

002081

Iowa Electric Light and Power Company
February 27, 1992
DAEC-92-0083

10000030235

Mr. A. Bert Davis
Regional Administrator
U.S. Nuclear Regulatory Commission
Region III
799 Roosevelt Road
Glen Ellyn, Illinois 60137

Subject: Semi-Annual Effluent Release Report June 26,
1991, through December 31, 1991, for the
Duane Arnold Energy Center, Unit No. 1
Docket: 50-331

Dear Mr. Davis:

Please find enclosed a copy of the Semi-Annual Report for
the Duane Arnold Energy Center, Unit No. 1, for the period June
26, 1991, through December 31, 1991. This report satisfies the
requirements for the Semi-Annual Effluent Release Report, as
stated in Section 6.11.1f of Technical Specifications, (Appendix
A to the Operating License DPR-49).

Sincerely,

David L. Wilson
Plant Superintendent - Nuclear

DLW/RL/hc

Enclosure: Semi-Annual Effluent Release Report

cc: Director of Nuclear Regulatory Commission (original w/a)
Attn: Document Control Desk
U.S. Nuclear Regulatory Commission
Mail Station Pl-137
Washington, D. C. 20555

NRC Resident Inspector (w/attachment)

S. P. Sands, NRC Project Manager (w/attachment)

J. Franz (w/o attachments)

File: A*118e, NRC-7a

9208170151 911231
PDR ADOCK 05000331
R PDR

Duane Arnold Energy Center • 3277 DAEC Road • Paln. Iowa 52324 • 319/851-7611

DAI

DUANE ARNOLD ENERGY CENTER

SEMI-ANNUAL REPORT

RADIOACTIVE EFFLUENT RELEASES

JUNE 26, 1991 THROUGH DECEMBER 31, 1991

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INTRODUCTION

This semi-annual report covers the period of June 26, 1991, through December 31, 1991.

There were no radioactive liquid releases from DAEC during this reporting period.

Gaseous releases were continuous for the period and resulted in concentrations at the site boundary well below levels needed to comply with 10 CFR 50, Appendix I dose limits, and 10 CFR 20 concentration limits. There were no abnormal releases of radioactive material to the environment.

A total of nine solid radioactive waste shipments were made during the period. Six shipments of spent resins and mechanical aqueous filters were sent directly for burial and three shipments of dry active waste were sent to a vendor for processing. The report, therefore, indicates both waste quantities shipped and the amounts buried.

There were no changes to the Offsite Dose Assessment Manual.

The Process Control Plan was revised so the set of five procedures has become a single procedure. Obsolete and/or irrelevant portions of the old procedures were removed. A summary of the change and the revised procedure are included.

SEMIANNUAL RADIOACTIVE MATERIAL RELEASE REPORT (1991)

LIQUID EFFLUENT *

Nuclides Released	Unit	3rd Quarter	4th Quarter
strontium-89	Ci	0.0E+00	0.0E+00
strontium-90	Ci	0.0E+00	0.0E+00
cesium-134	Ci	0.0E+00	0.0E+00
cesium-137	Ci	0.0E+00	0.0E+00
iodine-131	Ci	0.0E+00	0.0E+00
cobalt-58	Ci	0.0E+00	0.0E+00
cobalt-60	Ci	0.0E+00	0.0E+00
iron-55	Ci	0.0E+00	0.0E+00
iron-59	Ci	0.0E+00	0.0E+00
zinc-65	Ci	0.0E+00	0.0E+00
manganese-54	Ci	0.0E+00	0.0E+00
chromium-51	Ci	0.0E+00	0.0E+00
zirconium-niobium-95	Ci	0.0E+00	0.0E+00
molybdenum-99	Ci	0.0E+00	0.0E+00
technetium-99m	Ci	0.0E+00	0.0E+00
barium-lanthanum-140	Ci	0.0E+00	0.0E+00
cerium-141	Ci	0.0E+00	0.0E+00
Other (specify)	Ci	0.0E+00	0.0E+00
	Ci	0.0E+00	0.0E+00
	Ci	0.0E+00	0.0E+00
	Ci	0.0E+00	0.0E+00
	Ci	0.0E+00	0.0E+00
Total for period (above)	Ci	0.0E+00	0.0E+00
xenon-133	Ci	0.0E+00	0.0E+00
xenon-135	Ci	0.0E+00	0.0E+00

* No liquid release June 26, 1991, through December 31, 1991.

SEMIANNUAL RADIOACTIVE MATERIAL RELEASE REPORT (1991)

GASEOUS EFFLUENTS *

Nuclides Released	Unit	3rd Quarter	4th Quarter
-------------------	------	-------------	-------------

1. Fission gases

krypton-85	Ci	1.76E-04	0.00E+00
krypton-85m	Ci	0.00E+00	0.00E+00
krypton-87	Ci	0.00E+00	0.00E+00
krypton-88	Ci	0.00E+00	0.00E+00
xenon-131m	Ci	0.00E+00	0.00E+00
xenon-133	Ci	9.46E-09	0.00E+00
xenon-135	Ci	8.51E-01	1.56E+00
xenon-135m	Ci	8.60E-01	7.26E+00
xenon-138	Ci	0.00E+00	0.00E+00
tritium	Ci	4.74E+00	4.98E+00
nitrogen-13	Ci	8.28E-01	1.63E+00
Total for period	Ci	7.28E+00	1.54E+01

2. Iodines

iodine-131	Ci	3.49E-05	1.61E-05
iodine-133	Ci	7.84E-05	2.38E-05
iodine-135	Ci	8.77E-06	0.00E+00
Total for period	Ci	1.22E-04	3.99E-05

3. Particulates

strontium-89	Ci	5.53E-06	5.90E-06
strontium-90	Ci	1.69E-08	1.13E-08
cesium-134	Ci	0.00E+00	0.00E+00
cesium-137	Ci	4.10E-06	0.00E+00
barium lanthanum-140	Ci	0.00E+00	0.00E+00
chromium-51	Ci	5.50E-04	6.54E-04
manganese-54	Ci	8.34E-06	3.56E-06
iron-59	Ci	0.00E+00	0.00E+00
cobalt-58	Ci	2.45E-05	3.07E-05
cobalt-60	Ci	1.10E-04	7.49E-05
Total for period	Ci	7.02E-04	7.69E-04

* Release period is June 26, 1991 at 0900 through December 31, 1991, at 2400.

SEMI-ANNUAL REPORT SUMMARY
(JUNE 26, 1991-DECEMBER 31, 1991)

SHIPMENTS MADE TO BURIAL FACILITIES

Final Disposition: Barnwell, SC

<u>Waste Type</u>	<u>#</u>	<u>Volume M3</u>	<u>Activity (Ci)</u>
Resin and Mechanical Aqueous Filters	6	31.5	4.19E+02

SHIPMENTS MADE TO PROCESSING FACILITIES

Shipped To: Scientific Ecology Group, Oak Ridge, TN

<u>Waste Type</u>	<u>#</u>	<u>Volume M3</u>	<u>Activity (Ci)</u>
Dry Active Waste	3	94.5	1.61E+00

TOTAL SOLID WASTE DISPOSITION

	<u>#</u>	<u>Volume M3</u>	<u>Activity (Ci)</u>
Waste Shipped:		126.0	4.21E+02
Waste Buried*:		59.0	4.25E+02

Mode of Transport: Exclusive-Use Vehicle

Number of Shipments: 9

Destination: Barnwell, SC	6
Oak Ridge, TN	3

Waste Classification:	A-Unstable	3
	A-Stable	5
	B	1
	C	0

* Includes waste buried directly by DAEC and waste buried by processing facilities.

SUMMARY
(June 26, 1991 - December 31, 1991)

MAJOR NUCLIDE COMPOSITION
SPENT RESINS AND AQUEOUS MECHANICAL FILTERS

PRINCIPLE NUCLIDES	3RD QTR (Ci)	4TH QTR (Ci)	TOTAL (Ci)	PERCENT ABUNDANCE
Co-60	1.38E+02	1.62E+01	1.54E+02	3.68E+01
Fe-55	1.13E+02	7.23E+01	1.85E+02	4.42E+01
Cs-137	2.48E+00	1.28E+00	3.76E+00	8.97E-01
Mn-54	5.61E+01	3.26E+00	5.94E+01	1.42E+01
Cs-134	1.32E+00	3.54E-01	1.67E+00	3.99E-01
Co-58	7.08E+00	8.54E-01	7.93E+00	1.89E+00
Cr-51	6.71E-01	9.64E-01	1.64E+00	3.90E-01
Ni-63	3.33E+00	5.41E-01	3.87E+00	9.22E-01
Ni-59	4.34E-02	1.86E-03	4.53E-02	1.08E-02
Fe-59	1.76E-01	1.21E-01	2.97E-01	7.08E-02
Zn-65	4.78E-01	0.00E+00	4.78E-01	1.14E-01
Ag-110M	4.34E-01	0.00E+00	4.34E-01	1.03E-01
H-3	1.13E-02	2.30E-02	3.43E-02	8.18E-03
C-14	1.31E-02	1.72E-01	1.86E-01	4.43E-02
TRUs*	1.89E-04	0.00E+00	1.89E-04	4.52E-05
Others**	3.15E-03	1.94E-02	2.26E-02	5.38E-03
<hr/> TOTAL	<hr/> 3.24E+02	<hr/> 9.59E+01	<hr/> 4.19E+02	<hr/> 1.00E+02

* Alpha Emitting Transuranics with Half-Life >5 years, Pu-241 and Cm-242

** Sr-89, Sr-90, Co-57, U-233

SUMMARY
(June 26, 1991 - December 31, 1991)

MAJOR NUCLIDE COMPOSITION
DRY ACTIVE WASTE

<u>PRINCIPLE NUCLIDES</u>	<u>3RD QTR (Ci)</u>	<u>4TH QTR (Ci)</u>	<u>TOTAL (Ci)</u>	<u>PERCENT ABUNDANCE</u>
Co-60	1.87E-01	3.01E-01	4.88E-01	3.03E+01
Fe-55	3.36E-01	6.86E-01	1.07E+00	6.65E+01
Mn-54	6.50E-03	1.50E-02	2.15E-02	1.34E+00
Ni-63	8.72E-03	2.03E-02	2.91E-02	1.80E+00
TRUs*	7.96E-05	0.00E+00	7.96E-05	4.94E-03
C-14	1.67E-04	9.87E-05	2.66E-04	1.65E-02
Ni-59	9.00E-05	0.00E+00	9.00E-05	5.58E-03
Sr-90	3.37E-06	0.00E+00	3.37E-06	2.09E-04
<hr/>	<hr/>	<hr/>	<hr/>	<hr/>
TOTAL	5.89E-01	1.02E+00	1.61E+00	1.00E+02

* Alpha Emitting Transuranics with Half-Life >5 years Pu-241 and Cm-242

SUMMARY OF CHANGES

TO THE OFFSITE DOSE ASSESSMENT MANUAL (ODAM)

For the period of June 26, 1991, through December 31, 1991, no changes were made to the Offsite Dose Assessment Manual (ODAM).

SUMMARY OF CHANGES

TO

THE PROCESS CONTROL PLAN (PRCP)

During the period of June 26, 1991, through December 31, 1991, the following change was made to the existing PRCP's:

A radwaste procedure rewrite effort consolidated all of the existing PRCP's into one procedure. This rewrite deleted procedures for waste processing methods no longer utilized at the DAEC. Because irradiated components are considered inherently stable, no process control program is required. Therefore, the PRCP for irradiated hardware was placed into an administrative procedure.

The new Process Control Procedure gives expanded details of administrative controls for waste processing. The procedure also includes updates on vendor processing methods and diagrams.

All waste product forms at DAEC still conform to the requirements of 10 CFR 61.56.

SUMMARY OF METEOROLOGICAL DATA

The following pages are a summation of meteorological data accumulated during the calendar year 1991 by the MIDAS System at the Duane Arnold Energy Center (DAEC). Each table includes wind speed, wind direction, and stability class at the specified sensor height (33' or 156'). A summary table of all stability classes at each height is also included.

Data recovery for the year was satisfactory per the Regulatory Guide 1.23 standard of 90%. For atmospheric stability, wind speed, and wind direction recovery was greater than 95% at both 33 feet and 156 feet.

17
SITE: DUANE ARNOLD

02/12/92 16:17

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD: 91010101-91123124

STABILITY CLASS: A DT/92

ELEVATION: SPEED:WS30 DIRECTION:WD30 LAPSE:DEL 2

WIND SPEED (MPH)

WIND DIRECTION	1-3	4-7	8-12	13-18	19-24	24	TOTAL
N	4	15	17	0	0	0	36
NNE	1	11	3	0	0	0	15
NE	2	20	6	0	0	0	28
ENE	0	10	4	0	0	3	17
E	1	10	3	0	0	0	14
ESE	6	12	2	0	0	0	20
SE	1	40	15	0	0	0	56
SSE	1	34	25	0	0	2	62
S	3	42	09	18	0	0	132
SSW	2	17	25	21	1	1	77
SW	0	7	13	17	7	0	44
WSW	2	5	16	3	0	1	27
W	1	6	12	11	10	0	40
WNW	0	0	26	34	1	0	61
NW	0	6	18	22	4	0	50
NNW	1	6	10	7	1	0	25
TOTAL	39	288	294	133	24	2	773

PERIODS OF CALM (HOURS): 130

VARIABLE DIRECTION: 0

HOURS OF MISSING DATA: 386

ENTER: (RETURN) CONTINUE, (S0) START OVER, (SK) TO EXIT

SITE: DUANE ARNOLD

03/13/92 16:10

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD = 51010101-01:03104

STABILITY CLASS: A DT/02

ELEVATION: SPEED:W033 DIRECTION:W033 LAPSE:000 T

WIND SPEED (KMH)

WIND DIRECTION	1-3	4-7	8-12	13-18	19-24	24	TOTAL
V	0	1	1	1	0	0	3
NNE	0	4	10	0	0	0	14
NE	1	10	4	0	0	0	15
ENE	0	4	2	0	0	0	6
E	0	3	3	0	0	0	11
ESE	1	6	1	0	0	0	8
SE	0	4	2	1	0	0	7
SSE	0	2	9	0	0	0	11
S	1	6	17	6	0	0	30
SSW	0	3	10	4	1	0	18
SW	1	5	9	1	0	0	16
WSW	0	1	2	2	0	0	5
W	0	2	6	2	1	0	11
WNW	0	5	8	4	3	1	21
NW	0	4	9	4	2	0	19
NNW	1	3	7	4	0	0	15
TOTAL	5	72	102	29	7	2	219

PERIODS OF CALM (HOURS) : 100

VARIABLE DIRECTION :

HOURS OF MISSING DATA: 300

ENTER: [RETURN] CONTINUE, [END] STOP OVER, [EXIT] TO EXIT

SITE: DUANE ARNOLD

02/10/92 16:10

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD: 91010101-91123124

STABILITY CLASS: C DT/02

ELEVATION: SPEED:WS30 DIRECTION:0000 LAPSE:011 T

WIND SPEED(MPH)

WIND DIRECTION	1-3	4-7	8-12	13-19	19-24	>24	TOTAL
N	0	2	4	3	0	0	10
NNE	0	2	8	1	0	0	11
NE	3	8	3	0	0	0	15
NNE	1	4	7	0	0	0	6
E	1	3	4	3	0	0	8
ESE	1	3	6	4	0	0	13
SE	1	5	7	1	3	0	14
SSE	0	0	10	1	0	0	11
S	1	7	11	4	1	0	26
SSW	0	4	14	4	0	0	23
SW	0	1	4	0	0	1	6
WSW	0	6	2	0	1	1	10
W	1	1	6	4	5	0	17
WNW	0	5	10	6	3	0	24
NW	0	6	10	6	4	0	27
NNW	0	4	12	2	0	0	18
TOTAL	9	30	112	36	14	2	255

PERIODS OF CALM(HOURS): 100

VARIABLE DIRECTION: 0

HOURS OF MISSING DATA: 380

ENTER: [RETURN] CONTINUE, [ESC] START OVER, [END] TO EXIT

SITE: DUANE ARNOLD

02/13/72 16:18

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD = 0101161-01123124

TABULIT. CLASS: 0 DT 02

ELEVATION: SPEED:WSS3 DIRECTION:WDSS LAP:RCEL 2

WIND SPEED(MPH)

WIND DIRECTION	1-3	4-7	8-12	13-18	19-24	24	TOTAL
N	12	22	43	7	0	0	100
NNE	2	31	58	11	0	0	107
NE	3	59	72	43	0	0	157
ENE	8	67	25	3	1	0	104
E	12	58	78	17	0	0	165
ESE	2	104	60	12	0	0	158
SE	14	75	48	2	0	0	141
SSE	10	82	67	7	0	0	176
S	9	62	91	23	1	0	189
SSW	4	27	40	15	0	0	77
SW	0	21	26	9	5	2	73
WSW	6	32	36	18	5	1	98
W	5	15	29	40	16	3	110
WNW	5	26	43	54	33	4	166
NW	4	67	78	76	14	1	241
NNW	1	42	164	84	7	0	305
TOTAL	131	851	918	388	90	11	2405

PERIODS OF CALM(HOURS) : 160

VARIABLE DIRECTION: 0

HOURS OF MISSING DATA: 336

ENTER: (RETURN) CONTINUE, (ESC) START OVER, (END) TO EXIT

SITE: DUANE ARNOLD

02/13/02 16:18

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD = 9103101-91103124

STABILITY CLASS: E DT/02

ELEVATION: SPEED:W500 DIRECTION:W030 LAPSE:DEL T

WIND SPEED(MPH)

WIND DIRECTION	1-3	4-7	8-12	13-18	19-24	24	TOTAL
N	17	46	37	7	1	0	108
NNE	24	74	73	13	0	0	186
NE	31	53	70	6	1	0	201
ENE	23	36	37	11	3	0	167
E	40	114	26	12	2	0	207
ESE	41	136	35	13	1	0	230
SE	46	139	30	7	2	0	251
SSE	58	212	67	10	0	0	352
S	48	227	106	9	0	0	403
SSW	35	21	70	16	2	0	219
SW	26	45	13	9	2	0	114
WSW	19	41	21	8	3	2	97
W	27	45	36	10	2	1	126
WNW	16	32	6	31	13	1	213
NW	14	126	41	25	8	0	270
NNW	13	33	89	21	1	1	158
TOTAL	499	1550	965	211	39	5	3334

PERIODS OF CALM(HOURS): 189

VARIABLE DIRECTION 0

HOURS OF MISSING DATA: 386

ENTER: (RETURN) CONTINUE, (ESC) START OVER, (END) TO EXIT

SITE: DUANE ARNOLD

02/13/92 16:12

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD = 91010101-91123124

STABILITY CLASS: F DT/DE

ELEVATION: SPEED:W300 DIRECTION:W000 LAPSE:DEL T

WIND SPEED(MPH)

WIND DIRECTION	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	5	5	4	1	1	0	16
NNE	7	33	9	1	0	0	50
NE	21	24	1	1	0	0	48
ENE	24	9	1	0	1	0	35
E	27	16	0	0	0	0	44
ESE	19	11	0	0	0	0	30
SE	44	25	3	0	0	0	72
SSE	51	35	8	2	0	0	96
S	58	32	6	2	0	0	101
SSW	47	21	7	2	0	0	77
SW	28	17	1	1	0	0	50
WSW	01	17	0	1	0	1	20
W	13	19	0	0	0	0	32
WNW	8	13	4	2	1	0	28
NW	0	8	2	3	0	0	13
NNW	7	6	3	3	0	0	19
TOTAL	376	292	52	31	3	1	755

PERIODS OF CALM(HOURS): 189

VARIABLE DIRECTION 0

HOURS OF MISSING DATA: 386

ENTER: [RETURN] CONTINUE, [ESC] START OVER, [CEX] TO EXIT

SITE: DUANE ARNOLD

02/13/00 16:19

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD * 91010101-91123124

STABILITY CLASS: G BT/DB

ELEVATION: SPEED:WS03 DIRECTION:WD03 LAPSE:LEL T

WIND SPEED: MPH

WIND DIRECTION	1-3	4-7	8-12	13-18	19-24	24	TOTAL
N	24	6	0	2	0	1	33
NNE	8	11	0	1	0	0	20
NE	20	11	0	1	0	0	32
ENE	29	2	0	0	0	0	31
E	35	1	0	0	0	0	36
ESE	23	0	0	0	0	0	23
SE	19	3	0	0	0	0	22
SSE	47	6	0	1	0	0	54
S	60	5	0	0	0	0	65
SSW	22	6	0	1	0	0	29
SW	11	5	0	0	0	0	16
WSW	24	3	0	0	0	0	27
W	12	2	0	0	0	0	14
WNW	4	1	0	0	0	0	5
NW	3	1	0	0	0	0	4
NNW	1	0	1	0	0	0	2
TOTAL	472	63	1	6	0	1	543

PERIODS OF CALM (HOURS): 189

VARIABLE DIRECTION 0

HOURS OF MISSING DATA: 386

ENTER: (RETURN) CONTINUE, (END) START OVER, (EXIT) TO EXIT

SITE: DUANE AFNCLD

02/13/92 16:10

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD = 91010101-91123124

STABILITY CLASS: ALL BT'02

ELEVATION: SPEED:W033 DIRECTION:W033 LAPSE:DEL T

WIND DIRECTION	WIND SPEED(MPH)						TOTAL
	1-3	4-7	8-12	13-18	19-24	24	
N	62	115	108	18	2	1	311
NNE	47	156	161	29	0	0	493
NE	86	215	156	21	1	0	495
ENE	92	191	70	14	5	0	375
E	122	256	74	30	0	0	495
ESE	100	277	104	29	1	0	535
SE	127	274	106	11	0	0	553
SSE	173	404	186	31	0	0	710
S	208	389	390	62	2	1	1070
SSW	150	192	176	69	12	1	578
SW	138	103	91	40	14	3	401
WSW	72	136	77	29	9	6	305
W	59	90	92	69	34	4	358
WNW	33	140	160	131	54	6	536
NW	21	218	208	136	32	1	636
NNW	20	94	286	121	9	1	538
TOTAL	1521	3197	2445	824	177	24	3374

PERIODS OF CALM(HOURS): 189

VARIABLE DIRECTION 0

HOURS OF MISSING DATA: 386

ENTER: (RETURNS) CONTINUE. (ESC) START OVER. (END) TO EXIT

11
SITE: DUANE ARNOLD

02/13/92 16:22

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD = 91010101-91123124
STABILITY CLASS: A MT/DZ
ELEVATION: SPEED:WS156 DIRECTION:WD156 LAPSE:DEL T

WIND DIRECTION	WIND SPEED (MPH)						TOTAL
	1-3	4-7	8-12	13-18	19-24	25+	
N	5	8	17	5	1	0	36
NNE	1	8	13	3	0	0	24
NE	1	16	13	1	0	0	31
ENE	0	12	6	1	0	0	19
E	1	11	13	0	0	0	25
ESE	1	9	4	0	0	0	14
SE	0	18	12	6	0	0	36
SSE	1	28	42	14	0	0	85
S	3	30	46	41	13	0	133
SSW	1	13	27	28	2	2	73
SW	2	7	19	34	10	6	80
WSW	2	3	10	8	0	1	24
W	0	4	11	3	3	3	32
WNW	0	2	14	29	14	0	59
NW	2	5	19	31	18	0	75
NNW	0	8	12	7	3	0	30
TOTAL	20	184	278	206	71	15	774

PERIODS OF CALM/HOURS: 30
VARIABLE DIRECTION 0
HOURS OF MISSING DATA: 400
ENTER: (CR) (JRN) CONTINUE, (SOD) START OVER, (EX) TO EXIT

SITE: DLANE ARNOLD

02-13-92 16:22

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD = 91010101-91103124

STABILITY CLASS: B DT/02

ELEVATION: SPEED:WS156 DIRECTION:WD156 LAISE:DEL-T

WIND SPEED(MPH)

WIND DIRECTION	1-3	4-7	8-12	13-18	19-24	24	TOTAL
N	1	0	8	3	1	0	13
NNE	0	5	6	2	0	0	13
NE	0	6	6	1	0	0	13
NNE	0	4	4	0	0	0	8
E	0	3	4	1	0	0	8
ESE	1	4	0	0	0	0	12
SE	0	3	4	4	0	0	11
SSE	0	2	3	6	0	0	11
S	0	4	7	9	2	0	22
SSW	0	2	4	9	3	2	22
SW	0	2	10	6	0	0	18
WSW	1	2	4	1	1	0	9
W	0	0	5	2	1	0	8
WNW	0	2	7	1	2	2	14
NW	0	4	5	4	7	0	20
NNW	0	1	13	3	0	0	17
TOTAL	3	44	97	51	19	4	218

PERIODS OF CALM(HOURS): 30

VARIABLE DIRECTION 0

HOURS OF MISSING DATA: 400

ENTER: (RETURN) CONTINUE, (ESC) START OVER, (END) TO EXIT

SITE: DUANE ARNOLD

02/13/92 16:23

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD * 91010101-91123124

STABILITY CLASS: C TT:DE

ELEVATION: SPEED:WS150 DIRECTION:WB150 LAPSE:DEL T

WIND SPEED (MPH)

WIND DIRECTION	1-3	4-7	8-12	13-18	19-24	24	TOTAL
N	1	2	12	3	0	0	18
NNE	0	2	5	2	0	0	9
NE	1	10	3	3	0	0	17
ENE	0	2	2	0	0	0	7
E	1	2	4	0	0	0	7
ESE	0	3	7	0	0	0	17
SE	1	2	5	4	0	0	12
SSE	1	1	13	7	0	0	22
S	0	4	13	7	2	4	30
SSW	0	2	7	3	2	0	21
SW	0	0	2	4	2	0	9
WSW	0	2	1	2	0	1	7
W	0	2	3	2	1	3	12
WNW	0	2	5	2	4	2	15
NW	0	3	10	9	7	3	32
NNW	0	3	9	6	0	0	18
TOTAL	5	30	103	60	23	13	254

PERIODS OF CALM (HOURS): 20

VARIABLE DIRECTION 0

HOURS OF MISSING DATA: 000

ENTER: (RETURN) CONTINUE, ESCAPE START OVER, CTRL TO EXIT

SITE: DUANE ARNOLD

02/13/92 16:23

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD = 91010.01-91123104

STABILITY CLASS: D DT/DZ

ELEVATION: SPEED:WS156 DIRECTION:WD116 LAISE:DEL T

WIND DIRECTION	WIND SPEED MPH						TOTAL
	1-3	4-7	8-12	13-18	19-24	25	
N	6	28	39	33	5	0	111
NNE	3	30	46	27	0	0	106
NE	0	30	71	23	0	0	140
ENE	0	36	54	10	1	1	109
E	7	48	67	36	5	0	163
ESE	3	50	74	43	10	0	180
SE	0	42	86	44	2	0	174
SSE	5	41	60	38	0	0	144
S	3	22	61	01	21	15	183
SSW	3	23	41	41	12	3	123
SW	3	19	26	16	7	0	79
WSW	3	26	25	16	1	6	77
W	3	11	31	23	11	6	85
WNW	3	14	23	28	31	17	116
NW	3	22	61	57	74	17	234
NNW	4	29	130	116	38	4	321
TOTAL	63	465	915	637	233	78	2391

PERIODS OF CALM(HOURS): 20

VARIABLE DIRECTION 0

HOURS OF MISSING DATA: 430

ENTER: [RETURN] CONTINUE, [ESC] START OVER, [F10] TO EXIT

SITE: DUANE ARNOLD

02/13/92 15:23

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD = 91010101-91123124

STABILITY CLASS: E DT/D2

ELEVATION: SPEED:WS150 DIRECTION:W155 LAPSERIAL 7

WIND DIRECTION	WIND SPEED(MPH)						TOTAL
	1-3	4-7	8-12	13-18	19-24	25-30	
N	10	42	56	42	7	0	167
NNE	3	38	79	61	3	0	184
NE	4	59	92	45	0	0	200
ENE	9	41	67	36	8	0	164
E	12	58	83	38	8	0	199
ESE	13	75	103	38	7	1	237
SE	7	41	142	41	9	0	240
SSE	7	52	136	64	8	2	270
S	7	43	243	154	7	0	454
SSW	10	30	103	75	8	0	234
SW	9	34	60	14	5	4	127
WSW	12	44	23	3	5	5	98
W	8	38	31	31	2	0	110
WNW	9	72	65	43	18	5	172
NW	7	53	86	63	18	9	236
NNW	4	28	138	57	0	0	227
TOTAL	133	716	1506	801	116	39	3316

PERIODS OF CALM(HOURS): 30

VARIABLE DIRECTION 0

HOURS OF MISSING DATA: 420

ENTER: (P)RETURN) CONTINUE, (S) START OVER, (E)X) TO EXIT

SITE: DUANE ARNOLD

02/13/92 16:24

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD = 91010101-91123124

STABILITY CLASS: F DT/DT

ELEVATION: SPEED:WS156 DIRECTION:WD156 LAPSE:DEL 7

WIND SPEED (MPH)

WIND DIRECTION	1-3	4-7	8-12	13-19	19-24	24	TOTAL
N	3	21	11	4	5	0	44
NNE	1	5	27	11	0	0	45
NE	2	13	16	2	0	0	34
ENE	4	7	14	0	0	1	26
E	2	11	14	1	0	0	28
ESE	7	13	15	0	0	0	35
SE	10	19	46	3	0	0	89
SSE	0	22	46	8	1	0	83
S	6	23	36	9	2	0	76
SSW	4	14	27	7	1	0	53
SW	7	13	12	4	1	0	37
WSW	8	20	18	1	1	1	48
W	8	23	22	2	1	0	56
WNW	1	22	16	5	0	1	46
NW	3	7	16	3	5	0	34
NNW	6	7	15	6	1	0	36
TOTAL	79	250	349	66	18	3	769

PERIODS OF CALM (HOURS): 20

VARIABLE DIRECTION 0

HOURS OF MISSING DATA: 430

ENTER: (RETURN) CONTINUE. (SO) START OVER. (EX) TO EXIT

SITE: DUANE ARNOLD

02/13/90 16:34

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD = 91010101-91123124

STABILITY CLASS: G BT/DZ

ELEVATION: SPEED:WS156 DIRECTION:WD153 LAPSE:DEL T

WIND DIRECTION	WIND SPEED (MPH)						TOTAL
	1-3	4-7	8-12	13-18	19-24	24	
N	17	11	6	2	1	1	39
NNE	6	18	6	1	0	0	31
NE	8	17	8	1	2	0	37
ENE	1	10	6	0	0	0	17
E	4	6	2	1	0	0	13
ESE	9	17	5	0	0	0	31
SE	9	39	20	0	0	0	69
SSE	11	38	26	1	0	0	76
S	18	24	18	0	0	0	61
SSW	6	18	9	0	0	0	33
SW	11	18	4	0	0	0	33
WSW	12	22	5	1	0	0	43
W	19	15	3	0	0	0	37
WNW	7	22	5	0	0	0	34
NW	7	16	3	0	0	0	26
NNW	17	13	4	0	0	0	34
TOTAL	162	304	130	7	3	1	618

PERIODS OF CALM HOURS: 20

VARIABLE DIRECTION: 0

HOURS OF MISSING DATA: 420

ENTER: [RETURN] CONTINUE, [ESC] START OVER, [TEXT] TO EXIT

SITE: DUANE APNOLD

02/13/82 13:04

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD = 91010101 911231.4

STABILITY CLASS: ALL DT/DZ

ELEVATION: SPEED:WS156 DIRECTION:WD156 LAPSE:DEL T

WIND SPEED(MPH)

WIND DIRECTION	1-3	4-7	8-12	13-18	19-24	24	TOTAL
N	45	112	149	82	20	4	423
NNE	14	106	131	107	3	0	413
NE	25	151	209	76	13	2	477
ENE	14	115	153	50	9	5	346
E	27	133	207	67	13	0	454
ESE	34	173	215	71	23	1	516
SE	30	175	310	102	11	0	628
SSE	31	184	326	158	16	2	718
S	27	150	434	291	47	24	974
SSW	24	111	218	169	27	7	566
SW	35	89	133	80	25	20	363
WSW	38	120	83	27	8	14	304
W	38	93	108	68	19	13	340
WNW	20	96	135	108	69	27	456
NW	22	110	200	157	129	29	647
NNW	31	89	321	195	42	4	688
TOTAL	465	2013	3378	1828	483	153	8346

PERIODS OF CALM(HOURS): 20

VARIABLE DIRECTION 0

HOURS OF MISSING DATA: 420

ENTER: [RETURN] CONTINUE, [ESC] START OVER, [EX] TO EXIT