3	3	*	*				9	10.7
NNE	*	1	2	2	*	*				5	11.0
NE	*	*	1	1	*	*				2	11.2
ENE	*	1	1	2	1	*	*			5	13.3
E	*	1	2	1	*					4	10.5
ESE	*	1	1	*	*					3	7.5
SE	*	1	1	*	*					3	7.6
SSE	*	1	1	*	*	*				2	7.8
S	*	1	1	1	*	*	*			3	9.6
SSW	*	1	2	1	*	*	*			5	10.5
SW	*	2	3	3	*	*				9	9.9
WSW	*	2	4	2	*	*				9	10.0
W	*	1	2	1	*	*	*			5	10.7
WNW	*	2	3	3	2	1	*			11	14.0
NW	*	2	3	4	2	1		*		12	14.1
NNW	*	2	3	4	1	*	*			10	13.1
CALM	6									6	
TOTAL	9	23	31	29	9	3	*	*		1199	10.2

C OCCURRENCES OF PRECIPITATION AMOUNTS:

AMOUNTS	FREQUENCY OF OCCURRENCE FOR EACH HOUR OF THE DAY																								TOTAL OBS WITH PRECIP
	A.M. HOUR ENDING AT												P.M. HOUR ENDING AT												
	1	2	3	4	5	6	7	8	9	10	11	NOON	1	2	3	4	5	6	7	8	9	10	11	MID	
TRACE	20	21	21	31	25	25	26	25	32	32	24	31	31	31	19	24	21	10	22	24	20	14	15	16	56
0.01 TO 0.09	6	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	11	6	4	3	6
0.10 TO 0.19	15	16	15	15	16	16	15	16	15	15	15	15	12	10	16	12	11	16	14	12	3	11	15	12	21
0.20 TO 0.29	6	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	1	4	4	4	19
0.30 TO 0.39																									13
0.40 TO 0.49																									10
0.50 TO 0.59																									5
0.60 AND OVER																									
TOTAL	48	45	44	53	49	49	49	49	55	55	47	54	51	49	43	44	40	34	44	44	35	35	38	35	155

D PERCENTAGE FREQUENCIES OF CEILING–VISIBILITY:

VISIBILITY MILES	CEILING FEET										TOTAL
	0	100-200	300-500	600-900	1000-1900	2000-2900	3000-4900	5000-8900	9000-14900	15000 AND OVER	
0 TO 1/8	*	*	*				*	*	*	1	1
3/16 TO 3/8	*		*	*	*		*	*	*	1	1
1/2 TO 3/4			*	1	*	*	*	*	*	1	3
1 TO 2 1/2			*	1	3	1	1	1	1	2	9
3 TO 6			*	*	3	2	1	2	3	15	23
7 TO 15				*	*	1	1	7	8	45	62
20 TO 30							*	*	*	*	*
35 OR MORE											
TOTAL	1	1	3	3	5	4	10	12	12	62	109

E PERCENTAGE FREQUENCIES OF SKY COVER, WIND, AND RELATIVE HUMIDITY:

HOUR OF DAY	CLOUDS SCALE 0-10			WIND SPEED (M.P.H.)				RELATIVE HUMIDITY (%)					
	0-3	4-7	8-10	0-3	4-12	13-24	25-38 & OVER	0-39	40-49	50-59	60-69	70-79	80-100
00	46	5	49	11	61	27	2	*	12	40	17	14	16
01	44	6	50	13	59	27	1		12	37	17	17	17
02	42	8	50	16	53	29	1		11	36	15	18	18
03	41	8	51	12	60	27	1		9	38	16	17	21
04	44	8	48	12	59	28	1		8	39	16	14	23
05	40	12	49	13	61	24	*		10	35	17	16	22
06	36	13	51	14	52	33	1		9	35	17	16	22
07	31	11	58	12	59	27	1		8	37	17	17	21
08	34	11	54	11	53	33	3		11	40	16	14	18
09	32	12	56	9	48	40	4		23	38	13	9	17
10	30	13	57	7	47	45	2	1	20	38	10	8	13
11	27	15	58	8	42	45	5	1	34	37	7	10	11
12	25	19	55	5	45	44	6	1	45	31	8	6	11
13	24	20	56	5	42	49	4	4	49	27	6	5	11
14	27	21	52	5	43	49	3	3	49	29	5	5	11
15	28	19	54	8	40	49	4	5	49	30	2	4	10
16	32	14	53	6	44	49	2	5	47	30	4	4	10
17	34	16	50	9	53	41	2	3	43	34	3	4	...
18	39	14	45	7	37	55	2	1	34	41	7	5	12
19	45	12	43	7	45	47	2	2	25	43	12	7	11
20	47	10	43	6	45	47	2	1	24	48	16	7	12
21	46	8	46	10	59	28	3	2	36	44	14	10	14
22	46	9	45	10	61	27	2	1	42	45	13	12	14
23	45	9	46	11	62	25	1	1	42	41	18	14	14
AVG	37	12	51	9	54	34	2	1	24	37	12	11	15

FIGURE 12

PHILADELPHIA, PA.
International

WBAN 7440

A TEMPERATURE AND WIND SPEED–RELATIVE HUMIDITY OCCURRENCES:

TEMP. (°F)	0-3 MPH						4-12 MPH						13-24 MPH						25 MPH AND OVER						TOTAL
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
84/ 80														1											1
79/ 75							2	2																	4
74/ 70	1	1					4	11					2	3						1		1			20
69/ 65	1		1				8	15	2	9	2		5	12	8				1	5					63
64/ 60	3	[illegible]	2	1			10	45	17	12	11	8	6	35	15	4	11	6		6	2	1	4	2	203
59/ 55	2	7	8	5	5	5	21	80	42	21	23	45	17	55	32	10	14	23	2	8	1		2	4	424
54/ 50	1	17	8	4	10	11	22	163	96	18	26	69	24	70	25	12	8	24	3	5	6			2	625
49/ 45	4	32	32	12	25	19	20	193	212	81	45	78	24	95	78	7	20	21	5	2	3	1			1012
44/ 40	2	25	54	38	24	39	18	169	330	107	100	175	11	126	108	17	43	90	3	17	3		8	16	1534
39/ 35		29	44	38	49	38	1	140	370	180	159	173	5	135	142	26	46	107	2	33	5		5	8	1735
34/ 30		10	40	29	29	47	9	188	222	63	54	75	3	113	77	12	5	62		23	7	1		10	1045
29/ 25		5	29	2	5	8		99	149	22	7	4	1	68	70	5	11	14		7	8		4	3	501
24/ 20			1	9	1			24	74	7	11	1		15	27	8	18	17			3			1	205
19/ 15			7						25	5	8			7	1	5	10								52
14/ 10				2	1				4	1															8
TOTAL	15	130	212	132	157	176	111	1127	1554	497	447	628	90	726	582	106	184	379	16	107	40	5	21	49	7440

B PERCENTAGE FREQUENCIES OF WIND DIRECTION AND SPEED:

DIRECTION	HOURLY OBSERVATIONS OF WIND SPEED									%	MEAN SPEED
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		
N	*	2	4	3	1	*				10	11.2
NNE	*	1	2	2	*	*	*			6	11.5
NE	*	*	1	1	*	*				2	12.7
ENE	*	1	2	3	1	*				8	13.5
E	*	1	2	2	1	*	*			5	11.8
ESE	*	1	1	2	*	*				4	9.8
SE	*	1	1	1	*	*	*			3	9.6
SSE	*	1	1	1	*	*				3	10.6
S	*	1	1	1	*	*				3	10.7
SSW	*	1	2	1	*	*				4	11.4
SW	*	1	2	2	*	*				5	11.5
WSW	*	2	3	2	*	*				7	10.8
W	*	1	2	1	1	*				5	11.0
WNW	*	2	3	3	2	1	*			10	14.2
NW	*	1	3	4	2	1	*	*		11	14.4
NNW	*	2	3	4	1	*	*			11	13.7
CALM	3									3	
TOTAL	8	20	32	30	10	3	*	*		100	11.8

C OCCURRENCES OF PRECIPITATION AMOUNTS:

INTENSITIES	FREQUENCY OF OCCURRENCE FOR EACH HOUR OF THE DAY																								
	A.M. HOUR ENDING AT												P.M. HOUR ENDING AT												[illegible]
	1	2	3	4	5	6	7	8	9	10	11	NOON	1	2	3	4	5	6	7	8	9	10	11	MID	
TRACE	30	27	29	28	21	26	25	23	29	34	32	26	33	40	35	36	36	32	27	36	36	35	35	26	41
[illegible]	9	13	12	13	10	12	16	12	9	12	14	12	12	6	5	4	6	15	9	10	4	5	3	5	4
[illegible]	21	14	16	16	20	22	13	26	23	24	21	26	16	19	15	16	20	14	21	14	16	14	13	23	34
[illegible]	9	9	5	6	9	5	9	4	6	9	9	6	5	4	4	5	5		5	5	5	5	6	9	26
[illegible]			2	5		5	5	2	2				2		5					2					15
[illegible]																				2					27
[illegible]																									16
[illegible]																									
TOTAL	65	65	65	65	66	65	68	65	65	74	75	72	70	73	64	65	65	65	60	56	59	57	65	56	[illegible]

D PERCENTAGE FREQUENCIES OF CEILING–VISIBILITY:

VISIBILITY (MILES)	CEILING (FEET)									
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0 TO 1/8	*	*		*					*	*
3/16 TO 1/8	*	*	*	*						*
1/2 TO 3/4	*	*	*	1	*				*	1
1 TO 2 1/2		*	1	3	1	*	*	*	1	8
3 TO 6		*	*	4	3	1	2	2	9	22
7 TO 15			*	1	1	1	2	8	49	68
20 TO 30								*	1	1
35 OR MORE										
TOTAL	*	1	2	9	6	3	9	11	59	100

E PERCENTAGE FREQUENCIES OF SKY COVER, WIND, AND RELATIVE HUMIDITY:

HOUR OF DAY	CLOUDS SCALE 0-10			WIND SPEED (M.P.H.)				RELATIVE HUMIDITY (%)					
	0-3	4-7	8-10	0-3	4-12	13-24	25 & OVER	0-29	30-49	50-69	70-79	80-89	90-100
00	44	5	51	7	58	34	1	1	16	38	15	12	18
01	44	7	49	10	60	29	2		15	36	16	15	18
02	42	7	52	8	60	31	2		12	36	16	15	21
03	39	11	50	10	58	30	2		11	37	16	14	22
04	43	10	47	9	59	31	1		9	37	16	16	21
05	45	8	47	9	58	32	1		9	36	15	16	23
06	39	9	52	8	60	30	2		7	35	20	12	26
07	36	12	52	6	61	31	3		10	37	17	12	24
08	35	12	53	5	53	41	1	1	17	42	12	10	18
09	36	12	52	3	46	47	4	1	28	38	9	6	18
10	32	15	53	3	45	47	5	2	39	29	5	11	14
11	28	15	56	5	41	50	4	5	45	24	5	10	12
12	28	17	55	3	41	50	6	7	48	21	6	9	12
13	26	15	58	3	38	53	6	10	49	16	6	8	11
14	26	17	56	3	38	56	5	12	48	15	5	9	11
15	25	16	59	4	33	56	7	12	51	15	5	9	10
16	26	20	54	2	38	55	6	11	50	16	6	6	11
17	30	15	55	3	44	49	5	9	45	21	6	9	11
18	34	16	50	3	53	43	2	4	42	29	5	8	12
19	37	14	49	3	60	35	2	2	35	35	7	7	14
20	42	10	48	6	59	32	3	1	28	37	11	9	14
21	43	11	46	7	59	32	2		23	42	11	9	15
22	43	11	46	8	58	32	2		20	44	10	9	16
23	45	7	47	8	58	32	2		19	39	14	13	15
AVG	36	12	51	6	53	40	3	3	28	32	10	11	16

FIGURE 13

PHILADELPHIA, PENNA.
[International] AP

APRIL
7200 Obs.

A TEMPERATURE AND WIND SPEED–RELATIVE HUMIDITY OCCURRENCES:

WIND DIR.	0-4 M.P.H.						5-14 M.P.H.						15-24 M.P.H.						25 M.P.H. AND OVER						TOTAL OBS.
TEMP.																									
RH																									
00/ 05							1						1	3	1										5
06/ 11							3	11	2					8						1					26
12/ 17	3	1	3				5	45	7				12	38	10										114
18/ 23	3	11	6				25	53	29				20	55	27					4					205
TOTAL	9	17	7	7			43	70	75	17	2		32	99	40	10			3	1	1				350
00/ 05	4	14	13	4	5	2	44	111	114	52	26	9	15	31	34	18	4	3	4	4					529
06/ 11	1	13	14	9	11	5	32	144	141	64	27	14	20	85	57	13	27	17	2			1			802
12/ 17	8	121	51	25	21	41	24	176	224	94	94	154	14	94	43	11	27	10	3	8	4	1		3	1163
18/ 23	2	104	43	35	41	17	15	154	757	113	130	180	9	1171	75	20	37	54	2	5					1334
TOTAL	15	352	121	73	78	65	115	585	1236	323	277	343	58	1381	209	62	95	84	11	17	5	2		3	3982
00/ 05	1	81	20	22	24	23	3	77	171	80	62	62	3	36	75	22	10	43		1	1	4		1	600
06/ 11	1	3	27	20	13	4	3	17	103	38	42	15	4	17	56	14	17	16		1	5	2		1	400
12/ 17			4	1	4		1	4	31	10	3			2	3	2	1	4							84
18/ 23		11					1	1	1	1															12
TOTAL	21	90	212	151	127	101	213	933	2918	825	390	602	123	805	350	128	211	244	14	23	12	3	0	14	7299

B PERCENTAGE FREQUENCIES OF WIND DIRECTION AND SPEED:

DIRECTION	HOURLY OBSERVATIONS OF WIND SPEED (M.P.H.)												TOTAL	% OF WIND
	0-3	4-7	8-12	13-18	19-24	25-31	32-38	39-46	47-54	55-63	64-72	73 AND OVER		
N	*	2	3	3	*	*							8	11.2
NNE	*	1	2	2	*	*							5	11.4
NE	*	1	1	1	*	*							3	11.9
ENE	*	1	3	3	1	*	*						8	13.1
E	*	1	2	2	*	*	*						6	11.7
ESE	*	1	2	1	*	*							4	9.7
SE	*	1	1	1	*								3	8.9
SSE	*	1	1	1	*								3	8.8
S	*	2	2	2	*								5	10.4
SSW	*	1	2	3	1	*	*						8	12.1
SW	*	2	3	2	*								8	11.3
WSW	*	2	4	3	1	*							10	11.5
W	*	1	2	2	*								4	11.3
WNW	*	1	2	3	1	*	*						8	13.3
NW	*	1	2	2	1	*							6	12.6
NNW	*	1	2	2	1	*							6	12.4
CALM	4												4	
TOTAL	6	23	34	33	7	1	*						100	11.1

C OCCURRENCES OF PRECIPITATION AMOUNTS:

AMOUNTS	FREQUENCY OF OCCURRENCE FOR EACH HOUR OF THE DAY																								TOTAL
	AM HOUR ENDING AT												PM HOUR ENDING AT												
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	
TRACE	24	17	19	13	24	12	19	16	10	20	10	26	24	23	10	17	23	18	26	29	18	10	12	21	55
.01-.09	9	4	2	4	14	4	8	4	4	6	4	15	10	9	9	10	7	7	8	10	10	8	11	8	9
.10-.19	10	14	20	21	12	19	12	16	13	14	13	9	8	9	15	17	14	12	12	11	11	15	20	14	35
.20-.29	4	8	8	9	9	4	6	2	2	1	1	3	3	2	2	2	4	3	2	4	4	3	4	4	23
.30-.39			1		1	1	1	1	1	1								2	1	1		1		1	22
.40-.49	1	1																							15
.50-.59																									8
.60-.69																									
.70-.79																									
.80-.89																									
.90-.99																									
1.00 AND OVER																									
TOTAL	48	44	50	47	60	40	46	39	30	42	28	53	45	43	36	46	48	42	49	55	43	37	47	47	168

D PERCENTAGE FREQUENCIES OF CEILING–VISIBILITY:

VISIBILITY MILES	CEILING FEET												TOTAL
	*												
0 TO 1/8	*	*	*	*								*	*
1/4 TO 1/2	*	*										*	*
3/4 TO 1			*	*	*	*						*	1
1 1/4 TO 2 1/2			*	1	1	1	*	*	*	*		1	7
3 TO 4				*	*	5	3	1	1	1	3	121	23
5 TO 6						1	21	2	6	10	44		84
7 TO 10										*	11		1
11 OR MORE													
TOTAL	*	1	2	1	1	7	24	3	7	11	58	122	120

E PERCENTAGE FREQUENCIES OF SKY COVER, WIND, AND RELATIVE HUMIDITY

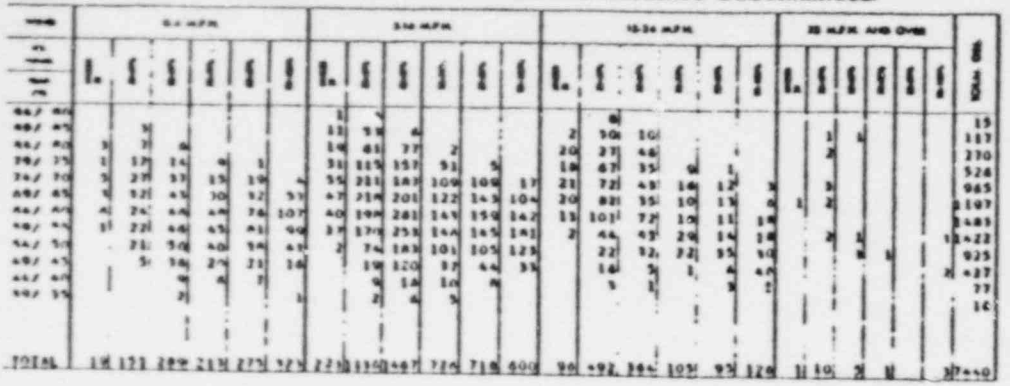
HOUR OF DAY	CLOUDS SCALE 0-10				WIND SPEED (M.P.H.)				RELATIVE HUMIDITY (%)					
	0-	4-	8-	0-	4-	13-	25-	0-	30-	50-	70-	90-	99-
	3	7	10	3	12	24	4	29	49	69	89	98	100
							DYSI						
00	39	7	53	8	48	24	*			57	20	20	4
01	39	11	50	9	68	23			6	33	19	23	18
02	36	12	52	12	65	23			4	34	20	21	21
03	34	11	54	11	64	24	*		4	29	24	17	25
04	36	11	53	12	61	27	*	*	4	26	24	21	24
05	29	17	54	11	62	26	1	*	2	29	22	22	24
06	27	15	58	13	60	26	1	*	4	28	22	20	26
07	29	17	55	10	53	34	1	1	8	34	18	17	23
08	33	14	53	10	49	40	1	1	20	38	13	12	16
09	31	17	52	8	42	48	2	1	30	37	9	9	13
10	29	17	54	4	45	48	3	3	39	40	7	10	10
11	28	18	54	5	44	49	2	8	42	45	7	9	9
12	24	16	60	3	43	51	3	12	45	22	7	9	7
13	24	16	59	2	40	54	3	16	44	18	7	9	6
14	23	18	59	2	42	53	3	18	42	21	5	7	6
15	24	17	58	4	38	56	2	19	44	18	5	7	6
16	23	20	57	2	42	53	3	20	41	20	4	8	8
17	23	19	58	3	41	54	1	14	43	23	5	7	8
18	25	14	59	2	52	46		7	41	26	8	9	8
19	29	18	55	4	62	33		2	37	33	7	11	10
20	34	13	51	3	66	31	*	1	29	34	12	12	12
21	40	10	50	3	67	30	*	1	17	39	16	14	13
22	41	11	48	5	66	29			13	40	17	13	17
23	41	7	52	6	66	28		1	9	38	17	18	17
AVG	31	15	54	6	54	38	1	9	24	30	13	14	14

FIGURE 14

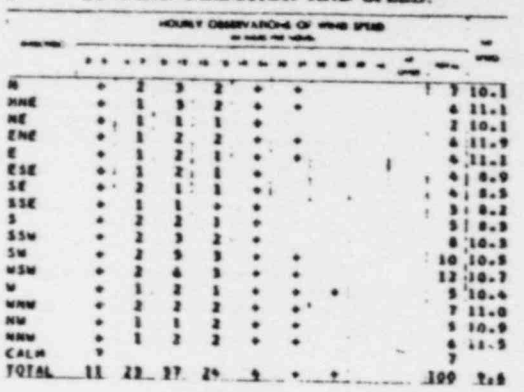
PHILADELPHIA, PENNA.
International

MAY
19

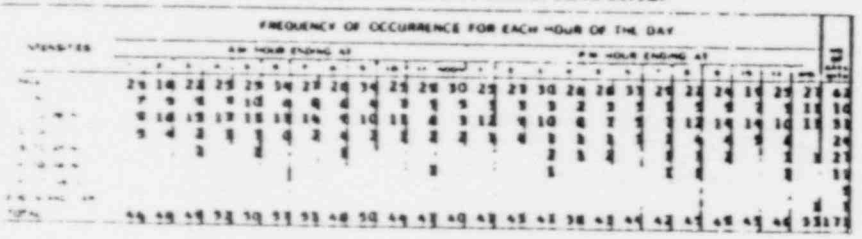
A TEMPERATURE AND WIND SPEED–RELATIVE HUMIDITY OCCURRENCES:



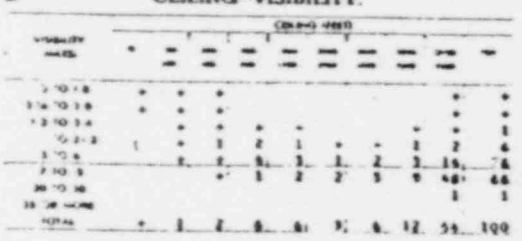
B PERCENTAGE FREQUENCIES OF WIND DIRECTION AND SPEED:



C OCCURRENCES OF PRECIPITATION AMOUNTS:



D PERCENTAGE FREQUENCIES OF CEILING–VISIBILITY:



E PERCENTAGE FREQUENCIES OF SKY COVER, WIND, AND RELATIVE HUMIDITY:

HOUR OF DAY	CLOUDS SCALE 0-10			WIND SPEED M.P.H.				RELATIVE HUMIDITY (%)					
	0- 3	4- 7	8- 10	0- 3	4- 12	13- 24	25- OVER	0- 29	30- 49	50- 69	70- 79	80- 89	90- 100
00	41	11	48	13	71	15	*	3	25	23	20	20	9
01	39	11	50	19	68	13		7	26	22	23	22	7
02	41	11	48	21	69	10		7	23	23	23	27	7
03	39	11	50	23	64	13		6	21	15	28	29	7
04	33	11	56	21	66	13		4	22	18	24	33	8
05	25	13	61	21	65	14		3	21	19	25	33	8
06	28	13	59	21	64	15		5	24	20	23	29	8
07	29	12	59	14	62	24		13	28	19	19	22	8
08	37	14	49	11	58	30	1	11	21	33	14	17	15
09	25	19	56	12	54	31	*	4	28	32	12	15	10
10	25	19	55	8	58	34	*	5	36	31	12	10	6
11	25	17	57	6	54	40	1	7	40	29	10	9	5
12	25	20	56	4	54	41	*	9	45	25	10	6	4
13	23	21	56	6	49	44	*	12	44	28	7	6	3
14	25	21	54	4	47	48	1	14	45	26	6	6	3
15	23	25	51	4	45	50	1	15	46	25	6	7	3
16	24	22	54	4	47	48	1	15	46	23	7	6	3
17	25	21	55	3	51	45	1	12	42	29	7	5	5
18	27	19	54	5	55	40		6	39	34	8	6	4
19	29	19	52	5	63	32		4	33	34	14	7	8
20	33	16	51	8	69	23		2	22	39	16	11	10
21	39	13	48	8	70	22		2	15	38	16	18	11
22	41	13	46	12	70	19		1	12	36	19	18	14
23	44	10	46	12	72	16	*	1	10	31	21	19	18
AVG.	31	16	53	11	60	28	*	5	24	29	14	15	14

HCGS

B.1.30

REV. 1

FIGURE 15

HCGS

B.1.31

REV. 1

PHILADELPHIA, PENNA.
International AP

JUNE
1900 Obs.

A TEMPERATURE AND WIND SPEED–RELATIVE HUMIDITY OCCURRENCES

WIND / TEMP / RH	0-4 M.P.H.						5-14 M.P.H.						15-24 M.P.H.						25 M.P.H. AND OVER						TOTAL OBS.
	00-	04-	08-	12-	16-	20-	00-	04-	08-	12-	16-	20-	00-	04-	08-	12-	16-	20-	00-	04-	08-	12-	16-	20-	
104/109								1						1											2
98/ 99		1	3					17	8					1	3										35
94/ 97	1	14	8				3	36	44				2	21	12					1					180
90/ 93	2	10	24	1			14	103	138	17			6	50	51				2	2					20.
86/ 89	2	23	44	16	2		26	259	265	57	12		8	69	60	7									856
78/ 85	2	25	50	36	12	4	10	220	277	105	86	19	11	54	57	15	10	1		2					1074
74/ 77	1	26	47	37	9	0	8	195	219	102	218	132	13	47	50	16	15	8		5		1		1	1492
70/ 73	1	8	34	43	7	0	4	98	271	179	205	196	4	42	52	9	12	8		2					1330
66/ 69		5	27	52	4	0		34	185	184	152	197	1	12	15	10	13	10							1044
62/ 65		1	23	34	4	0		22	78	84	96	61		2	13	4	23	13				1		1	521
58/ 61		1	4	5	0	0		2	15	5	57	25			4		2	15						2	147
54/ 57						0			2		1	3													6
50/ 53												1			1										2
46/ 49																									
TOTAL	8	124	314	229	32	5	86	1060	1609	809	814	729	45	279	229	78	79	56	2	12	1	1	1	1	7209

B PERCENTAGE FREQUENCIES OF WIND DIRECTION AND SPEED:

DIRECTION	HOURLY OBSERVATIONS OF WIND SPEED (MILES PER HOUR)												TOTAL	AVERAGE SPEED
	0- 3	4- 7	8- 12	13- 18	19- 24	25- 31	32- 38	39- 46	47- 54	55- OVER	CALMS			
N	0	3	5	1	0								9	9.1
NNE	0	1	2	1	0								5	9.7
NE	0	1	1	1	0								2	10.9
ENE	0	1	2	1	0	0							4	11.2
E	0	1	2	1	0	0							4	9.7
ESE	0	1	1	1	0								3	9.1
SE	0	2	2	1	0	0							4	8.1
SSE	0	2	1	0									3	7.3
S	1	2	2	1	0								6	8.5
SSW	0	2	3	2	0	0							7	9.7
SW	1	2	4	2	0	0							9	9.7
WSW	0	4	6	3	0	0							14	9.7
W	0	2	2	1	0								6	8.6
WNW	0	3	3	1	0	0	0						7	10.1
NW	0	2	3	1	0	0	0						7	10.0
NNW	0	2	2	1	0	0							6	9.9
CALMS	5												5	
TOTAL	10	27	38	19	5	0	0						100	9.0

C OCCURRENCES OF PRECIPITATION AMOUNTS:

INTENSITIES	FREQUENCY OF OCCURRENCE FOR EACH HOUR OF THE DAY																								TOTAL
	AM HOUR ENDING AT												PM HOUR ENDING AT												
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	
TOTAL	21	25	39	35	32	35	40	39	38	29	29	30	33	30	28	43	37	33	23	26	25	29	26	25	145

D PERCENTAGE FREQUENCIES OF CEILING-VISIBILITY:

VISIBILITY (MILES)	CEILING (FEET)										TOTAL
	0	100- 200	200- 500	500- 1000	1000- 1500	1500- 2000	2000- 2500	2500- 3000	3000- 3500	3500- OVER	
0 TO 1/8	0	0	0	0						0	0
1/4 TO 1/2	0	0									0
1/2 TO 3/4		0	0	0		0				0	1
1 TO 1 1/2			0	1	2	1	0	0	0	0	3
2 TO 4				0	1	1	1	3	2	10	19
5 TO 15				0	0	1	2	4	6	48	62
20 TO 30										0	0
35 OR MORE											
TOTAL	0	1	1	2	3	3	3	7	8	79	109

E PERCENTAGE FREQUENCIES OF SKY COVER, WIND, AND RELATIVE HUMIDITY:

HOUR OF DAY	CLOUDS (SCALE 0-10) 0- 3	4- 7	8- 10	WIND SPEED (M.P.H.) 0- 3	4- 12	13- 24	25- OVER	RELATIVE HUMIDITY (%) 0- 29	30- 49	50- 69	70- 89	90- 100
00	49	17	34	13	74	13		3	20	24	34	19
01	48	16	36	13	75	12		4	16	23	35	24
02	46	17	38	21	71	8		1	18	19	33	29
03	43	14	42	22	68	9		1	17	17	33	32
04	36	19	45	17	75	9		1	14	17	28	40
05	31	19	50	23	66	11		1	19	20	23	37
06	30	20	50	22	62	16		1	22	20	29	28
07	37	15	48	14	64	22		5	31	21	24	19
08	34	18	48	9	68	23	0	13	43	20	16	11
09	34	21	45	10	64	27	0	21	47	15	10	7
10	33	25	42	7	64	29		31	48	9	7	5
11	31	27	42	6	63	30	1	31	48	8	5	5
12	28	26	46	6	60	32	2	3	46	36	6	5	4
13	25	29	45	5	61	33	0	4	51	31	6	5	3
14	26	29	45	5	54	40	2	4	52	30	4	6	3
15	24	33	44	3	57	38	1	3	53	27	4	6	4
16	25	29	46	3	56	41	0	8	47	28	4	6	5
17	31	30	39	3	64	33		6	41	34	7	7	4
18	33	24	44	3	67	31		4	33	42	9	7	5
19	35	20	46	5	74	21	0	2	22	49	12	9	5
20	41	17	42	5	77	18		1	11	51	20	10	7
21	46	14	40	7	79	14			7	39	31	13	10
22	48	16	36	10	80	10			6	28	34	20	12
23	50	16	34	8	80	12			4	22	33	26	15
AVG.	36	21	43	10	68	22	0	2	21	31	16	17	14

FIGURE 16

PHILADELPHIA, PENNA.
International

JULY
1960

A TEMPERATURE AND WIND SPEED–RELATIVE HUMIDITY OCCURRENCES:

B PERCENTAGE FREQUENCIES OF WIND DIRECTION AND SPEED:

C OCCURRENCES OF PRECIPITATION AMOUNTS:

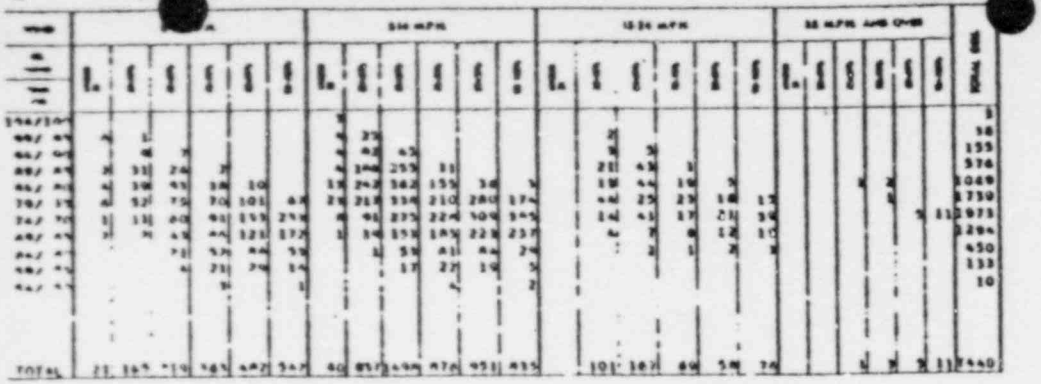
D PERCENTAGE FREQUENCIES OF CEILING–VISIBILITY:

E PERCENTAGE FREQUENCIES OF SKY COVER, WIND, AND RELATIVE HUMIDITY:

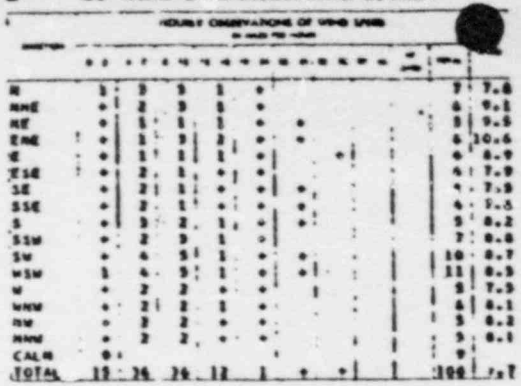
HOUR OF DAY	CLOUDS SCALE 0-10			WIND SPEED (M.P.H.)			RELATIVE HUMIDITY (%)					
	0-2	3-7	8-10	0-3	4-12	13-24	25-OVER	0-29	30-49	50-69	70-89	90-100
00	45	12	43	13	74	13		2	17	26	31	25
01	45	13	42	16	75	9		4	15	21	34	29
02	45	12	43	18	75	7		1	13	18	34	34
03	45	14	42	22	73	5			12	17	33	38
04	38	13	48	22	74	4			8	17	31	44
05	32	18	50	25	67	7			9	17	27	48
06	32	17	51	25	65	10			12	21	31	36
07	32	18	51	18	70	12		2	27	24	24	23
08	35	16	49	14	69	17		8	40	22	20	10
09	34	16	49	9	73	18		20	44	18	13	5
10	32	19	48	8	73	19		31	42	14	10	4
11	29	26	45	11	64	25		1	41	40	8	4	3
12	24	31	45	4	68	28		2	47	35	7	6	2
13	21	32	47	7	63	31		5	48	34	7	5	2
14	20	36	44	5	64	31		5	49	34	6	3	3
15	23	33	44	3	57	36		8	47	32	6	4	3
16	27	29	44	5	63	32		5	48	31	9	5	3
17	30	26	44	6	67	29		3	45	34	8	6	4
18	32	20	47	6	67	27		1	35	43	8	9	5
19	32	22	46	5	75	20		2	23	48	13	10	4
20	39	18	42	9	79	12			9	45	23	13	10
21	44	17	37	9	83	8			6	34	32	16	13
22	49	16	35	11	81	8			4	27	29	24	16
23	48	15	37	13	79	8			3	19	27	30	22
AVG	35	20	45	12	71	17		1	20	29	17	18	14

FIGURE 17

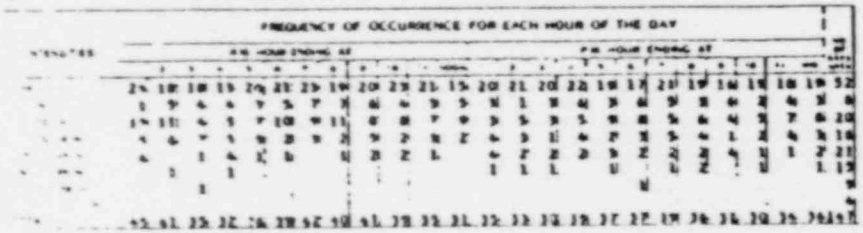
A TEMPERATURE AND WIND SPEED–RELATIVE HUMIDITY OCCURRENCES:



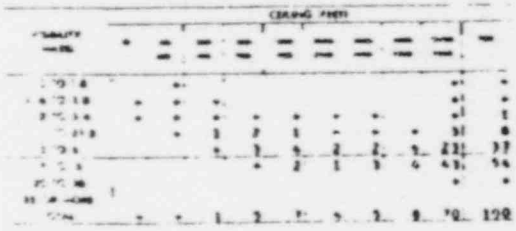
B PERCENTAGE FREQUENCIES OF WIND DIRECTION AND SPEED:



C OCCURRENCES OF PRECIPITATION AMOUNTS:



D PERCENTAGE FREQUENCIES OF CEILING–VISIBILITY:



E PERCENTAGE FREQUENCIES OF SKY COVER, WIND, AND RELATIVE HUMIDITY:

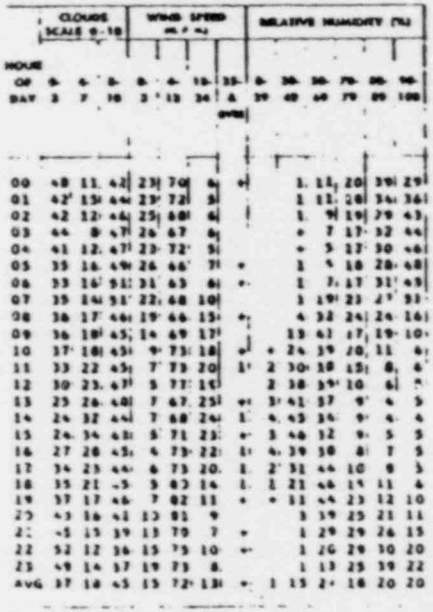


FIGURE 18

PHILADELPHIA PENNA.
Interval 1 AP

SEPTEMBER
1200 Obs.

A TEMPERATURE AND WIND SPEED–RELATIVE HUMIDITY OCCURRENCES

WIND DIR. / WIND SPEED (M.P.H.)	0-4 M.P.H.						5-14 M.P.H.						15-24 M.P.H.						25 M.P.H. AND OVER						TOTAL OBS.
	0-10%	11-30%	31-50%	51-70%	71-90%	91-100%	0-10%	11-30%	31-50%	51-70%	71-90%	91-100%	0-10%	11-30%	31-50%	51-70%	71-90%	91-100%	0-10%	11-30%	31-50%	51-70%	71-90%	91-100%	
00/ 02																									
03/ 05																									
06/ 08																									
09/ 11																									
12/ 14																									
15/ 17																									
18/ 20																									
21/ 23																									
TOTAL																									

B PERCENTAGE FREQUENCIES OF WIND DIRECTION AND SPEED:

HOURLY OBSERVATIONS OF WIND SPEED (M.P.H.)

DIRECTION	0-3	4-7	8-12	13-18	19-24	25-31	32-38	39-46	47-54	55-63	64-72	73-82	83-92	93-103	104-114	115-125	TOTAL	AV. SPEED
N	1	3	3	1	+		+										8	8.3
NNE	1	2	3	1	+	+	+										7	8.9
NE	+	1	1	1	+												2	9.6
ENE	+	2	2	1	+	+	+										6	10.8
E	+	1	2	1	+	+											4	9.1
ESE	+	2	1	+	+												3	7.8
SE	1	2	1	+		+											3	6.8
ESE	1	2	1	+		+											4	6.7
S	1	3	2	1	+												7	8.2
SSW	1	3	3	2	+	+											8	9.5
SW	1	3	3	2	+												10	9.0
WSW	1	3	4	7	+	+											16	8.8
W	1	2	1	+	+												4	7.8
WNW	+	2	2	1	+												5	8.5
NW	+	2	2	1	+	+											5	8.6
NNW	+	2	2	1	+	+											6	9.0
CALM	8																8	
TOTAL	19	34	33	14	2	+	+										100	9.0

C OCCURRENCES OF PRECIPITATION AMOUNTS:

WIND DIR.	FREQUENCY OF OCCURRENCE FOR EACH HOUR OF THE DAY																								TOTAL
	A.M. HOUR ENDING AT												P.M. HOUR ENDING AT												
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	
TOTAL	29	32	28	36	29	26	35	25	29	24	26	19	18	18	25	28	28	25	29	28	35	32	25	23	116

D PERCENTAGE FREQUENCIES OF CEILING–VISIBILITY:

VISIBILITY (MILES)	CEILING (FEET)										
	*	0-199	200-499	500-999	1000-1999	2000-3999	4000-7999	8000-12000	12000-16000	16000 OR MORE	TOTAL
0 TO 1/8		+	+							+	+
1/8 TO 1/4			+	+							+
1/4 TO 1/2			+	+	+	+	+			+	1
1/2 TO 1			+	1	2	1	+	+	+	3	7
1 TO 2				+	3	3	3	2	2	19	30
2 TO 5					1	2	2	5	4	47	61
5 TO 10								+	+	+	1
10 OR MORE											
TOTAL	*	1	2	3	6	6	7	7	6	70	100

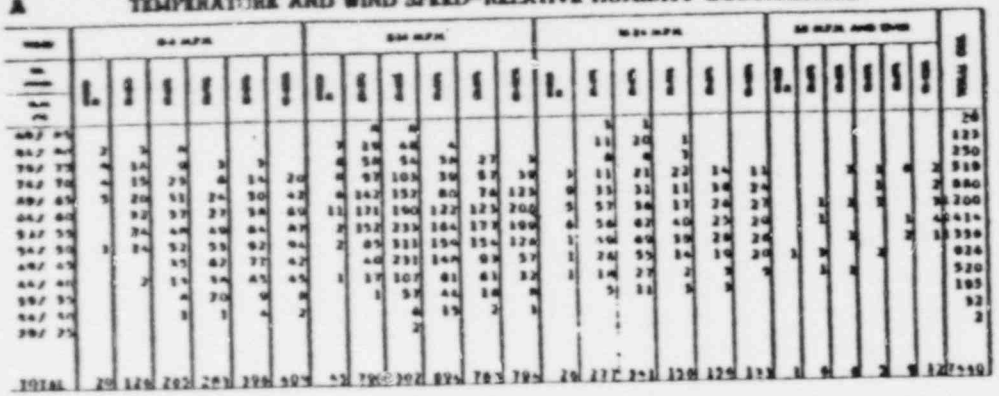
E PERCENTAGE FREQUENCIES OF SKY COVER, WIND, AND RELATIVE HUMIDITY:

HOUR OF DAY	CLOUDS SCALE 0-10				WIND SPEED (M.P.H.)			RELATIVE HUMIDITY (%)					
	0-3	4-7	8-10	0-3	4-12	13-23	24 & OVER	0-29	30-49	50-69	70-79	80-89	90-100
00	52	10	38	24	69	7			+	12	21	34	32
01	51	8	40	25	68	7				11	19	32	38
02	48	11	41	26	67	6	+			9	18	30	43
03	49	12	39	23	64	6				7	16	27	50
04	48	11	41	28	66	6			+	6	14	27	54
05	42	10	48	29	63	8			+	4	15	27	53
06	38	12	50	25	66	10				6	19	26	48
07	36	12	52	22	68	11	1		+	15	20	25	39
08	37	14	49	16	66	18	1		+	10	20	24	21
09	38	18	45	11	64	23	1		13	16	20	20	12
10	38	19	43	7	69	23	1	1	21	42	17	12	7
11	35	28	37	7	67	25	1	1	30	43	16	7	4
12	35	23	42	3	67	28	2	1	42	40	10	4	3
13	32	24	44	7	64	29	1	3	46	38	7	5	2
14	32	27	41	6	64	30	+	3	48	33	7	7	2
15	31	26	43	6	64	29	1	3	49	33	7	7	2
16	38	27	42	5	64	31	+	2	43	38	9	6	3
17	41	29	40	5	75	19	+	+	37	42	10	7	4
18	38	22	40	6	80	14	+		17	49	19	10	6
19	44	16	40	7	81	11			7	44	28	12	9
20	52	13	35	13	77	10			1	36	29	22	12
21	51	14	35	14	76	9	+		1	26	29	18	16
22	50	12	38	19	72	9			1	19	27	33	21
23	52	7	42	24	66	10			1	14	26	30	29
AVG	42	16	42	15	69	16	+	1	15	24	18	19	21

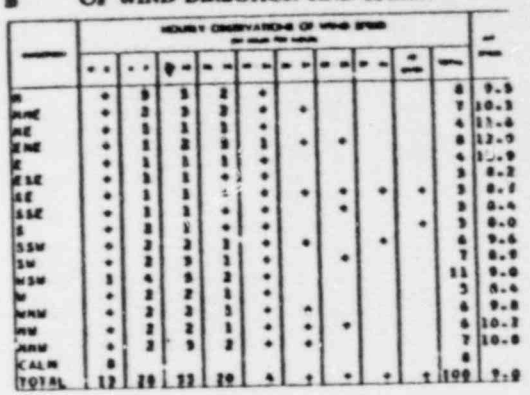
FIGURE 19

PHILADELPHIA, PENNA.
International AP

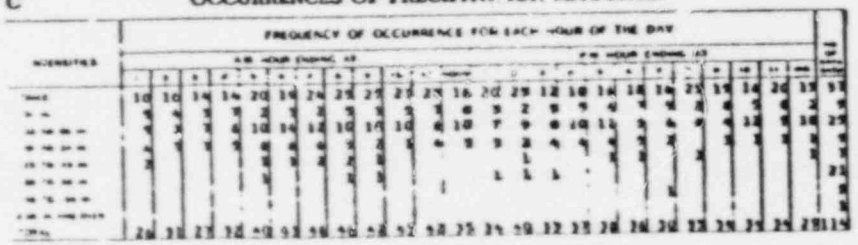
A TEMPERATURE AND WIND SPEED—RELATIVE HUMIDITY OCCURRENCES



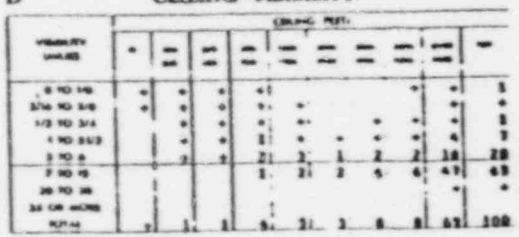
B PERCENTAGE FREQUENCIES OF WIND DIRECTION AND SPEED:



C OCCURRENCES OF PRECIPITATION AMOUNTS:



D PERCENTAGE FREQUENCIES OF CEILING–VISIBILITY:



E PERCENTAGE FREQUENCIES OF SKY COVER, WIND, AND RELATIVE HUMIDITY:

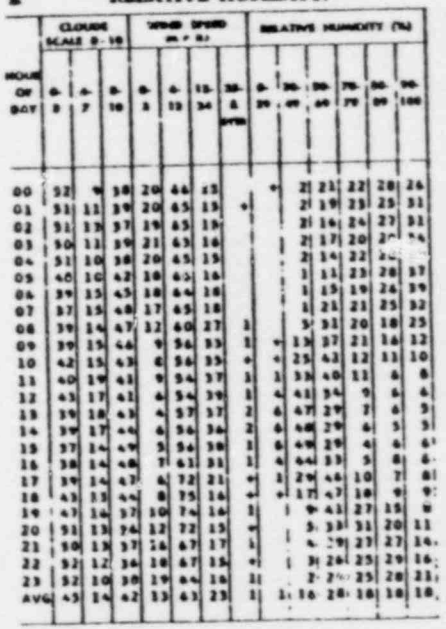


FIGURE 20

A TEMPERATURE AND WIND SPEED–RELATIVE HUMIDITY OCCURRENCES:

[illegible]	0-3 M.P.H.						4-12 M.P.H.						13-24 M.P.H.						25 M.P.H. AND OVER						TOTAL OBS.
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
[illegible]								1	4																5
[illegible]	1	4	1				3	7	8	4	3			9	6	5	2								93
[illegible]		17	8	1	2	8	8	38	14	9	22	33		8	17	8	19	9			2	2	2		210
[illegible]		4	13	17	3	24	9	55	71	31	36	45	2	14	18	14	24	24			7	4	2	2	430
[illegible]		5	78	21	17	43	4	97	119	65	71	155	4	50	27	11	14	23	1	2					764
[illegible]		35	44	27	48	44	10	122	204	72	103	143	3	34	32	14	9	10		1				1	941
[illegible]		24	51	50	48	49		158	290	171	127	128		85	73	21	8	12		12	2	2	1		1310
[illegible]		12	77	51	102	74		98	311	188	114	97		66	87	17	18	38	3	5	3	3	8	12	1353
[illegible]		6	69	60	94	50	1	64	293	144	111	64	1	48	68	15	11	15		2	3	2	8		1127
[illegible]		4	40	38	55	57		42	170	78	41	33	2	76	56	6	8	9		1	3			3	604
[illegible]			9	14	23	4	3	21	76	25	8		2	12	15		1	2		1	3		2		224
[illegible]			2					8	24	5	2	1	1	14	2										50
[illegible]								3	1					9	1										14
TOTAL	1	93	345	293	508	378	31	715	1290	724	629	752	12	373	297	111	113	145	9	24	13	13	10	11	7200

B PERCENTAGE FREQUENCIES OF WIND DIRECTION AND SPEED:

DIRECTION	HOURLY OBSERVATIONS OF WIND SPEED									TOTAL	AVG. SPEED
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		
N	*	3	3	1	*	*				7	9.1
NNE	*	1	2	1	*	*				5	10.3
NE	*	*	*	1	*	*				2	11.9
ENE	*	1	1	1	*					3	10.6
E	*	1	1	1	*	*				3	9.2
ESE	*	1	1	*	*	0	*			3	7.8
SE	*	1	1	*	*		*			2	7.0
SSE	*	1	1	*						2	7.4
S	*	2	1	1	*	*				4	9.0
SSW	*	2	2	1	*	*				6	9.9
SW	*	2	3	1	*					7	8.8
WSW	*	4	4	2	*	*				11	9.6
W	*	2	3	1	1	*				7	10.4
WNW	*	3	4	3	1	*	*	*		11	11.4
NW	*	2	3	3	1	*				9	11.1
NNW	*	2	2	3	*	*	*			8	11.4
CALM	9									9	
TOTAL	19	28	33	20	9	1	*	*		100	9.2

C OCCURRENCES OF PRECIPITATION AMOUNTS:

[illegible]	FREQUENCY OF OCCURRENCE FOR EACH HOUR OF THE DAY — A.M. HOUR ENDING AT												P.M. HOUR ENDING AT												[illegible]
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	
TRACE	14	16	18	21	22	15	17	18	30	31	27	21	27	24	19	24	23	15	18	16	17	19	15	15	36
[illegible]	5	1	5	5	5	6	5	9	9	7	7	7	5	4	6	5	4	8	6	8	10	9	7	6	7
[illegible]	11	15	12	14	17	12	19	11	9	9	9	11	13	14	15	12	16	14	13	11	12	8	12	10	21
[illegible]	7	5	7	4	5	4		2	4	5	5	2	1	2	2	4	1	3	6	5	2	5	2	4	20
[illegible]	1		2		5	5	1	2								1	2	1		5	2	3	2	1	15
[illegible]			2																		2	2			15
[illegible]																									4
[illegible]																									1
TOTAL	38	37	51	55	53	52	52	52	58	70	58	51	54	58	52	58	58	51	53	58	55	53	38	38	[illegible]

D PERCENTAGE FREQUENCIES OF CEILING–VISIBILITY:

VISIBILITY (MILES)	CEILING (FEET)									
	0	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0 TO 1/8	1	*	*	*				*	*	1
3/16 TO 3/8	*	*	*	*	*			*	*	1
1/2 TO 3/4		*	*	*	*	*	*	*	1	2
1 TO 2 1/2		*	1	2	1	*	*	1	4	9
3 TO 6			*	2	2	1	2	3	12	23
7 TO 15				5	2	2	5	7	44	61
20 TO 30						*	*	*	11	1
35 OR MORE										
TOTAL	1	1	2	5	5	3	8	11	65	100

E PERCENTAGE FREQUENCIES OF SKY COVER, WIND, AND RELATIVE HUMIDITY.

HOUR OF DAY	CLOUDS SCALE 0-10			WIND SPEED (M.P.H.)				RELATIVE HUMIDITY (%)					
	0-3	4-7	8-10	0-3	4-12	13-24	25 & over	0-29	30-49	50-69	70-79	80-89	90-100
00	43	9	47	18	65	17		*	4	33	1	24	20
01	44	11	45	16	67	16	1		4	29	21	21	24
02	46	12	43	21	61	18	*		4	26	21	24	26
03	47	8	45	20	62	17	1		3	24	21	21	30
04	45	10	46	17	64	18	*		3	23	20	22	32
05	45	9	45	21	67	17	1		4	23	15	26	32
06	38	14	52	17	67	15	1		4	22	14	30	30
07	32	15	53	19	65	15	1		2	24	15	28	31
08	32	15	52	15	63	22			5	28	15	29	23
09	32	15	53	15	55	30	*		9	39	18	17	17
10	33	14	53	11	58	30	2		20	42	14	13	11
11	28	20	52	8	51	39	2	1	28	40	11	11	8
12	28	17	55	9	48	41	2	2	40	32	10	6	10
13	30	12	58	8	46	44	2	4	46	27	8	6	9
14	31	13	56	9	45	43	2	4	50	23	9	6	8
15	28	14	57	7	53	37	3	4	49	25	8	6	9
16	30	16	54	9	58	32	1	1	45	32	8	6	10
17	36	15	49	9	67	22	1	1	28	49	10	6	11
18	42	10	49	11	71	17	1	*	17	50	13	10	10
19	43	11	46	8	75	16	1		12	48	17	12	11
20	42	13	44	11	71	17	1		8	44	22	14	12
21	43	12	45	14	67	19	*	*	8	38	23	16	16
22	45	12	43	16	64	20	*		8	33	23	19	17
23	46	10	44	18	61	20	*		6	33	22	23	17
AVG	38	13	49	14	61	24	1	1	17	33	16	16	18

13

FIGURE 21

PHILADELPHIA, PENNA.
International AP

DECEMBER
7460 Obs.

A TEMPERATURE AND WIND SPEED–RELATIVE HUMIDITY OCCURRENCES.

B PERCENTAGE FREQUENCIES OF WIND DIRECTION AND SPEED.

C OCCURRENCES OF PRECIPITATION AMOUNTS.

D PERCENTAGE FREQUENCIES OF CEILING–VISIBILITY.

E PERCENTAGE FREQUENCIES OF SKY COVER, WIND, AND RELATIVE HUMIDITY.

HOUR OF DAY	CLOUDS (SCA) 0-10			WIND SPEED (KTS)				RELATIVE HUMIDITY (%)					
	0-3	4-7	8-10	0-3	4-12	13-24	25-OVER	0-29	30-49	50-69	70-89	90-99	100
00	44	6	47	12	65	21	2	9	37	17	17	20	
01	45	8	46	17	62	20	1	8	34	17	18	23	
02	47	8	45	16	64	22	1	6	37	15	22	20	
03	45	8	46	14	65	19	1	6	38	15	19	21	
04	43	9	50	19	61	23	1	4	38	16	18	24	
05	38	13	49	15	63	22	1	3	37	17	18	24	
06	35	10	54	13	64	23	1	3	39	16	15	26	
07	31	12	57	14	63	22	1	3	37	19	17	24	
08	30	10	60	15	59	26	1	5	38	19	19	18	
09	31	12	57	13	54	32	1	10	44	14	15	17	
10	29	15	55	7	51	40	1	24	38	16	10	14	
11	32	12	55	7	53	40	1	32	35	10	9	13	
12	31	15	54	5	51	42	1	37	31	11	7	11	
13	32	12	56	5	48	45	1	39	30	11	5	11	
14	28	16	55	6	48	44	1	40	31	9	5	11	
15	32	13	55	5	54	39	2	41	28	10	5	17	
16	34	15	52	6	57	36	1	38	33	9	6	12	
17	38	12	50	8	62	29	1	26	40	12	10	12	
18	40	10	50	8	67	25	1	18	44	12	11	14	
19	42	10	48	9	66	24	1	14	46	11	14	14	
20	45	7	47	14	63	23	1	12	43	13	14	18	
21	45	7	48	12	64	24	1	12	39	18	14	17	
22	43	7	50	12	66	21	1	11	36	14	18	18	
23	43	6	51	14	62	23	1	11	34	17	17	20	
AVG	38	11	52	11	60	28	1	17	37	14	13	17	

FIGURE 22

PHILADELPHIA, PA
International AP

ANNU
87,672 Obs.

A TEMPERATURE AND WIND SPEED–RELATIVE HUMIDITY OCCURRENCES:

WIND SPEED (MPH) / RELATIVE HUMIDITY (%)	0-3 MPH						4-12 MPH						13-24 MPH						25 MPH AND OVER						TOTAL OBS.
HOUR OF DAY	1	4	7	10	13	16	1	4	7	10	13	16	1	4	7	10	13	16	1	4	7	10	13	16	
100/100							2	1																	3
99/ 95		1	1				5	10	1				1	2	1										17
94/ 90	1	4	2				2	37	14				1	4	2										74
89/ 85	1	10	12	2			3	68	83	4			1	19	18	3									225
84/ 80	2	15	26	8	2		6	102	138	45	11	1	4	23	24	7	2		1	1	1	1			420
79/ 75	2	16	28	25	24	10	11	102	146	64	24	17	5	24	22	11	7	3	1	1	1	1			455
74/ 70	2	15	31	26	43	40	14	94	148	96	57	120	7	23	25	13	11	10	1	1	1	1			863
69/ 65	2	12	29	29	44	43	12	80	126	93	104	116	6	24	23	9	13	12	1	1	1	1			809
64/ 60	1	10	27	30	43	46	11	74	114	82	84	98	5	24	27	10	15	13	1	1	1	1			759
59/ 55	1	9	25	29	36	41	8	77	113	70	78	93	5	26	34	13	15	14	1	1	1	1			710
54/ 50	1	10	24	28	32	34	5	70	126	61	65	83	4	35	29	14	19	23	1	1	1	1			663
49/ 45	1	11	23	24	28	34	3	71	140	71	64	77	4	46	43	9	15	23	1	1	1	1			901
44/ 40	1	9	24	25	32	35	3	67	159	73	60	81	5	47	60	12	17	35	1	1	1	1			950
39/ 35	1	10	22	30	39	34	2	61	192	88	74	75	2	48	56	15	14	31	1	1	1	1			818
34/ 30		8	15	23	33	28	2	70	164	63	45	49	2	42	50	6	6	15	1	1	1	1			654
29/ 25		4	10	14	19	6	2	52	100	24	16	6	2	29	32	2	4	6	1	1	1	1			335
24/ 20		1	5	3	4	1	1	31	44	10	4	1	2	38	28	4	3	2	1	1	1	1			189
19/ 15			1	1	2	1	1	17	50	3	3	1	1	15	12	1	2	1	1	1	1	1			100
14/ 10			1	2	2	1	1	6	10	1	1	1	1	6	3	1	1	1	1	1	1	1			32
09/ 05				1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1			9
TOTAL	14	132	251	298	384	408	93	1097	1875	875	815	849	58	575	592	126	149	221	14	21	28	8	10	13	7167

In Tables A and C, occurrences are for the average year (10-year total divided by 10). Values are rounded to the nearest whole, but not adjusted to make their sums exactly equal to column or row totals. "+" indicates more than 0 but less than 0.5.

B PERCENTAGE FREQUENCIES OF WIND DIRECTION AND SPEED:

DIRECTION	HOURLY OBSERVATIONS OF WIND SPEED (MPH)																								AVG SPEED (MPH)
	0	0-3	4-7	8-12	13-18	19-24	25-31	32-38	39-46	47-54	55-63	64-72	73-82	83-92	93-103	104-114	115-125	126-136	137-147	148-158	159-169	170-180	181-191	192-202	
N	+	2	3	2	+	+	+	+																	8	9.9
NNE	+	1	2	1	+	+	+	+																	6	10.4
NE	+	1	1	1	+	+	+																		3	11.3
ENE	+	1	2	2	+	+	+																		6	12.0
E	+	1	2	1	+	+	+																		4	10.3
ESE	+	1	1	+	+	+																			3	8.4
SE	+	1	1	+	+	+	+	+																	3	8.0
SSE	+	1	1	+	+	+	+																		3	7.9
S	+	2	1	1	+	+	+	+																	4	8.8
SSW	+	2	2	1	+	+	+	+																	6	10.0
SW	+	2	4	2	+	+	+																		8	9.7
WSW	+	3	5	2	+	+																			11	9.7
W	+	2	2	1	+	+	+																		6	9.6
WNW	+	2	3	2	1	+	+	+																	8	11.6
NW	+	2	2	2	1	+	+	+																	7	11.7
NNW	+	2	2	2	1	+	+																		7	11.6
CALM	3																									
TOTAL	11	27	33	21	5	1	+	+																		9.6

C OCCURRENCES OF PRECIPITATION AMOUNTS:

INTENSITIES	FREQUENCY OF OCCURRENCE FOR EACH HOUR OF THE DAY																								TOTAL
	AM HOUR ENDING AT												PM HOUR ENDING AT												
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	
TRACE	24	25	24	23	24	23	30	30	33	32	31	24	29	29	28	28	27	25	26	27	25	25	24	25	59
0.01 - 0.09	8	7	7	8	7	8	6	8	6	6	6	6	7	5	6	6	4	5	6	5	6	6	6	6	16
0.10 - 0.19	13	14	15	14	14	13	13	13	13	13	13	12	13	15	14	14	13	13	13	12	14	15	14	14	32
0.20 - 0.29	5	5	5	5	6	5	4	4	4	4	4	3	3	3	3	3	3	3	3	3	3	3	3	3	25
0.30 - 0.39	3	2	3	3	2	3	2	2	2	2	2	2	1	2	2	2	2	2	2	2	2	2	2	2	19
0.40 - 0.49	1	1	1	1	1	1	1	1	1	1	1	1	+	+	+	+	1	1	1	1	1	1	1	1	20
0.50 - 0.59	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	8
0.60 - 0.69	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	1
TOTAL	54	54	55	54	54	53	56	58	59	57	56	48	53	54	52	53	50	49	51	50	51	51	49	51	179

D PERCENTAGE FREQUENCIES OF CEILING–VISIBILITY:

VISIBILITY (MILES)	CEILING (100 FT)											TOTAL
	0	0-1/2	1/2-1	1-2	2-3	3-5	5-7	7-10	10-15	15-20	20+	
0 TO 1/8	+	+	+	+	+	+	+	+	+	+	1	1
1/4 TO 1/2	+	+	+	+	+	+	+	+	+	+	+	+
3/4 TO 1		+	+	+	+	+	+	+	+	+	1	1
1 1/4 TO 2			+	1	2	1	+	+	+	+	3	8
2 1/2 TO 4			+	+	1	3	1	2	3	16	28	
5 TO 15				+	1	2	2	5	7	44	62	
20 TO 30							+	+	+	+	+	
35 OR MORE												
TOTAL	1	1	2	4	3	6	3	7	10	66	100	

E PERCENTAGE FREQUENCIES OF SKY COVER, WIND, AND RELATIVE HUMIDITY:

HOUR OF DAY	CLOUD SCALE 0-10			WIND SPEED (M.P.H.)				RELATIVE HUMIDITY (%)					
	0-3	4-7	8-10	0-3	4-12	13-24	25+	0-29	30-49	50-69	70-79	80-89	90-100
							MPH						
00	46	9	45	15	67	18	1	+	6	27	20	24	22
01	44	10	45	16	67	17	+		6	26	19	25	25
02	44	11	45	18	65	17	+		5	25	18	24	28
03	45	10	46	19	64	16	1		4	23	18	24	32
04	43	11	46	18	65	17	+	+	5	23	18	23	33
05	37	13	50	19	63	18	+	+	5	22	18	23	34
06	34	14	52	19	62	19	1	+	4	24	19	23	31
07	33	14	53	15	67	21	1	+	5	29	19	22	25
08	33	14	53	12	60	27	1	+	10	34	18	19	17
09	33	16	51	11	59	31	1	+	19	39	15	14	13
10	32	17	51	8	57	33	2	1	28	38	12	10	10
11	30	20	50	7	54	37	2	3	35	36	10	8	8
12	29	20	51	5	54	38	2	4	42	32	9	6	7
13	27	20	53	5	52	41	2	6	45	29	7	6	7
14	27	23	51	5	52	41	2	7	44	28	7	6	6
15	27	22	51	5	51	43	2	7	47	27	6	6	7
16	29	20	50	5	55	39	2	6	44	30	7	7	7
17	33	19	48	5	61	32	1	4	36	36	8	7	8
18	36	16	48	4	66	27	1	2	28	43	11	9	9
19	38	15	47	4	70	23	1	1	20	42	15	11	10
20	42	13	45	5	70	20	1	1	13	41	19	14	12
21	44	12	44	10	70	19	1	+	10	36	22	17	14
22	45	12	43	13	68	19	+	+	9	33	22	20	17
23	46	10	44	14	67	19	1	+	8	29	22	23	19
AVG	36	15	49	11	62	26	1	2	20	31	15	15	17

USCOMM-NOAA-ASHEVILLE-1974-800

FIGURE 23

PLAN VIEW OF METEOROLOGICAL TOWER ARTIFICIAL ISLAND

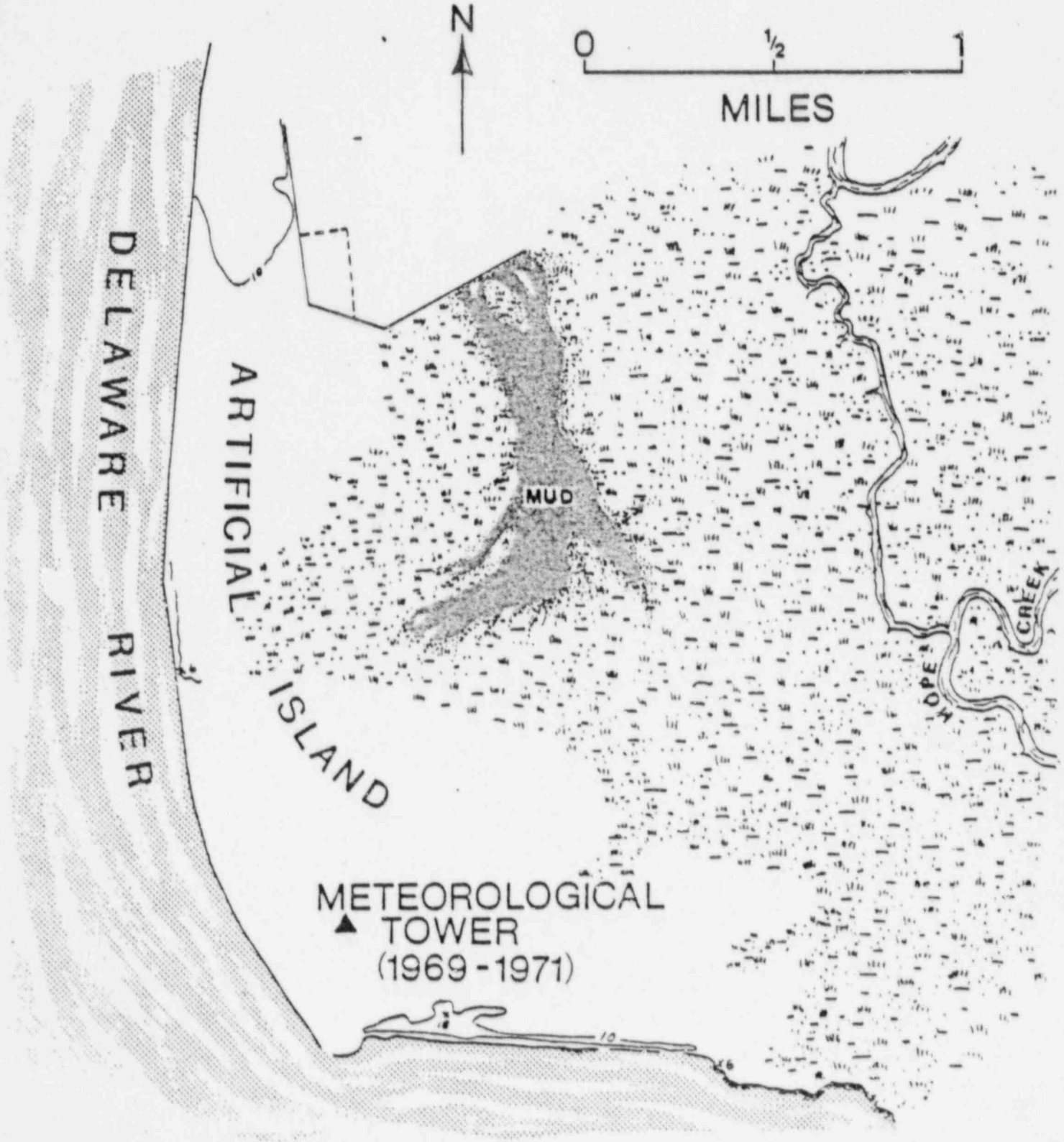


FIGURE 2.4

FIGURE 25

METEOROLOGICAL INSTRUMENTATION

ARTIFICIAL ISLAND

1969 - 1971

Ambient Temperature

Rosemount Resistance Thermometers
Model 1-109MB

Beckman and Whitley Aspirated
Thermal Radiation Shields
Model M327

Bristol Dynamaster 6 Point Recorder
M[illegible]64A-6P 1570-33 — Range: -30°F - +120°F

Wind Speed and Direction

Bendix-Friez Aerovane
Model 120

Bendix-Friez Recorder
Model 141

Wind Speed - Distance Constant: 15' — Range: 0-100 mph

Wind Direction - Distance Constant: 34' — Range: 0-540°

Barometric Pressure

Belfort Drum Type Microbarograph — Range: 28.50-31.00" Hg

Relative Humidity

Casella Hygrothermograph — Range: 0-100%

Precipitation

Belfort Weighing Rain Gauge — Range: 0-12"

FIGURE 26

SAMPLE COMPARISONS OF STABILITY ESTIMATES

Stability	Site Characteristics: Shore	Shore	Shore	Estuary	Inland
Unstable					
Smith-Singer *	45	68	46	64	67
(Pasq. A, B, C)+	12	16	8	10	18
Neutral					
Smith-Singer	28	13	19	14	16
(Pasq. D)	64	29	31	46	36
Stable					
Smith-Singer	28	19	35	22	17
(Pasq. E, F, G)	23	55	61	44	46

* Smith-Singer Gustiness or Lapse Rate Equivalent

+ NRC Lapse Rate Categories

FIGURE 27

HOPE CREEK

BUILDING VENT

DEPLETED X/Q AT GROUND LEVEL APPLICABLE TO

LONG-TERM (ROUTINE) GASEOUS RELEASES

(SECONDS/M^3)

SECTOR ANNUAL X/Q AT GROUND LEVEL

DISTANCE MILES	SECTOR BEARING (DEGREES) 22,5	45,0	67,5	90,0	112,5	135,0	157,5	180,0
,25	1,085E-06	1,134E-06	8,914E-07	1,55?E-06	1,397E-06	2,011E-06	1,383E-06	1,302E-06
,50	5,043E-07	5,454E-07	4,599E-07	7,033E-07	5,896E-07	8,094E-07	5,614E-07	5,821E-07
,75	2,873E-07	3,159E-07	2,747E-07	4,005E-07	3,243E-07	4,354E-07	3,053E-07	3,294E-07
1,00	1,829E-07	2,026E-07	1,784E-07	2,545E-07	2,031E-07	2,697E-07	1,902E-07	2,086E-07
1,10	1,562E-07	1,733E-07	1,530E-07	2,172E-07	1,728E-07	2,287E-07	1,615E-07	1,778E-07
1,20	1,348E-07	1,498E-07	1,325E-07	1,873E-07	1,486E-07	1,963E-07	1,388E-07	1,532E-07
1,30	1,175E-07	1,306E-07	1,157E-07	1,631E-07	1,292E-07	1,702E-07	1,204E-07	1,333E-07
1,40	1,032E-07	1,149E-07	1,019E-07	1,431E-07	1,132E-07	1,490E-07	1,055E-07	1,169E-07
1,50	9,135E-08	1,017E-07	9,029E-08	1,266E-07	1,000E-07	1,315E-07	9,312E-08	1,033E-07
1,60	8,141E-08	9,069E-08	8,052E-08	1,127E-07	8,902E-08	1,168E-07	8,278E-08	9,190E-08
1,70	7,298E-08	8,132E-08	7,223E-08	1,009E-07	7,970E-08	1,045E-07	7,406E-08	8,226E-08
1,80	6,579E-08	7,332E-08	6,512E-08	9,091E-08	7,175E-08	9,398E-08	6,664E-08	7,403E-08
1,90	5,960E-08	6,642E-08	5,900E-08	8,227E-08	6,494E-08	8,498E-08	6,027E-08	6,696E-08
2,00	5,423E-08	6,044E-08	5,368E-08	7,480E-08	5,904E-08	7,720E-08	5,476E-08	6,084E-08
2,10	4,955E-08	5,523E-08	4,903E-08	6,828E-08	5,390E-08	7,044E-08	4,997E-08	5,552E-08
2,20	4,545E-08	5,065E-08	4,496E-08	6,257E-08	4,940E-08	6,452E-08	4,578E-08	5,085E-08
2,30	4,183E-08	4,661E-08	4,136E-08	5,754E-08	4,545E-08	5,932E-08	4,209E-08	4,674E-08
2,40	3,863E-08	4,304E-08	3,817E-08	5,309E-08	4,194E-08	5,472E-08	3,883E-08	4,310E-08
2,50	3,577E-08	3,985E-08	3,533E-08	4,913E-08	3,882E-08	5,063E-08	3,593E-08	3,986E-08
2,60	3,322E-08	3,700E-08	3,279E-08	4,559E-08	3,604E-08	4,698E-08	3,334E-08	3,698E-08
2,70	3,093E-08	3,445E-08	3,051E-08	4,241E-08	3,355E-08	4,371E-08	3,102E-08	3,439E-08
2,80	2,887E-08	3,214E-08	2,846E-08	3,955E-08	3,130E-08	4,077E-08	2,893E-08	3,206E-08
2,90	2,701E-08	3,006E-08	2,661E-08	3,697E-08	2,927E-08	3,811E-08	2,704E-08	2,995E-08
3,00	2,532E-08	2,818E-08	2,492E-08	3,463E-08	2,743E-08	3,571E-08	2,534E-08	2,805E-08
3,10	2,378E-08	2,646E-08	2,339E-08	3,251E-08	2,576E-08	3,352E-08	2,379E-08	2,632E-08
3,20	2,238E-08	2,489E-08	2,200E-08	3,057E-08	2,424E-08	3,153E-08	2,237E-08	2,474E-08
3,30	2,110E-08	2,346E-08	2,072E-08	2,880E-08	2,285E-08	2,971E-08	2,108E-08	2,330E-08
3,40	1,993E-08	2,215E-08	1,955E-08	2,717E-08	2,157E-08	2,805E-08	1,990E-08	2,198E-08
3,50	1,885E-08	2,094E-08	1,848E-08	2,568E-08	2,040E-08	2,652E-08	1,881E-08	2,076E-08
3,60	1,785E-08	1,983E-08	1,749E-08	2,431E-08	1,932E-08	2,511E-08	1,781E-08	1,965E-08

FIGURE 28

HOPE CREEK

BUILDING VENT

DEPLETED X/Q AT GROUND LEVEL APPLICABLE TO

LONG-TERM (ROUTINE) GASEOUS RELEASES

(SECONDS/M^3)

SECTOR ANNUAL X/Q AT GROUND LEVEL

DISTANCE	SECTOR BEARING(DEGREES)							
MILES	22.5	45.0	67.5	90.0	112.5	135.0	157.5	180.0
3.70	1.693E-08	1.881E-08	1.657E-08	2.304E-08	1.832E-08	2.381E-08	1.689E-08	1.862E-08
3.80	1.608E-08	1.786E-08	1.573E-08	2.187E-08	1.740E-08	2.261E-08	1.603E-08	1.767E-08
3.90	1.529E-08	1.698E-08	1.495E-08	2.079E-08	1.655E-08	2.149E-08	1.524E-08	1.679E-08
4.00	1.456E-08	1.616E-08	1.422E-08	1.978E-08	1.575E-08	2.046E-08	1.451E-08	1.597E-08
4.10	1.388E-08	1.540E-08	1.354E-08	1.885E-08	1.502E-08	1.950E-08	1.383E-08	1.521E-08
4.20	1.325E-08	1.469E-08	1.291E-08	1.797E-08	1.433E-08	1.860E-08	1.319E-08	1.450E-08
4.30	1.266E-08	1.403E-08	1.233E-08	1.716E-08	1.369E-08	1.777E-08	1.260E-08	1.384E-08
4.40	1.210E-08	1.342E-08	1.178E-08	1.640E-08	1.309E-08	1.699E-08	1.205E-08	1.323E-08
4.50	1.159E-08	1.284E-08	1.127E-08	1.569E-08	1.253E-08	1.626E-08	1.153E-08	1.265E-08
4.60	1.110E-08	1.230E-08	1.078E-08	1.503E-08	1.201E-08	1.558E-08	1.104E-08	1.211E-08
4.70	1.065E-08	1.179E-08	1.033E-08	1.440E-08	1.151E-08	1.494E-08	1.059E-08	1.160E-08
4.80	1.022E-08	1.131E-08	9.910E-09	1.381E-08	1.105E-08	1.433E-08	1.016E-08	1.113E-08
4.90	9.815E-09	1.086E-08	9.512E-09	1.326E-08	1.061E-08	1.377E-08	9.757E-09	1.068E-08
5.00	9.435E-09	1.044E-08	9.136E-09	1.274E-08	1.020E-08	1.323E-08	9.378E-09	1.026E-08
5.10	9.077E-09	1.004E-08	8.782E-09	1.225E-08	9.815E-09	1.273E-08	9.020E-09	9.864E-09
5.20	8.739E-09	9.662E-09	8.448E-09	1.179E-08	9.450E-09	1.225E-08	8.682E-09	9.489E-09
5.30	8.419E-09	9.306E-09	8.133E-09	1.135E-08	9.104E-09	1.180E-08	8.363E-09	9.135E-09
5.40	8.115E-09	8.969E-09	7.834E-09	1.094E-08	8.777E-09	1.138E-08	8.062E-09	8.801E-09
5.50	7.830E-09	8.650E-09	7.552E-09	1.055E-08	8.467E-09	1.098E-08	7.776E-09	8.484E-09
6.00	6.601E-09	7.282E-09	6.342E-09	8.870E-09	7.139E-09	9.252E-09	6.551E-09	7.128E-09
7.50	4.253E-09	4.672E-09	4.042E-09	5.678E-09	4.60[illegible]E-09	5.961E-09	4.216E-09	4.558E-09
10.00	2.407E-09	2.628E-09	2.252E-09	3.186E-09	2.610E-09	3.377E-09	2.385E-09	2.546E-09
15.00	1.122E-09	1.189E-09	1.008E-09	1.433E-09	1.198E-09	1.541E-09	1.094E-09	1.146E-09
20.00	6.748E-10	7.184E-10	6.110E-10	8.540E-10	7.311E-10	9.256E-10	6.716E-10	6.918E-10
25.00	4.769E-10	5.041E-10	4.325E-10	5.903E-10	5.166E-10	6.418E-10	4.779E-10	4.863E-10
30.00	3.588E-10	3.746E-10	3.234E-10	4.344E-10	3.860E-10	4.733E-10	3.569E-10	3.620E-10
35.00	2.728E-10	2.834E-10	2.448E-10	3.272E-10	2.935E-10	3.581E-10	2.734E-10	2.740E-10
40.00	2.085E-10	2.199E-10	1.857E-10	2.495E-10	2.248E-10	2.746E-10	2.094E-10	2.087E-10
45.00	1.606E-10	1.660E-10	1.417E-10	1.925E-10	1.739E-10	2.134E-10	1.616E-10	1.605E-10
50.00	1.252E-10	1.292E-10	1.092E-10	1.508E-10	1.362E-10	1.684E-10	1.263E-10	1.246E-10

FIGURE 29

HOPE CREEK

BUILDING VENT

DEPLETED X/Q AT GROUND LEVEL APPLICABLE TO

LONG-TERM (ROUTINE) GASEOUS RELEASES

(SECONDS/M^3)

SECTOR ANNUAL X/Q AT GROUND LEVEL

DISTANCE MILES	SECTOR BEARING(DEGREES) 202,5	225,0	247,5	270,0	292,5	315,0	337,5	360,0
.25	7,385E-07	8,610E-07	5,707E-07	6,810E-07	3,592E-07	6,965E-07	1,170E-06	1,685E-06
.50	4,904E-07	4,0[illegible]9E-07	2,687E-07	3,260E-07	2,013E-07	4,012E-07	6,143E-07	7,587E-07
.75	2,354E-07	2,345E-07	1,550E-07	1,861E-07	1,219E-07	2,463E-07	3,697E-07	4,287E-07
1,00	1,511E-07	1,493E-07	9,876E-08	1,179E-07	7,920E-08	1,618E-07	2,415E-07	2,718E-07
1,10	1,294E-07	1,277E-07	8,424E-08	1,005E-07	[illegible]E-08	1,393E-07	2,077E-07	2,318E-07
1,20	1,119E-07	1,099E-07	7,260E-08	8,652E-08	5,672E-08	1,209E-07	1,802E-07	1,999E-07
1,30	9,756E-08	9,567E-08	6,314E-08	7,520E-08	5,121E-08	1,059E-07	1,577E-07	1,740E-07
1,40	8,575E-08	8,397E-08	5,536E-08	6,591E-08	4,501E-08	9,335E-08	1,391E-07	1,528E-07
1,50	7,587E-08	7,425E-08	4,890E-08	5,820E-08	3,983E-08	8,288E-08	1,235E-07	1,352E-07
1,60	6,757E-08	6,609E-08	4,347E-08	5,174E-08	3,547E-08	7,403E-08	1,104E-07	1,204E-07
1,70	6,052E-08	5,918E-08	3,889E-08	4,628E-08	3,177E-08	6,649E-08	9,915E-08	1,078E-07
1,80	5,449E-08	5,328E-08	3,497E-08	4,162E-08	2,860E-08	6,003E-08	8,955E-08	9,716E-08
1,90	4,930E-08	4,821E-08	3,161E-08	3,762E-08	2,587E-08	5,444E-08	8,125E-08	8,796E-08
2,00	4,480E-08	4,381E-08	2,869E-08	3,416E-08	2,350E-08	4,958E-08	7,404E-08	8,000E-08
2,10	4,088E-08	3,998E-08	2,616E-08	3,114E-08	2,144E-08	4,534E-08	6,773E-08	7,307E-08
2,20	3,744E-08	3,663E-08	2,394E-08	2,850E-08	1,963E-08	4,161E-08	6,219E-08	6,699E-08
2,30	3,440E-08	3,367E-08	2,198E-08	2,618E-08	1,803E-08	3,831E-08	5,729E-08	6,163E-08
2,40	3,172E-08	3,106E-08	2,026E-08	2,413E-08	1,662E-08	3,538E-08	5,294E-08	5,688E-08
2,50	2,933E-08	2,873E-08	1,872E-08	2,231E-08	1,536E-08	3,277E-08	4,907E-08	5,266E-08
2,60	2,719E-08	2,665E-08	1,735E-08	2,068E-08	1,424E-08	3,044E-08	4,560E-08	4,888E-08
2,70	2,528E-08	2,479E-08	1,612E-08	1,922E-08	1,323E-08	2,834E-08	4,248E-08	4,550E-08
2,80	2,355E-08	2,311E-08	1,502E-08	1,791E-08	1,232E-08	2,645E-08	3,966E-08	4,245E-08
2,90	2,200E-08	2,159E-08	1,402E-08	1,672E-08	1,151E-08	2,474E-08	3,712E-08	3,970E-08
3,00	2,059E-08	2,022E-08	1,312E-08	1,565E-08	1,076E-08	2,319E-08	3,481E-08	3,720E-08
3,10	1,931E-08	1,897E-08	1,230E-08	1,468E-08	1,009E-08	2,177E-08	3,271E-08	3,493E-08
3,20	1,814E-08	1,784E-08	1,153E-08	1,379E-08	9,479E-09	2,048E-08	3,079E-08	3,288E-08
3,30	1,708E-08	1,680E-08	1,087E-08	1,298E-08	8,919E-09	1,930E-08	2,903E-08	3,097E-08
3,40	1,610E-08	1,585E-08	1,025E-08	1,224E-08	8,406E-09	1,822E-08	2,742E-08	2,924E-08
3,50	1,520E-08	1,497E-08	9,674E-09	1,156E-08	7,935E-09	1,723E-08	2,593E-08	2,765E-08
3,60	1,438E-08	1,417E-08	9,147E-09	1,094E-08	7,502E-09	1,631E-08	2,457E-08	2,618E-08

FIGURE 30

HOPE CREEK
BUILDING VENT
DEPLETED X/Q AT GROUND LEVEL APPLICABLE TO
LONG-TERM (ROUTINE) GASEOUS RELEASES
(SECONDS/M^3)
SECTOR ANNUAL X/Q AT GROUND LEVEL

DISTANCE MILES	SECTOR BEARING(DEGREES) 202,5	225,0	247,5	270,0	292,5	315,0	337,5	360,0
3,70	1,362E-08	1,343E-08	8,662E-09	1,036E-08	7,103E-09	1,546E-08	2,331E-08	2,482E-08
3,80	1,291E-08	1,274E-08	8,214E-09	9,825E-09	6,734E-09	1,468E-08	2,214E-08	2,357E-08
3,90	1,226E-08	1,210E-08	7,799E-09	9,332E-09	6,392E-09	1,396E-08	2,105E-08	2,241E-08
4,00	1,166E-08	1,152E-08	7,414E-09	8,874E-09	6,075E-09	1,328E-08	2,005E-08	2,133E-08
4,10	1,110E-08	1,097E-08	7,057E-09	8,449E-09	5,781E-09	1,265E-08	1,911E-08	2,033E-08
4,20	1,058E-08	1,046E-08	6,724E-09	8,053E-09	5,508E-09	1,207E-08	1,824E-08	1,940E-08
4,30	1,009E-08	9,981E-09	6,414E-09	7,684E-09	5,252E-09	1,153E-08	1,742E-08	1,853E-08
4,40	9,636E-09	9,537E-09	6,125E-09	7,340E-09	5,014E-09	1,102E-08	1,666E-08	1,771E-08
4,50	9,211E-09	9,121E-09	5,855E-09	7,018E-09	4,792E-09	1,054E-08	1,595E-08	1,695E-08
4,60	8,813E-09	8,732E-09	5,601E-09	6,716E-09	4,583E-09	1,009E-08	1,528E-08	1,624E-08
4,70	8,440E-09	8,366E-09	5,364E-09	6,434E-09	4,388E-09	9,673E-09	1,465E-08	1,557E-08
4,80	8,089E-09	8,023E-09	5,141E-09	6,168E-09	4,204E-09	9,278E-09	1,406E-08	1,494E-08
4,90	7,760E-09	7,701E-09	4,932E-09	5,919E-09	4,032E-09	8,907E-09	1,350E-08	1,435E-08
5,00	7,450E-09	7,397E-09	4,735E-09	5,684E-09	3,870E-09	8,558E-09	1,298E-08	1,379E-08
5,10	7,158E-09	7,111E-09	4,549E-09	5,463E-09	3,717E-09	8,228E-09	1,248E-08	1,326E-08
5,20	6,883E-09	6,840E-09	4,374E-09	5,254E-09	3,573E-09	7,917E-09	1,202E-08	1,277E-08
5,30	6,622E-09	6,585E-09	4,209E-09	5,057E-09	3,437E-09	7,623E-09	1,158E-08	1,230E-08
5,40	6,376E-09	6,344E-09	4,052E-09	4,870E-09	3,308E-09	7,345E-09	1,116E-08	1,185E-08
5,50	6,144E-09	6,115E-09	3,904E-09	4,694E-09	3,186E-09	7,081E-09	1,076E-08	1,143E-08
6,00	5,149E-09	5,137E-09	3,272E-09	3,939E-09	2,667E-09	5,953E-09	9,066E-09	9,628E-09
7,50	3,264E-09	3,278E-09	2,076E-09	2,509E-09	1,684E-09	3,802E-09	5,823E-09	6,187E-09
10,00	1,808E-09	1,833E-09	1,153E-09	1,401E-09	9,265E-10	2,128E-09	3,277E-09	3,490E-09
15,00	8,094E-10	8,315E-10	5,295E-10	6,421E-10	3,961E-10	9,344E-10	1,474E-09	1,576E-09
20,00	4,997E-10	5,167E-10	3,475E-10	4,117E-10	2,559E-10	5,817E-10	8,753E-10	9,396E-10
25,00	3,619E-10	3,751E-10	2,673E-10	3,089E-10	1,946E-10	4,141E-10	6,023E-10	6,469E-10
30,00	2,749E-10	2,853E-10	2,108E-10	2,399E-10	9,144E-11	3,107E-10	4,415E-10	4,746E-10
35,00	2,095E-10	2,180E-10	1,634E-10	1,850E-10	6,591E-11	2,355E-10	3,314E-10	3,575E-10
40,00	1,590E-10	1,661E-10	1,245E-10	1,411E-10	4,961E-11	1,786E-10	2,520E-10	2,728E-10
45,00	1,208E-10	1,267E-10	9,599E-11	1,072E-10	3,864E-11	1,360E-10	1,939E-10	2,112E-10
50,00	9,245E-11	9,756E-11	7,111E-11	8,182E-11	3,088E-11	1,046E-10	1,514E-10	1,660E-10

FIGURE 31

HOPE CREEK

BUILDING VENT

D/Q AT GROUND LEVEL APPLICABLE TO

LONG-TERM (ROUTINE) GASEOUS RELEASES

(M^{-2})

SECTOR ANNUAL D/Q AT GROUND LEVEL

DISTANCE MILES	SECTOR BEARING(DEGREES) 22,5	45,0	67,5	90,0	112,5	135,0	157,5	180,0
,25	1,085E-08	1,134E-08	8,914E-09	1,534E-08	1,397E-08	2,011E-08	1,383E-08	1,302E-08
,50	5,043E-09	5,454E-09	4,599E-09	7,033E-09	5,896E-09	8,094E-09	5,614E-09	5,821E-09
,75	2,873E-09	3,159E-09	2,747E-09	4,005E-09	3,243E-09	4,354E-09	3,053E-09	3,294E-09
1,00	1,829E-09	2,026E-09	1,784E-09	2,545E-09	2,031E-09	2,697E-09	1,902E-09	2,086E-09
1,10	1,562E-09	1,733E-09	1,530E-09	2,172E-09	1,728E-09	2,287E-09	1,615E-09	1,778E-09
1,20	1,348E-09	1,498E-09	1,325E-09	1,873E-09	1,486E-09	1,963E-09	1,388E-09	1,532E-09
1,30	1,175E-09	1,306E-09	1,157E-09	1,631E-09	1,292E-09	1,702E-09	1,204E-09	1,333E-09
1,40	1,032E-09	1,149E-09	1,019E-09	1,431E-09	1,132E-09	1,490E-09	1,055E-09	1,169E-09
1,50	9,135E-10	1,017E-09	9,029E-10	1,266E-09	1,000E-09	1,315E-09	9,312E-10	1,033E-09
1,60	8,141E-10	9,069E-10	8,052E-10	1,127E-09	8,902E-10	1,168E-09	8,278E-10	9,190E-10
1,70	7,298E-10	8,132E-10	7,223E-10	1,009E-09	7,970E-10	1,045E-09	7,406E-10	8,226E-10
1,80	6,579E-10	7,332E-10	6,512E-10	9,091E-10	7,175E-10	9,398E-10	6,664E-10	7,403E-10
1,90	5,960E-10	6,642E-10	5,900E-10	8,227E-10	6,494E-10	8,498E-10	6,027E-10	6,696E-10
2,00	5,423E-10	6,044E-10	5,368E-10	7,480E-10	5,904E-10	7,720E-10	5,476E-10	6,084E-10
2,10	4,955E-10	5,523E-10	4,903E-10	6,828E-10	5,390E-10	7,044E-10	4,997E-10	5,552E-10
2,20	4,545E-10	5,065E-10	4,496E-10	6,257E-10	4,940E-10	6,452E-10	4,578E-10	5,085E-10
2,30	4,183E-10	4,661E-10	4,136E-10	5,754E-10	4,545E-10	5,932E-10	4,209E-10	4,674E-10
2,40	3,863E-10	4,304E-10	3,817E-10	5,309E-10	4,194E-10	5,472E-10	3,883E-10	4,310E-10
2,50	3,577E-10	3,985E-10	3,533E-10	4,913E-10	3,882E-10	5,063E-10	3,593E-10	3,986E-10
2,60	3,322E-10	3,700E-10	3,279E-10	4,559E-10	3,604E-10	4,698E-10	3,334E-10	3,698E-10
2,70	3,093E-10	3,445E-10	3,051E-10	4,241E-10	3,355E-10	4,371E-10	3,102E-10	3,439E-10
2,80	2,887E-10	3,214E-10	2,846E-10	3,955E-10	3,130E-10	4,077E-10	2,893E-10	3,206E-10
2,90	2,701E-10	3,006E-10	2,661E-10	3,697E-10	2,927E-10	3,811E-10	2,704E-10	2,995E-10
3,00	2,532E-10	2,818E-10	2,492E-10	3,463E-10	2,743E-10	3,571E-10	2,534E-10	2,805E-10
3,10	2,378E-10	2,646E-10	2,339E-10	3,251E-10	2,576E-10	3,352E-10	2,379E-10	2,632E-10
3,20	2,238E-10	2,489E-10	2,200E-10	3,057E-10	2,424E-10	3,153E-10	2,237E-10	2,474E-10
3,30	2,110E-10	2,346E-10	2,072E-10	2,880E-10	2,285E-10	2,971E-10	2,108E-10	2,330E-10
3,40	1,993E-10	2,215E-10	1,955E-10	2,717E-10	2,157E-10	2,805E-10	1,990E-10	2,198E-10
3,50	1,885E-10	2,094E-10	1,848E-10	2,568E-10	2,040E-10	2,652E-10	1,881E-10	2,076E-10
3,60	1,785E-10	1,983E-10	1,749E-10	2,431E-10	1,932E-10	2,511E-10	1,781E-10	1,965E-10

FIGURE 32

HOPE CREEK

BUILDING VENT

D/Q AT GROUND LEVEL APPLICABLE TO

LONG-TERM (ROUTINE) GASEOUS RELEASES

(M^{-2})

SECTOR ANNUAL D/Q AT GROUND LEVEL

DISTANCE MILES	SECTOR BEARING (DEGREES) 22.5	45.0	67.5	90.0	112.5	135.0	157.5	180.0
1.70	1.693E-10	1.881E-10	1.657E-10	2.304E-10	1.832E-10	2.381E-10	1.689E-10	1.862E-10
1.80	1.604E-10	1.786E-10	1.573E-10	2.187E-10	1.740E-10	2.261E-10	1.603E-10	1.767E-10
1.90	1.524E-10	1.698E-10	1.495E-10	2.079E-10	1.655E-10	2.149E-10	1.524E-10	1.679E-10
2.00	1.456E-10	1.616E-10	1.422E-10	1.978E-10	1.575E-10	2.046E-10	1.451E-10	1.597E-10
2.10	1.388E-10	1.540E-10	1.354E-10	1.885E-10	1.502E-10	1.950E-10	1.383E-10	1.521E-10
2.20	1.325E-10	1.469E-10	1.291E-10	1.797E-10	1.433E-10	1.860E-10	1.319E-10	1.450E-10
2.30	1.266E-10	1.403E-10	1.233E-10	1.716E-10	1.369E-10	1.777E-10	1.260E-10	1.384E-10
2.40	1.210E-10	1.342E-10	1.178E-10	1.640E-10	1.309E-10	1.699E-10	1.205E-10	1.323E-10
2.50	1.159E-10	1.284E-10	1.127E-10	1.569E-10	1.253E-10	1.626E-10	1.153E-10	1.265E-10
2.60	1.110E-10	1.230E-10	1.078E-10	1.503E-10	1.201E-10	1.558E-10	1.104E-10	1.211E-10
2.70	1.065E-10	1.179E-10	1.033E-10	1.440E-10	1.151E-10	1.494E-10	1.059E-10	1.160E-10
2.80	1.022E-10	1.131E-10	9.910E-11	1.381E-10	1.105E-10	1.433E-10	1.016E-10	1.113E-10
2.90	9.815E-11	1.086E-10	9.512E-11	1.326E-10	1.061E-10	1.377E-10	9.757E-11	1.068E-10
3.00	9.435E-11	1.044E-10	9.136E-11	1.274E-10	1.020E-10	1.323E-10	9.378E-11	1.026E-10
3.10	9.077E-11	1.004E-10	8.782E-11	1.225E-10	9.815E-11	1.273E-10	9.020E-11	9.864E-11
3.20	8.739E-11	9.662E-11	8.448E-11	1.179E-10	9.450E-11	1.225E-10	8.682E-11	9.489E-11
3.30	8.419E-11	9.306E-11	8.133E-11	1.135E-10	9.104E-11	1.180E-10	8.363E-11	9.133E-11
3.40	8.116E-11	8.969E-11	7.834E-11	1.094E-10	8.777E-11	1.138E-10	8.062E-11	8.801E-11
3.50	7.830E-11	8.650E-11	7.552E-11	1.055E-10	8.467E-11	1.098E-10	7.776E-11	8.484E-11
3.60	7.561E-11	7.282E-11	6.342E-11	4.870E-11	7.139E-11	9.252E-11	6.551E-11	7.128E-11
3.70	4.253E-11	4.672E-11	4.042E-11	5.678E-11	4.603E-11	5.961E-11	4.216E-11	4.552E-11
10.00	2.407E-11	2.628E-11	2.292E-11	3.186E-11	2.610E-11	3.377E-11	2.385E-11	2.566E-11
15.00	1.102E-11	1.189E-11	1.008E-11	1.433E-11	1.198E-11	1.541E-11	1.094E-11	1.196E-11
20.00	6.744E-12	7.184E-12	6.110E-12	8.540E-12	7.311E-12	9.256E-12	6.716E-12	6.914E-12
25.00	4.739E-12	5.041E-12	4.325E-12	5.903E-12	5.166E-12	6.418E-12	4.779E-12	4.865E-12
30.00	3.588E-12	3.796E-12	3.254E-12	4.344E-12	3.860E-12	4.735E-12	3.589E-12	3.620E-12
35.00	2.828E-12	2.954E-12	2.498E-12	3.272E-12	2.935E-12	3.581E-12	2.734E-12	2.740E-12
40.00	2.305E-12	2.359E-12	1.957E-12	2.495E-12	2.248E-12	2.740E-12	2.094E-12	2.087E-12
45.00	1.896E-12	1.880E-12	1.517E-12	1.925E-12	1.739E-12	2.134E-12	1.616E-12	1.603E-12
50.00	1.252E-12	1.292E-12	1.092E-12	1.388E-12	1.362E-12	1.684E-12	1.263E-12	1.246E-12

FIGURE 33

HOPE CREEK

BUILDING VENT

D/Q AT GROUND LEVEL APPLICABLE TO

LONG-TERM (ROUTINE) GASEOUS RELEASES

(M^{-2})

SECTOR ANNUAL D/Q AT GROUND LEVEL

DISTANCE MILES	SECTOR BEARING(DEGREES) 202,5	225,0	247,5	270,0	292,5	315,0	337,5	360,0
.25	7,385E-09	8,610E-09	5,707E-09	6,810E-09	3,592E-09	8,965E-09	1,170E-08	1,683E-08
.50	3,904E-09	4,089E-09	2,687E-09	3,260E-09	2,013E-09	4,012E-09	6,143E-09	7,587E-09
.75	2,334E-09	2,345E-09	1,550E-09	1,861E-09	1,219E-09	2,463E-09	3,697E-09	4,287E-09
1,00	1,511E-09	1,493E-09	9,876E-10	1,179E-09	7,920E-10	1,618E-09	2,415E-09	2,718E-09
1,10	1,294E-09	1,274E-09	8,424E-10	1,005E-09	6,788E-10	1,393E-09	2,077E-09	2,318E-09
1,20	1,119E-09	1,099E-09	7,260E-10	8,652E-10	5,872E-10	1,209E-09	1,802E-09	1,999E-09
1,30	9,756E-10	9,567E-10	6,314E-10	7,520E-10	5,121E-10	1,059E-09	1,577E-09	1,740E-09
1,40	8,573E-10	8,397E-10	5,536E-10	6,591E-10	4,501E-10	9,335E-10	1,391E-09	1,528E-09
1,50	7,587E-10	7,425E-10	4,890E-10	5,820E-10	3,983E-10	8,288E-10	1,235E-09	1,352E-09
1,60	6,757E-10	6,609E-10	4,347E-10	5,174E-10	3,547E-10	7,403E-10	1,104E-09	1,204E-09
1,70	6,052E-10	5,918E-10	3,889E-10	4,628E-10	3,177E-10	6,649E-10	9,915E-10	1,078E-09
1,80	5,449E-10	5,328E-10	3,497E-10	4,162E-10	2,860E-10	6,003E-10	8,955E-10	9,716E-10
1,90	4,930E-10	4,821E-10	3,161E-10	3,762E-10	2,587E-10	5,444E-10	8,125E-10	8,796E-10
2,00	4,480E-10	4,381E-10	2,869E-10	3,416E-10	2,350E-10	4,958E-10	7,404E-10	8,000E-10
2,10	4,088E-10	3,998E-10	2,616E-10	3,114E-10	2,144E-10	4,534E-10	6,773E-10	7,307E-10
2,20	3,744E-10	3,663E-10	2,394E-10	2,850E-10	1,963E-10	4,161E-10	6,219E-10	6,699E-10
2,30	3,440E-10	3,367E-10	2,198E-10	2,618E-10	1,803E-10	3,831E-10	5,729E-10	6,163E-10
2,40	3,172E-10	3,106E-10	2,026E-10	2,417E-10	1,662E-10	3,538E-10	5,294E-10	5,688E-10
2,50	2,933E-10	2,873E-10	1,872E-10	2,237E-10	1,536E-10	3,277E-10	4,907E-10	5,266E-10
2,60	2,719E-10	2,665E-10	1,735E-10	2,078E-10	1,424E-10	3,044E-10	4,560E-10	4,888E-10
2,70	2,528E-10	2,479E-10	1,612E-10	1,722E-10	1,323E-10	2,834E-10	4,248E-10	4,550E-10
2,80	2,355E-10	2,311E-10	1,502E-10	1,791E-10	1,232E-10	2,645E-10	3,966E-10	4,245E-10
2,90	2,200E-10	2,159E-10	1,402E-10	1,672E-10	1,151E-10	2,474E-10	3,712E-10	3,970E-10
3,00	2,059E-10	2,022E-10	1,312E-10	1,565E-10	1,076E-10	2,319E-10	3,481E-10	3,720E-10
3,10	1,931E-10	1,897E-10	1,230E-10	1,468E-10	1,009E-10	2,177E-10	3,271E-10	3,493E-10
3,20	1,814E-10	1,784E-10	1,155E-10	1,379E-10	9,479E-11	2,048E-10	3,079E-10	3,286E-10
3,30	1,708E-10	1,680E-10	1,087E-10	1,298E-10	8,919E-11	1,930E-10	2,903E-10	3,097E-10
3,40	1,610E-10	1,585E-10	1,025E-10	1,224E-10	8,406E-11	1,822E-10	2,742E-10	2,924E-10
3,50	1,520E-10	1,497E-10	9,679E-11	1,156E-10	7,935E-11	1,723E-10	2,593E-10	2,765E-10
3,60	1,439E-10	1,417E-10	9,147E-11	1,094E-10	7,502E-11	1,631E-10	2,457E-10	2,618E-10

FIGURE 34

HOPE CREEK

BUILDING VENT

D/Q AT GROUND LEVEL APPLICABLE TO

LONG-TERM (ROUTINE) GASEOUS RELEASES

(M^{-2})

SECTOR ANNUAL D/Q AT GROUND LEVEL

DISTANCE MILES	SECTOR BEARING(DEGREES) 202.5	225.0	247.5	270.0	292.5	315.0	337.5	360.0
3.70	1.362E-10	1.343E-10	8.662E-11	1.036E-10	7.103E-11	1.346E-10	2.331E-10	2.482E-10
3.80	1.291E-10	1.274E-10	8.214E-11	9.825E-11	6.734E-11	1.460E-10	2.214E-10	2.357E-10
3.90	1.226E-10	1.210E-10	7.799E-11	9.332E-11	6.392E-11	1.396E-10	2.105E-10	2.241E-10
4.00	1.166E-10	1.152E-10	7.414E-11	8.874E-11	6.075E-11	1.328E-10	2.005E-10	2.133E-10
4.10	1.110E-10	1.097E-10	7.057E-11	8.449E-11	5.781E-11	1.265E-10	1.911E-10	2.033E-10
4.20	1.058E-10	1.046E-10	6.724E-11	8.053E-11	5.508E-11	1.207E-10	1.824E-10	1.940E-10
4.30	1.009E-10	9.981E-11	6.414E-11	7.684E-11	5.252E-11	1.153E-10	1.742E-10	1.853E-10
4.40	9.636E-11	9.537E-11	6.125E-11	7.340E-11	5.014E-11	1.102E-10	1.666E-10	1.771E-10
4.50	9.211E-11	9.121E-11	5.855E-11	7.018E-11	4.792E-11	1.054E-10	1.595E-10	1.695E-10
4.60	8.815E-11	8.732E-11	5.601E-11	6.716E-11	4.583E-11	1.009E-10	1.528E-10	1.624E-10
4.70	8.440E-11	8.366E-11	5.364E-11	6.434E-11	4.388E-11	9.673E-11	1.465E-10	1.557E-10
4.80	8.089E-11	8.023E-11	5.141E-11	6.168E-11	4.204E-11	9.278E-11	1.406E-10	1.494E-10
4.90	7.760E-11	7.701E-11	4.932E-11	5.919E-11	4.032E-11	8.907E-11	1.350E-10	1.435E-10
5.00	7.450E-11	7.397E-11	4.735E-11	5.684E-11	3.870E-11	8.558E-11	1.298E-10	1.379E-10
5.10	7.158E-11	7.111E-11	4.549E-11	5.461E-11	3.717E-11	8.228E-11	1.248E-10	1.326E-10
5.20	6.885E-11	6.840E-11	4.374E-11	5.254E-11	3.573E-11	7.917E-11	1.202E-10	1.277E-10
5.30	6.622E-11	6.585E-11	4.209E-11	5.057E-11	3.437E-11	7.623E-11	1.158E-10	1.230E-10
5.40	6.376E-11	6.344E-11	4.052E-11	4.870E-11	3.308E-11	7.345E-11	1.116E-10	1.185E-10
5.50	6.144E-11	6.115E-11	3.904E-11	4.694E-11	3.186E-11	7.081E-11	1.076E-10	1.143E-10
6.00	5.149E-11	5.137E-11	3.939E-11	2.667E-11	3.953E-11	9.066E-11	9.628E-11	
7.50	3.264E-11	3.278E-11	2.076E-11	2.509E-11	1.684E-11	3.802E-11	5.863E-11	6.187E-11
10.00	1.808E-11	1.853E-11	1.155E-11	1.401E-11	9.265E-12	2.124E-11	3.277E-11	3.490E-11
15.00	8.099E-12	8.315E-12	5.295E-12	6.421E-12	3.961E-12	9.344E-12	1.474E-11	1.570E-11
20.00	4.997E-12	5.167E-12	3.475E-12	4.117E-12	2.139E-12	5.817E-12	8.755E-12	9.396E-12
25.00	3.619E-12	3.751E-12	2.675E-12	3.089E-12	1.346E-12	4.141E-12	6.023E-12	6.469E-12
30.00	2.749E-12	2.853E-12	2.108E-12	2.399E-12	9.144E-13	3.107E-12	4.415E-12	4.746E-12
35.00	2.093E-12	2.180E-12	1.654E-12	1.850E-12	6.591E-13	2.355E-12	3.314E-12	3.575E-12
40.00	1.590E-12	1.661E-12	1.245E-12	1.411E-12	4.963E-13	1.786E-12	2.520E-12	2.720E-12
45.00	1.259E-12	1.267E-12	9.399E-13	1.072E-12	3.864E-13	1.360E-12	1.939E-12	2.112E-12
50.00	9.245E-13	9.756E-13	7.111E-13	8.182E-13	3.088E-13	1.046E-12	1.514E-12	1.660E-12

FIGURE 36

HOPE CREEK

BUILDING VENT

UNDEPLETED X/Q AT GROUND LEVEL APPLICABLE TO

LONG-TERM (ROUTINE) GASEOUS RELEASES

(SECONDS/M^3)

SECTOR ANNUAL X/Q AT GROUND LEVEL

DISTANCE MILES	SECTOR BEARING (DEGREES) 22.5	45.0	67.5	90.0	112.5	135.0	157.5	180.0
.25	1.590E-06	1.476E-06	1.193E-06	1.488E-06	1.728E-06	2.481E-06	1.719E-06	1.698E-06
.50	7.998E-07	8.878E-07	8.023E-07	1.170E-06	8.960E-07	1.243E-06	8.650E-07	9.847E-07
.75	5.155E-07	5.827E-07	5.481E-07	7.660E-07	5.590E-07	7.667E-07	5.349E-07	6.441E-07
1.00	3.554E-07	4.052E-07	3.878E-07	5.322E-07	3.800E-07	5.189E-07	3.627E-07	4.476E-07
1.10	3.113E-07	3.557E-07	3.419E-07	4.671E-07	3.337E-07	4.524E-07	3.164E-07	3.928E-07
1.20	2.749E-07	3.146E-07	3.035E-07	4.132E-07	2.920E-07	3.980E-07	2.784E-07	3.475E-07
1.30	2.449E-07	2.802E-07	2.712E-07	3.681E-07	2.591E-07	3.530E-07	2.470E-07	3.095E-07
1.40	2.190E-07	2.512E-07	2.437E-07	3.300E-07	2.315E-07	3.153E-07	2.206E-07	2.774E-07
1.50	1.972E-07	2.265E-07	2.202E-07	2.975E-07	2.082E-07	2.834E-07	1.985E-07	2.502E-07
1.60	1.786E-07	2.054E-07	2.000E-07	2.697E-07	1.883E-07	2.562E-07	1.793E-07	2.266E-07
1.70	1.626E-07	1.871E-07	1.825E-07	2.457E-07	1.711E-07	2.328E-07	1.629E-07	2.065E-07
1.80	1.488E-07	1.712E-07	1.672E-07	2.248E-07	1.563E-07	2.126E-07	1.488E-07	1.890E-07
1.90	1.365E-07	1.572E-07	1.538E-07	2.065E-07	1.435E-07	1.949E-07	1.364E-07	1.736E-07
2.00	1.258E-07	1.450E-07	1.419E-07	1.904E-07	1.319E-07	1.794E-07	1.256E-07	1.600E-07
2.10	1.165E-07	1.341E-07	1.314E-07	1.762E-07	1.219E-07	1.658E-07	1.160E-07	1.481E-07
2.20	1.079E-07	1.245E-07	1.221E-07	1.635E-07	1.130E-07	1.536E-07	1.075E-07	1.374E-07
2.30	1.004E-07	1.159E-07	1.138E-07	1.522E-07	1.051E-07	1.428E-07	9.997E-08	1.279E-07
2.40	9.367E-08	1.082E-07	1.063E-07	1.421E-07	9.798E-08	1.332E-07	9.320E-08	1.194E-07
2.50	8.762E-08	1.012E-07	9.952E-08	1.329E-07	9.159E-08	1.245E-07	8.712E-08	1.117E-07
2.60	8.216E-08	9.495E-08	9.341E-08	1.247E-07	8.583E-08	1.167E-07	8.164E-08	1.048E-07
2.70	7.721E-08	8.926E-08	8.786E-08	1.172E-07	8.062E-08	1.096E-07	7.667E-08	9.850E-08
2.80	7.271E-08	8.408E-08	8.281E-08	1.104E-07	7.588E-08	1.031E-07	7.216E-08	9.274E-08
2.90	6.860E-08	7.935E-08	7.819E-08	1.042E-07	7.156E-08	9.726E-08	6.805E-08	8.757E-08
3.00	6.485E-08	7.503E-08	7.397E-08	9.854E-08	6.762E-08	9.189E-08	6.429E-08	8.279E-08
3.10	6.140E-08	7.106E-08	7.009E-08	9.333E-08	6.400E-08	8.697E-08	6.085E-08	7.841E-08
3.20	5.824E-08	6.741E-08	6.652E-08	8.853E-08	6.067E-08	8.245E-08	5.768E-08	7.438E-08
3.30	5.532E-08	6.405E-08	6.323E-08	8.411E-08	5.761E-08	7.829E-08	5.477E-08	7.067E-08
3.40	5.262E-08	6.094E-08	6.018E-08	8.005E-08	5.478E-08	7.444E-08	5.207E-08	6.725E-08
3.50	5.013E-08	5.806E-08	5.736E-08	7.625E-08	5.216E-08	7.089E-08	4.958E-08	6.405E-08
3.60	4.781E-08	5.539E-08	5.473E-08	7.274E-08	4.974E-08	6.759E-08	4.727E-08	6.110E-08

FIGURE 37

HOPE CREEK

BUILDING VENT

UNDEPLETED X/Q AT GROUND LEVEL APPLICABLE TO

LONG-TERM (ROUTINE) GASEOUS RELEASES

(SECONDS/M^3)

SECTOR ANNUAL X/Q AT GROUND LEVEL

DISTANCE MILES	SECTOR BEARING (DEGREES) 22.5	45.0	67.5	90.0	112.5	135.0	157.5	180.0
0.70	4.566E-08	5.240E-08	5.230E-08	6.947E-08	4.748E-08	6.452E-08	4.513E-08	5.836E-08
0.80	4.365E-08	5.059E-08	5.002E-08	6.643E-08	4.538E-08	6.167E-08	4.313E-08	5.580E-08
0.90	4.177E-08	4.843E-08	4.790E-08	6.360E-08	4.343E-08	5.901E-08	4.127E-08	5.342E-08
1.00	4.005E-08	4.641E-08	4.592E-08	6.095E-08	4.160E-08	5.652E-08	3.953E-08	5.119E-08
1.10	3.848E-08	4.452E-08	4.406E-08	5.846E-08	3.989E-08	5.420E-08	3.790E-08	4.910E-08
1.20	3.706E-08	4.274E-08	4.232E-08	5.614E-08	3.828E-08	5.202E-08	3.637E-08	4.715E-08
1.30	3.542E-08	4.108E-08	4.068E-08	5.395E-08	3.678E-08	4.997E-08	3.494E-08	4.531E-08
1.40	3.407E-08	3.951E-08	3.914E-08	5.190E-08	3.536E-08	4.805E-08	3.360E-08	4.358E-08
1.50	3.279E-08	3.804E-08	3.769E-08	4.996E-08	3.403E-08	4.624E-08	3.233E-08	4.195E-08
1.60	3.159E-08	3.665E-08	3.632E-08	4.814E-08	3.278E-08	4.454E-08	3.114E-08	4.042E-08
1.70	3.046E-08	3.534E-08	3.503E-08	4.641E-08	3.159E-08	4.293E-08	3.001E-08	3.897E-08
1.80	2.939E-08	3.410E-08	3.381E-08	4.479E-08	3.048E-08	4.141E-08	2.895E-08	3.761E-08
1.90	2.837E-08	3.293E-08	3.265E-08	4.325E-08	2.942E-08	3.998E-08	2.795E-08	3.631E-08
2.00	2.742E-08	3.182E-08	3.156E-08	4.179E-08	2.842E-08	3.862E-08	2.699E-08	3.509E-08
2.10	2.651E-08	3.077E-08	3.052E-08	4.041E-08	2.747E-08	3.733E-08	2.609E-08	3.393E-08
2.20	2.564E-08	2.977E-08	2.954E-08	3.910E-08	2.657E-08	3.611E-08	2.524E-08	3.282E-08
2.30	2.482E-08	2.882E-08	2.860E-08	3.785E-08	2.572E-08	3.494E-08	2.443E-08	3.178E-08
2.40	2.404E-08	2.792E-08	2.771E-08	3.666E-08	2.490E-08	3.384E-08	2.365E-08	3.078E-08
2.50	2.330E-08	2.706E-08	2.686E-08	3.554E-08	2.413E-08	3.279E-08	2.292E-08	2.983E-08
2.60	2.260E-08	2.625E-08	2.605E-08	3.447E-08	2.340E-08	3.179E-08	2.222E-08	2.892E-08
2.70	2.193E-08	2.547E-08	2.528E-08	3.345E-08	2.270E-08	3.084E-08	2.156E-08	2.806E-08
2.80	2.130E-08	2.473E-08	2.455E-08	3.248E-08	2.204E-08	2.993E-08	2.093E-08	2.724E-08
2.90	2.069E-08	2.402E-08	2.385E-08	3.156E-08	2.141E-08	2.907E-08	2.033E-08	2.646E-08
3.00	2.012E-08	2.336E-08	2.319E-08	3.067E-08	2.081E-08	2.825E-08	1.976E-08	2.571E-08
3.10	1.957E-08	2.272E-08	2.255E-08	2.983E-08	2.024E-08	2.747E-08	1.921E-08	2.500E-08
3.20	1.904E-08	2.211E-08	2.195E-08	2.902E-08	1.969E-08	2.673E-08	1.869E-08	2.432E-08
3.30	1.854E-08	2.152E-08	2.137E-08	2.825E-08	1.917E-08	2.602E-08	1.819E-08	2.367E-08
3.40	1.806E-08	2.097E-08	2.081E-08	2.752E-08	1.867E-08	2.535E-08	1.772E-08	2.305E-08
3.50	1.760E-08	2.044E-08	2.029E-08	2.681E-08	1.819E-08	2.470E-08	1.726E-08	2.246E-08
3.60	1.716E-08	1.993E-08	1.978E-08	2.614E-08	1.773E-08	2.408E-08	1.683E-08	2.189E-08
3.70	1.674E-08	1.944E-08	1.930E-08	2.550E-08	1.730E-08	2.349E-08	1.642E-08	2.135E-08
3.80	1.634E-08	1.898E-08	1.884E-08	2.488E-08	1.688E-08	2.292E-08	1.602E-08	2.083E-08
3.90	1.596E-08	1.853E-08	1.839E-08	2.429E-08	1.648E-08	2.237E-08	1.564E-08	2.033E-08
4.00	1.559E-08	1.810E-08	1.797E-08	2.373E-08	1.610E-08	2.185E-08	1.528E-08	1.985E-08
4.10	1.524E-08	1.769E-08	1.756E-08	2.318E-08	1.573E-08	2.135E-08	1.493E-08	1.940E-08
4.20	1.490E-08	1.730E-08	1.717E-08	2.266E-08	1.538E-08	2.087E-08	1.459E-08	1.896E-08
4.30	1.457E-08	1.692E-08	1.680E-08	2.216E-08	1.504E-08	2.041E-08	1.427E-08	1.854E-08
4.40	1.426E-08	1.656E-08	1.644E-08	2.168E-08	1.471E-08	1.997E-08	1.396E-08	1.814E-08
4.50	1.396E-08	1.621E-08	1.609E-08	2.122E-08	1.440E-08	1.954E-08	1.366E-08	1.775E-08
4.60	1.367E-08	1.587E-08	1.576E-08	2.077E-08	1.409E-08	1.913E-08	1.337E-08	1.738E-08
4.70	1.339E-08	1.555E-08	1.544E-08	2.035E-08	1.380E-08	1.874E-08	1.309E-08	1.702E-08
4.80	1.312E-08	1.524E-08	1.513E-08	1.994E-08	1.352E-08	1.836E-08	1.282E-08	1.667E-08
4.90	1.286E-08	1.494E-08	1.483E-08	1.954E-08	1.325E-08	1.799E-08	1.256E-08	1.633E-08
5.00	1.261E-08	1.465E-08	1.455E-08	1.916E-08	1.299E-08	1.764E-08	1.231E-08	1.601E-08
5.10	1.237E-08	1.437E-08	1.427E-08	1.880E-08	1.274E-08	1.730E-08	1.207E-08	1.570E-08
5.20	1.213E-08	1.410E-08	1.400E-08	1.844E-08	1.250E-08	1.697E-08	1.184E-08	1.540E-08
5.30	1.190E-08	1.383E-08	1.374E-08	1.810E-08	1.226E-08	1.665E-08	1.161E-08	1.511E-08
5.40	1.168E-08	1.358E-08	1.348E-08	1.777E-08	1.203E-08	1.634E-08	1.140E-08	1.483E-08
5.50	1.147E-08	1.333E-08	1.324E-08	1.745E-08	1.181E-08	1.604E-08	1.119E-08	1.456E-08
6.00	1.048E-08	1.218E-08	1.209E-08	1.594E-08	1.079E-08	1.465E-08	1.022E-08	1.330E-08
7.50	1.369E-08	1.592E-08	1.585E-08	2.091E-08	1.414E-08	1.922E-08	1.342E-08	1.755E-08
10.00	8.345E-09	9.716E-09	9.694E-09	1.276E-08	8.597E-09	1.168E-08	8.158E-09	1.070E-08
15.00	4.171E-09	4.859E-09	4.862E-09	6.371E-09	4.283E-09	5.810E-09	4.063E-09	5.347E-09
20.00	2.593E-09	3.014E-09	3.021E-09	3.934E-09	2.655E-09	3.582E-09	2.521E-09	3.310E-09
25.00	1.821E-09	2.108E-09	2.116E-09	2.734E-09	1.861E-09	2.489E-09	1.769E-09	2.309E-09
30.00	1.376E-09	1.586E-09	1.593E-09	2.042E-09	1.403E-09	1.861E-09	1.336E-09	1.732E-09
35.00	1.089E-09	1.251E-09	1.257E-09	1.600E-09	1.109E-09	1.460E-09	1.058E-09	1.362E-09
40.00	8.903E-10	1.019E-09	1.025E-09	1.297E-09	9.055E-10	1.183E-09	8.647E-10	1.108E-09
45.00	7.451E-10	8.503E-10	8.557E-10	1.077E-09	7.570E-10	9.835E-10	7.237E-10	9.225E-10
50.00	6.344E-10	7.227E-10	7.276E-10	9.114E-10	6.444E-10	8.331E-10	6.166E-10	7.828E-10

FIGU[illegible]8

HOPE CREEK

BUILDING VENT

UNDEPLETED X/Q AT GROUND LEVEL APPLICABLE TO

LONG-TERM (ROUTINE) GASEOUS RELEASES

(SECONDS/M^3)

SECTOR ANNUAL X/Q AT GROUND LEVEL

DISTANCE MILES	SECTION MEANING(DEGREES) 202,5	225,0	247,5	270,0	292,5	315,0	337,5	360,0
.25	1.054E-06	1.133E-06	7.708E-07	9.461E-07	5.306E-07	9.525E-07	1.520E-06	2.168E-06
.50	7.502E-07	7.117E-07	4.937E-07	6.243E-07	4.223E-07	7.193E-07	1.006E-06	1.226E-06
.75	5.227E-07	4.744E-07	3.336E-07	4.219E-07	3.008E-07	5.037E-07	6.823E-07	7.896E-07
1.00	3.727E-07	3.323E-07	2.350E-07	2.972E-07	2.165E-07	3.600E-07	4.811E-07	5.446E-07
1.10	3.293E-07	2.923E-07	2.069E-07	2.618E-07	1.917E-07	3.182E-07	4.239E-07	4.771E-07
1.20	2.928E-07	2.590E-07	1.835E-07	2.322E-07	1.708E-07	2.831E-07	3.761E-07	4.219E-07
1.30	2.619E-07	2.310E-07	1.638E-07	2.073E-07	1.530E-07	2.534E-07	3.358E-07	3.749E-07
1.40	2.358E-07	2.074E-07	1.471E-07	1.862E-07	1.379E-07	2.280E-07	3.017E-07	3.357E-07
1.50	2.131E-07	1.872E-07	1.328E-07	1.682E-07	1.249E-07	2.063E-07	2.725E-07	3.024E-07
1.60	1.936E-07	1.699E-07	1.205E-07	1.527E-07	1.136E-07	1.876E-07	2.474E-07	2.734E-07
1.70	1.766E-07	1.549E-07	1.099E-07	1.393E-07	1.038E-07	1.713E-07	2.256E-07	2.494E-07
1.80	1.621E-07	1.418E-07	1.006E-07	1.276E-07	9.525E-08	1.571E-07	2.067E-07	2.280E-07
1.90	1.491E-07	1.303E-07	9.253E-08	1.174E-07	8.773E-08	1.446E-07	1.901E-07	2.094E-07
2.00	1.377E-07	1.203E-07	8.538E-08	1.083E-07	8.107E-08	1.336E-07	1.754E-07	1.929E-07
2.10	1.276E-07	1.113E-07	7.904E-08	1.003E-07	7.517E-08	1.238E-07	1.623E-07	1.784E-07
2.20	1.186E-07	1.034E-07	7.340E-08	9.318E-08	6.990E-08	1.151E-07	1.509E-07	1.656E-07
2.30	1.105E-07	9.629E-08	6.836E-08	8.680E-08	6.518E-08	1.073E-07	1.406E-07	1.541E-07
2.40	1.033E-07	8.992E-08	6.384E-08	8.108E-08	6.094E-08	1.003E-07	1.313E-07	1.438E-07
2.50	9.674E-08	8.418E-08	5.976E-08	7.592E-08	5.711E-08	9.394E-08	1.229E-07	1.345E-07
2.60	9.082E-08	7.899E-08	5.608E-08	7.125E-08	5.364E-08	8.821E-08	1.154E-07	1.261E-07
2.70	8.545E-08	7.429E-08	5.273E-08	6.702E-08	5.049E-08	8.300E-08	1.085E-07	1.185E-07
2.80	8.056E-08	7.000E-08	4.969E-08	6.316E-08	4.762E-08	7.827E-08	1.023E-07	1.116E-07
2.90	7.608E-08	6.609E-08	4.691E-08	5.964E-08	4.499E-08	7.393E-08	9.657E-08	1.053E-07
3.00	7.199E-08	6.251E-08	4.436E-08	5.642E-08	4.258E-08	6.997E-08	9.135E-08	9.957E-08
3.10	6.823E-08	5.922E-08	4.203E-08	5.346E-08	4.037E-08	6.632E-08	8.656E-08	9.429E-08
3.20	6.476E-08	5.620E-08	3.988E-08	5.074E-08	3.834E-08	6.296E-08	8.214E-08	8.943E-08
3.30	6.157E-08	5.341E-08	3.790E-08	4.823E-08	3.645E-08	5.986E-08	7.807E-08	8.495E-08
3.40	5.861E-08	5.083E-08	3.606E-08	4.590E-08	3.471E-08	5.700E-08	7.431E-08	8.081E-08
3.50	5.587E-08	4.844E-08	3.437E-08	4.375E-08	3.310E-08	5.434E-08	7.082E-08	7.698E-08
3.60	5.332E-08	4.622E-08	3.279E-08	4.175E-08	3.160E-08	5.187E-08	6.758E-08	7.343E-08

FIGURE 2.3

HOPE CREEK

BUILDING VENT

UNDEPLETED X/Q AT GROUND LEVEL APPLICABLE TO

LONG-TERM (ROUTINE) GASEOUS RELEASES

(SECONDS/M^3)

SECTOR ANNUAL X/Q AT GROUND LEVEL

DISTANCE MILES	SECTOR BEARING (DEGREES) 202.5	225.0	247.5	270.0	292.5	315.0	337.5	360.0
3.70	5.045E-08	4.015E-08	3.132E-08	3.969E-08	5.021E-08	4.957E-08	6.457E-08	7.013E-08
3.80	4.875E-08	4.223E-08	2.996E-08	3.816E-08	4.840E-08	4.743E-08	6.176E-08	6.705E-08
3.90	4.669E-08	4.044E-08	2.868E-08	3.654E-08	4.769E-08	4.543E-08	5.914E-08	6.416E-08
4.00	4.476E-08	3.876E-08	2.749E-08	3.503E-08	4.655E-08	4.356E-08	5.669E-08	6.149E-08
4.10	4.295E-08	3.719E-08	2.637E-08	3.361E-08	4.549E-08	4.181E-08	5.440E-08	5.898E-08
4.20	4.124E-08	3.571E-08	2.533E-08	3.228E-08	4.449E-08	4.016E-08	5.224E-08	5.663E-08
4.30	3.966E-08	3.433E-08	2.434E-08	3.103E-08	4.355E-08	3.862E-08	5.022E-08	5.442E-08
4.40	3.817E-08	3.303E-08	2.342E-08	2.986E-08	4.266E-08	3.716E-08	4.832E-08	5.234E-08
4.50	3.676E-08	3.180E-08	2.255E-08	2.875E-08	4.183E-08	3.579E-08	4.653E-08	5.038E-08
4.60	3.543E-08	3.065E-08	2.173E-08	2.771E-08	4.104E-08	3.450E-08	4.484E-08	4.854E-08
4.70	3.417E-08	2.955E-08	2.095E-08	2.672E-08	4.030E-08	3.328E-08	4.324E-08	4.680E-08
4.80	3.298E-08	2.852E-08	2.022E-08	2.579E-08	1.960E-08	3.213E-08	4.174E-08	4.515E-08
4.90	3.186E-08	2.755E-08	1.953E-08	2.491E-08	1.893E-08	3.103E-08	4.031E-08	4.360E-08
5.00	3.079E-08	2.662E-08	1.887E-08	2.408E-08	1.830E-08	3.000E-08	3.896E-08	4.212E-08
5.10	2.978E-08	2.575E-08	1.825E-08	2.328E-08	1.771E-08	2.902E-08	3.768E-08	4.073E-08
5.20	2.882E-08	2.491E-08	1.766E-08	2.253E-08	1.714E-08	2.809E-08	3.646E-08	3.940E-08
5.30	2.791E-08	2.412E-08	1.710E-08	2.182E-08	1.660E-08	2.720E-08	3.530E-08	3.814E-08
5.40	2.705E-08	2.337E-08	1.656E-08	2.114E-08	1.609E-08	2.636E-08	3.420E-08	3.695E-08
5.50	2.622E-08	2.265E-08	1.605E-08	2.049E-08	1.560E-08	2.555E-08	3.316E-08	3.581E-08
6.00	2.263E-08	1.954E-08	1.385E-08	1.768E-08	1.347E-08	2.206E-08	2.861E-08	3.086E-08
7.50	1.549E-08	1.336E-08	9.459E-09	1.210E-08	9.238E-09	1.512E-08	1.957E-08	2.105E-08
10.00	9.482E-09	8.167E-09	5.777E-09	7.400E-09	5.665E-09	9.264E-09	1.196E-08	1.283E-08
15.00	4.762E-09	4.099E-09	2.904E-09	3.720E-09	2.835E-09	4.660E-09	5.942E-09	6.400E-09
20.00	2.965E-09	2.555E-09	1.826E-09	2.326E-09	1.732E-09	2.904E-09	3.710E-09	3.949E-09
25.00	2.078E-09	1.798E-09	1.301E-09	1.643E-09	1.182E-09	2.039E-09	2.585E-09	2.748E-09
30.00	1.566E-09	1.361E-09	9.977E-10	1.248E-09	8.645E-10	1.538E-09	1.936E-09	2.048E-09
35.00	1.237E-09	1.079E-09	8.003E-10	9.929E-10	6.837E-10	1.216E-09	1.520E-09	1.604E-09
40.00	1.009E-09	8.834E-10	6.616E-10	8.149E-10	5.278E-10	9.929E-10	1.234E-09	1.299E-09
45.00	8.428E-10	7.400E-10	5.589E-10	6.843E-10	4.312E-10	8.300E-10	1.026E-09	1.078E-09
50.00	7.170E-10	6.311E-10	4.799E-10	5.847E-10	3.599E-10	7.064E-10	8.696E-10	9.120E-10

FIGURE 35

HCGS

TURBULENCE CLASSIFICATION

Smith-Singer Classification	Pasquill Classification	Brookhaven National Laboratory Classification (4)	Description of Wind Trace
I	A	B_2	Fluctuations of the wind direction during the course of one hour exceed 45 degrees.
II	B & C	B_1	Fluctuations are confined to a lower limit of 15 degrees and an upper limit of 45 degrees.
III	D	C	The lower limit of the fluctuations is 15 degrees, and no upper limit is imposed. The case is distinguished by an unbroken solid core, through which a straight line can be drawn for the entire hour, without touching "open space" on the chart.
IV	E & F	D	The trace approximates a line, and short-term fluctuations do not exceed 15 degrees. Direction may vary gradually over a wide angle during the hour.

B.1.54

REV. 1