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Duane Arnold Energy Center
3277 DAEC Road
Palo, IA 52324-9785

Operated by Nuclear Management Company, LLC

April 26, 2001
NG-01-0572

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Mail Station O-P1-17
Washington, D.C. 20555-0001

SUBJECT: Duane Arnold Energy Center
Docket No: 50-331
Op. License No: DPR-49
Annual Radioactive Material Release Report
(January 1, 2000 through December 31, 2000)
FILE: A-118e, NRC-7a

Please find enclosed a copy of the Annual Radioactive Material Release Report for the Duane Arnold Energy Center for the period January 1, 2000 through December 31, 2000. This report satisfies the requirements for the Annual Radioactive Material Release Report, as stated in the Offsite Dose Assessment Manual (ODAM) section 6.4.1.

Sincerely,

Robert Anderson
Plant Manager - Nuclear

RA/SF/hc

cc: Mr. James E. Dyer (w/attachment)
Regional Administrator
Region III
U.S. Nuclear Regulatory Commission
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NRC Resident Inspector - DAEC (w/attachments)
B. Mozafari(NRC-NRR) (w/attachments)
E. Protsch (w/o attachments)
D. Wilson (w/o attachments)
Robert Murrell(w/o attachments)
Wendell Aldrich (Safety Committee) (w/ attachments)
CTS Project (w/ attachments)
DOCU (w/attachments)

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Duane Arnold Energy Center

2000

Annual Radioactive Materials
Release Report

January 1, 2000 through December 31, 2000

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TABLES

INTRODUCTION

This Annual Radioactive Material Release Report is for the period of January 1, 2000, through December 31, 2000.

There were no radioactive liquid effluent releases from the Duane Arnold Energy Center during this report period.

Gaseous effluent releases were continuous for the period and resulted in a small fraction of the 10 CFR 20 site boundary concentration limits and the 10 CFR 50, Appendix I dose objectives. There were no abnormal releases of radioactive material to the environment. Tables quantifying gaseous releases are displayed on pages 5-6.

A total of five solid radioactive waste shipments were made during 2000. Three shipments were of spent resin, two of which were in high integrity containers (HICs) and the third was a steel liner. All three spent resin shipments were sent to ATG, Inc. located in Oak Ridge, Tennessee. Two shipments of Dry Active Waste were sent to GTS Duratek (Duratek, Inc.) for processing and volume reduction, recycling and/or free release at Oak Ridge, Tennessee. No aqueous mechanical filters, irradiated hardware or component shipments were made during this reporting period. Details are listed beginning on page 7.

Difficulty was experienced in 2000 with collecting better than 90% data recovery for two sensors on the DAEC meteorological tower. The problem is described on page 11.

A Summary of the DAEC Chemistry Lab (Radioactive Sample Analysis) Cross Check Program is included on page 17.

There were four revisions to the Offsite Dose Assessment Manual (ODAM) in 1999 and 2000

Revisions 12 and 13 included changes implemented as a result of plant modification # EMA44812.

Revision 14 corrected a typographical type error in table 6.3-1 which describes the Radiological Environmental Monitoring Program (REMP). There was also a minor change to Table 6.2-1 which describes alternate sampling and monitoring requirements when gaseous effluent monitoring systems are declared inoperable.

Revision 15 was implemented to remove references to IES Utilities and Alliant Energy.

Details of these changes are described in Attachments 1 and 2.

LIQUID EFFLUENT TABLE

Table 1 Liquid Effluents

ANNUAL RADIOACTIVE MATERIAL RELEASE REPORT (2000) **LIQUID EFFLUENTS BY CALENDAR QUARTER**					
Nuclides Released	Unit	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
strontium-89	Ci	<LLD	<LLD	<LLD	<LLD
strontium-90	Ci	<LLD	<LLD	<LLD	<LLD
cesium-134	Ci	<LLD	<LLD	<LLD	<LLD
cesium-137	Ci	<LLD	<LLD	<LLD	<LLD
iodine-131	Ci	<LLD	<LLD	<LLD	<LLD
cobalt-58	Ci	<LLD	<LLD	<LLD	<LLD
cobalt-60	Ci	<LLD	<LLD	<LLD	<LLD
iron-55	Ci	<LLD	<LLD	<LLD	<LLD
iron-59	Ci	<LLD	<LLD	<LLD	<LLD
zinc-65	Ci	<LLD	<LLD	<LLD	<LLD
manganese-54	Ci	<LLD	<LLD	<LLD	<LLD
chromium-51	Ci	<LLD	<LLD	<LLD	<LLD
zirconium-niobium-95	Ci	<LLD	<LLD	<LLD	<LLD
molybdenum-99	Ci	<LLD	<LLD	<LLD	<LLD
technetium-99m	Ci	<LLD	<LLD	<LLD	<LLD
barium-lanthanum-140	Ci	<LLD	<LLD	<LLD	<LLD
cerium-141	Ci	<LLD	<LLD	<LLD	<LLD
Other (specify)	Ci	<LLD	<LLD	<LLD	<LLD
		<LLD	<LLD	<LLD	<LLD
		<LLD	<LLD	<LLD	<LLD
Total for period (above)	Ci	<LLD	<LLD	<LLD	<LLD
xenon-133	Ci	<LLD	<LLD	<LLD	<LLD
xenon-135	Ci	<LLD	<LLD	<LLD	<LLD

<LLD means that the radionuclide was not identified in any samples and all measurement results were less than the lower limit of detection as required by the DAEC Offsite Dose Assessment Manual.

There were no radioactive liquid discharges from DAEC during this report period.

GASEOUS EFFLUENT TABLES

Table 2 Gaseous Effluents

ANNUAL RADIOACTIVE MATERIAL RELEASE REPORT (2000) GASEOUS EFFLUENTS BY CALENDAR QUARTER					
Nuclides Released	Unit	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
1. Fission gases					
krypton-85	Ci	<LLD	<LLD	<LLD	<LLD
krypton-85m	Ci	1.94E+00	<LLD	<LLD	<LLD
krypton-87	Ci	<LLD	<LLD	<LLD	<LLD
krypton-88	Ci	<LLD	<LLD	<LLD	<LLD
xenon-133	Ci	4.57E+00	<LLD	<LLD	4.78E+00
xenon-135	Ci	5.32E+00	3.69E+00	1.78E+00	3.48E+00
xenon-135m	Ci	1.20E+00	1.91E+00	3.84E+00	4.48E+00
xenon-138	Ci	1.72E+01	7.15E+00	1.45E+01	1.64E+00
Tritium	Ci	2.18E+00	1.60E+00	3.08E+00	3.57E+00
Total Fission Gasses for period	Ci	3.24E+01	1.44E+01	2.32E+01	1.80E+01
2. Iodines	Ci				
iodine-131	Ci	1.92E-05	1.41E-05	2.16E-05	4.76E-06
iodine-133	Ci	4.19E-06	1.47E-05	7.66E-06	1.81E-06
iodine-135	Ci	<LLD	<LLD	<LLD	<LLD
Total Iodines for period	Ci	2.34E-05	2.88E-05	2.93E-05	6.57E-06
3. Particulates					
strontium-89	Ci	8.03E-06	1.21E-05	1.71E-05	7.96E-06
strontium-90	Ci	1.86E-07	1.11E-07	1.37E-07	6.35E-08
cesium-134	Ci	<LLD	<LLD	<LLD	<LLD
cesium-137	Ci	6.14E-05	4.38E-05	9.31E-07	1.79E-04
barium-lanthanum-140	Ci	<LLD	3.56E-06	6.29E-06	2.08E-07
chromium-51	Ci	2.32E-05	<LLD	<LLD	<LLD
cobalt-58	Ci	2.17E-06	<LLD	<LLD	<LLD
cobalt-60	Ci	2.84E-04	2.05E-04	1.63E-05	1.02E-04
iron59	Ci	2.47E-06	<LLD	<LLD	<LLD
manganese-54	Ci	1.61E-04	7.09E-05	7.41E-06	1.52E-05
zinc-65	Ci	1.48E-03	1.11E-03	<LLD	1.59E-04
Total Particulates for Period	Ci	2.02E-03	1.45E-03	4.82E-05	4.63E-04
Total for Period	Ci	3.24E+01	1.44E+01	2.32E+01	1.80E+01

<LLD means that the radionuclide was not identified in any samples and all measurement results were less than the lower limit of detection as required by the DAEC Offsite Dose Assessment Manual.

Table 3 Gaseous Effluent by Release Point

ANNUAL RADIOACTIVE MATERIAL RELEASE REPORT (2000) GASEOUS EFFLUENTS BY RELEASE POINT (Curies)				
RELEASE POINT	OFFGAS STACK	REACTOR BUILDING	TURBINE BUILDING	LLRPSF
RELEASE HEIGHT	328 FEET	156 FEET	90 FEET	65 FEET
RELEASE MODE	ELEVATED	WAKE SPLIT	WAKE SPLIT	WAKE SPLIT
Kr-85m	1.94E+00	<LLD	<LLD	<LLD
Kr-85	<LLD	<LLD	<LLD	<LLD
Kr-87	<LLD	<LLD	<LLD	<LLD
Kr-88	<LLD	<LLD	<LLD	<LLD
Xe-133	1.85E+00	4.65E+00	1.56E+00	1.29E+00
Xe-135m	1.14E+01	<LLD	<LLD	<LLD
Xe-135	1.12E+01	1.56E+00	1.56E+00	<LLD
Xe-138	4.05E+01	<LLD	<LLD	<LLD
H-3	1.16E+00	6.42E+00	2.78E+00	6.72E-02
Cr-51	<LLD	2.32E-05	<LLD	<LLD
Mn-54	2.33E-07	2.54E-04	<LLD	<LLD
Co-58	<LLD	2.17E-06	<LLD	<LLD
Co-60	<LLD	6.06E-04	8.03E-07	<LLD
Fe-59	<LLD	2.47E-06	<LLD	<LLD
Sr-89	9.71E-06	1.91E-05	1.58E-05	5.59E-07
Sr-90	8.56E-08	2.28E-07	1.18E-07	6.51E-08
Cs-134	<LLD	<LLD	<LLD	<LLD
Cs-137	<LLD	2.85E-04	<LLD	<LLD
Ba-140	6.52E-06	3.54E-06	<LLD	<LLD
Zn-65	8.08E-07	2.75E-03	<LLD	<LLD
I-131	4.88E-05	1.09E-05	<LLD	<LLD
I-133	2.67E-05	1.69E-06	<LLD	<LLD
I-135	<LLD	<LLD	<LLD	<LLD
Totals	6.80E+01	1.26E+01	5.90E+00	1.36E+00

SUMMARY OF RADIOACTIVE SOLID WASTE

Listed below are tables summarizing the Duane Arnold Energy Center's generation of Radioactive Solid Waste for the period January 1, 2000 through December 31, 2000.

SHIPMENTS MADE TO BURIAL FACILITIES IN 2000:

Table 4 Waste Disposition

WASTE TYPE	NO. SHIPMENTS	VOLUME (M^3)	ACTIVITY (MBq)
Resin*	0	0	0
Aqueous Mechanical Filters*	0	0	0
DESTINATION			

(*) No radioactive waste shipments were shipped directly to burial during the year 2000.

SHIPMENTS MADE TO PROCESSING FACILITIES:

WASTE TYPE	NO. SHIPMENTS	VOLUME (M^3)	ACTIVITY (MBq)
Dry Active Waste	2	66.78	2.69E+4
DESTINATION	GTS Duratek (Duratek, Inc.) Oak Ridge, Tennessee		
Resin	3	16.04	7.07E+6
DESTINATION	ATG, Inc. Oak Ridge, Tennessee		

SOLIDIFICATION AGENT: None MODE OF TRANSPORTATION: Exclusive-Use Vehicle (Trucks)

TOTAL SOLID WASTE DISPOSITION:

WASTE	VOLUME (M^3)	ACTIVITY (MBq)
Shipped	1.16E+2	7.09E+6
Buried **	2.60E+1	5.35E+6

(**) Waste buried by the processing facility originated from waste shipments from the DAEC in years prior to 2000.

No irradiated hardware or component shipments were made during this reporting period.

WASTE CLASSIFICATION PER 10 CFR 61	NUMBER OF SHIPMENTS
A-Unstable	3
A-Stable	2
B	0
C	0

SUMMARY OF RADIOACTIVE SOLID WASTE

(January 1, 2000 - December 31, 2000)

MAJOR NUCLIDE COMPOSITION

Table 5 DRY ACTIVE WASTE

Principle Nuclide	1st QTR (MBq)	2nd QTR (MBq)	3rd QTR (MBq)	4th QTR (MBq)	Total (MBq)	Percent Abundance
H-3	5.43E+00	0.00E+00	0.00E+00	4.89E+00	1.03E+01	0.04%
C-14	1.66E+00	0.00E+00	0.00E+00	8.89E+00	1.06E+01	0.04%
Cr-51	1.20E+02	0.00E+00	0.00E+00	6.14E+02	7.34E+02	2.73%
Mn-54	2.02E+02	0.00E+00	0.00E+00	1.01E+03	1.21E+03	4.50%
Fe-55	3.44E+03	0.00E+00	0.00E+00	1.77E+04	2.11E+04	78.45%
Fe-59	0.00E+00	0.00E+00	0.00E+00	1.80E+01	1.80E+01	0.07%
Co-58	0.00E+00	0.00E+00	0.00E+00	1.06E+01	1.06E+01	0.04%
Co-60	4.86E+02	0.00E+00	0.00E+00	2.65E+03	3.13E+03	11.63%
Ni-59	3.75E+01	0.00E+00	0.00E+00	3.03E-01	3.78E+01	0.14%
Ni-63	0.00E+00	0.00E+00	0.00E+00	1.52E+02	1.52E+02	0.56%
Zn-65	2.67E+01	0.00E+00	0.00E+00	1.91E+02	2.18E+02	0.81%
Sr-90	3.74E-03	0.00E+00	0.00E+00	6.06E+00	6.07E+00	0.02%
Cs-134	2.28E-07	0.00E+00	0.00E+00	0.00E+00	2.28E-07	0.00%
Cs-137	0.00E+00	0.00E+00	0.00E+00	1.98E+02	1.98E+02	0.73%
Hf-181	2.49E-07	0.00E+00	0.00E+00	5.04E+01	5.04E+01	0.19%
Tc-99	0.00E+00	0.00E+00	0.00E+00	1.70E-05	1.70E-05	0.00%
Nb-95	2.46E+00	0.00E+00	0.00E+00	0.00E+00	2.46E+00	0.01%
I-129	0.00E+00	0.00E+00	0.00E+00	1.85E-05	1.85E-05	0.00%
Pu-238	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00%
Pu-239/40	0.00E+00	0.00E+00	0.00E+00	2.04E-03	2.04E-03	0.00%
Pu-241	5.51E-03	0.00E+00	0.00E+00	1.13E-01	1.18E-01	0.00%
Am-241	1.07E-03	0.00E+00	0.00E+00	2.51E-01	2.52E-01	0.00%
Cm-242	0.00E+00	0.00E+00	0.00E+00	5.79E-03	5.79E-03	0.00%
Cm-243/44	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00%
U-233/34	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00%
U-238	1.08E+01	0.00E+00	0.00E+00	0.00E+00	1.08E+01	0.04%
Cd-109	0.00E+00	0.00E+00	0.00E+00	6.06E-01	6.06E-01	0.00%
Co-57	0.00E+00	0.00E+00	0.00E+00	3.71E-01	3.71E-01	0.00%
Na-22	0.00E+00	0.00E+00	0.00E+00	6.11E-01	6.11E-01	0.00%
Totals	4.33E+03	0.00E+00	0.00E+00	2.26E+04	2.69E+04	100.00%

Notes:
No DAW Shipments were made during the second and third quarters of 2000.

Tc-99 and I-129 represent Minimum Detectable Activity (MDA) values, Tc-99 is a real value in 4th QTR These two nuclides are in units of uCi/cc from Rad Calc # 99-006-R and 00-003-R,

Except for 4th QTR shipment, sources containing Tc-99 were shipped to a processor.

H-3, C-14, Tc-99, and I-129 were required to be manifested per 10 CFR 20, Appendix G.

SUMMARY OF RADIOACTIVE SOLID WASTE

(January 1, 2000 - December 31, 2000)

MAJOR NUCLIDE COMPOSITION

Table 6 AQUEOUS MECHANICAL FILTERS

Principle Nuclide	1st QTR (MBq)	2nd QTR (MBq)	3rd QTR (MBq)	4th QTR (MBq)	Total (MBq)	Percent Abundance
H-3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00%
C-14	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00%
Cr-51	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00%
Mn-54	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00%
Fe-55	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00%
Fe-59	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00%
Co-58	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00%
Co-60	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00%
Ni-59	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00%
Ni-63	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00%
Zn-65	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00%
Sr-90	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00%
Cs-134	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00%
Cs-137	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00%
Hf-181	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00%
Tc-99	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MDA
Nb-95	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00%
I-129	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MDA
Pu-238	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00%
Pu-239/40	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00%
Pu-241	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00%
Am-241	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00%
Cm-242	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00%
Cm-243/44	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00%
U-233/34	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00%
U-238	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00%
Cd-109	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00%
Co-57	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00%
Na-22	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00%
Totals	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00%

Notes:
No Aqueous Mechanical Filter Shipments were made during the Year 2000

Tc-99 and I-129 represent Minimum Detectable Activity (MDA) values. These two nuclides are in units of uCi/cc from Rad Calc #00-004-R.

Except for 4th QTR shipment, sources containing Tc-99 were shipped to a processor.

H-3, C-14, Tc-99, and I-129 were required to be manifested per 10 CFR 20, Appendix G.

SUMMARY OF RADIOACTIVE SOLID WASTE

(January 1, 2000 - December 31, 2000)

MAJOR NUCLIDE COMPOSITION

Table 7 Spent Resin

Principle Nuclide	1st QTR (MBq)	2nd QTR (MBq)	3rd QTR (MBq)	4th QTR (MBq)	Total (MBq)	Percent Abundance
H-3	0.00E+00	2.00E+03	0.00E+00	3.92E+02	2.39E+03	0.03%
C-14	0.00E+00	5.48E+03	0.00E+00	1.89E+03	7.37E+03	0.10%
Cr-51	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00%
Mn-54	0.00E+00	2.68E+05	0.00E+00	7.25E+04	3.41E+05	4.82%
Fe-55	0.00E+00	3.44E+06	0.00E+00	1.18E+06	4.62E+06	65.39%
Fe-59	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00%
Co-58	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00%
Co-60	0.00E+00	5.56E+05	0.00E+00	2.13E+05	7.69E+05	10.88%
Ni-59	0.00E+00	2.64E+02	0.00E+00	9.99E+01	3.64E+02	0.01%
Ni-63	0.00E+00	3.40E+04	0.00E+00	1.42E+04	4.82E+04	0.68%
Zn-65	0.00E+00	1.01E+06	0.00E+00	2.30E+05	1.24E+06	17.50%
Sr-90	0.00E+00	3.91E+01	0.00E+00	2.39E+01	6.30E+01	0.00%
Cs-134	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00%
Cs-137	0.00E+00	2.43E+04	0.00E+00	1.67E+04	4.10E+04	0.58%
Cs-134	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00%
Tc-99	0.00E+00	9.80E-06	0.00E+00	6.29E-04	6.39E-04	MDA
Nb-95	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00%
I-129	0.00E+00	4.43E-05	0.00E+00	4.02E-04	4.46E-04	MDA
Pu-238	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00%
Pu-239/40	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00%
Pu-241	0.00E+00	2.65E+01	0.00E+00	1.32E+01	3.97E+01	0.00%
Am-241	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00%
Cm-242	0.00E+00	6.71E-01	0.00E+00	3.15E-01	9.86E-01	0.00%
Cm-243/44	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00%
U-233/34	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00%
U-238	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00%
Ru-106	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00%
Sr-89	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00%
Zr-95	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00%
Totals	0.00E+00	5.34E+06	0.00E+00	1.73E+06	7.07E+06	100.00%

Notes:

No Spent Resin Shipments were made during 1st and 3rd Quarters of 2000

Tc-99 and I-129 represent Minimum Detectable Activity (MDA) values. These two nuclides are in units of uCi/cc from Rad Calc #99-003-R and 00-004-R

Except for 4th QTR shipment, sources containing Tc-99 were shipped to a processor.

H-3, C-14, Tc-99, and I-129 were required to be manifested per 10 CFR 20, Appendix G.

SUMMARY OF METEOROLOGICAL DATA

The following pages are a summation of meteorological data accumulated during the calendar year 2000 by the MIDAS (Meteorological Information and Dose Assessment System) at the Duane Arnold Energy Center.

Better than 93% data recovery was obtained for Wind speed, temperature and 10 meter wind direction. A table summarizing data collection and lost data rescue is printed below.
Due to several lightning strikes on the Meteorological Data Collection Tower, DAEC initially achieved less than 90% data recovery for atmospheric stability and wind direction from the 50 meter elevation. (At the DAEC, wind stability is determined from Δt between the 10 meter and 50 meter elevation temperatures)

In order to achieve greater than 90% "good data" for the 50 meter wind direction sensor, the following actions were taken:

1. For 264 hours, 50 meter wind direction data available on the Plant Process Computer (PPC) but not initially accessible from the Midas software was made available to Midas.
2. For 925 hours, wind direction values from the 10 meter sensor were substituted into corresponding 50 meter values. This substitution was performed only for hours where the hourly average wind speed was greater than 4 mph.

In order to achieve greater than 90% "good data" for the Delta T (Stability) Sensor, the following action was taken:

3. For 635 hours, missing Delta T data values were determined by subtracting corresponding 10 meter sensor temperatures from 50 meter sensor temperatures.

Table 8 Met. Data Recovery

Sensor	Initial % Recovery "good" data	1.) Update Midas Data From PPC Data	2.) Substitute 10M directions for missing 50 meter directions	3.) Determine ΔT from difference in temps at 2 elevations	Final % Recovery "good" data
Wind Direction 10m	95.72%	0.28%			96.00%
Wind Direction 50m	77.69%	3.00%	10.53%		91.22%
Wind Speed 10m	97.39%	1.35%			98.74%
Wind Speed 50m	93.34%	3.02%			96.36%
Temperature 10m	99.03%				99.03%
Temperature 50m	98.08%				98.08%
Delta Temp./Stability	83.30%			7.23%	90.53%

Plant Modification #A52246 was initiated in 2000 to improve the reliability of Meteorological data collection by reducing the system's vulnerability to lightning strikes.

Listed below are Stability Class tables which include wind speed, wind direction, and stability class at the specified sensor heights (33 feet or 156 feet). A summary table of all stability classes at each height is also included.

Stability Class Data 33'

TEMPERATURE DIFFERENCE DEG.F/100 FT

TABLE	GREATER THAN	LESS THAN OR EQUAL TO
1(A)	------	-1.045
2(B)	-1.045	-0.935
3(C)	-0.935	-0.825
4(D)	-0.825	-0.275
5(E)	-0.275	0.825
6(F)	0.825	2.200
7(G)	2.200	------
8	ALL LAPSE GROUPS IN ONE TABLE	

STABILITY BASED ON DELTA-T

HOURS AT EACH WIND SPEED AND DIRECTION
PERIOD OF RECORD = 00010101-00123124
STABILITY CLASS: A DT/DZ
ELEVATION: SPEED:WS33 DIRECTION:WD33 LAPSE:DEL T

WIND SPEED(MPH)

WIND DIRECTION	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	18	66	37	8	13	1	145
NNE	1	8	16	3	0	0	28
NE	0	17	20	2	0	0	39
ENE	3	13	7	2	0	0	25
E	1	19	9	0	0	0	29
ESE	4	26	14	1	0	0	45
SE	6	100	20	0	0	0	126
SSE	4	42	33	10	0	0	89
S	1	36	77	23	6	0	143
SSW	1	19	44	30	2	0	96
SW	3	7	21	12	0	0	43
WSW	4	7	11	5	0	0	27
W	2	8	5	6	0	0	21
WNW	0	8	9	10	7	0	34
NW	3	12	15	16	13	1	60
NNW	0	12	24	16	2	0	54
TOTAL	51	400	362	144	43	2	1004

PERIODS OF CALM(HOURS): 72
VARIABLE DIRECTION 0
HOURS OF MISSING DATA: 940

HOURS AT EACH WIND SPEED AND DIRECTION
PERIOD OF RECORD = 00010101-00123124
STABILITY CLASS: B DT/DZ
ELEVATION: SPEED:WS33 DIRECTION:WD33 LAPSE:DEL T

WIND SPEED(MPH)

WIND DIRECTION	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	4	14	19	2	2	0	41
NNE	0	4	3	0	0	0	7
NE	1	3	8	0	0	0	12
ENE	0	1	5	1	0	0	7
E	2	4	2	0	0	0	8
ESE	0	4	2	0	0	0	6
SE	0	9	4	0	0	0	13
SSE	0	7	6	3	0	0	16
S	0	6	11	1	0	0	18
SSW	1	7	9	5	0	0	22
SW	0	1	3	3	0	0	7
WSW	0	0	6	1	0	0	7
W	2	0	7	1	1	0	11
WNW	0	2	4	3	1	0	10
NW	0	5	4	14	2	0	25
NNW	0	3	8	15	2	0	28
TOTAL	10	70	101	49	8	0	238

PERIODS OF CALM(HOURS): 72
VARIABLE DIRECTION 0
HOURS OF MISSING DATA: 940

HOURS AT EACH WIND SPEED AND DIRECTION
PERIOD OF RECORD = 00010101-00123124
STABILITY CLASS: C DT/DZ
ELEVATION: SPEED:WS33 DIRECTION:WD33 LAPSE:DEL T

WIND SPEED(MPH)

WIND DIRECTION	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	1	13	8	21	2	0	45
NNE	1	6	5	0	0	0	12
NE	1	3	5	2	0	0	11
ENE	1	1	1	0	0	0	3
E	1	8	2	0	0	0	11
ESE	1	7	4	0	0	0	12
SE	0	7	4	0	0	0	11
SSE	1	21	13	2	0	0	37
S	1	6	12	1	0	0	20
SSW	0	4	7	2	0	0	13
SW	0	3	4	2	0	0	9
WSW	0	3	2	1	0	0	6
W	0	2	7	3	0	0	12
WNW	1	1	4	6	0	0	12
NW	1	7	5	5	1	0	19
NNW	0	4	9	8	0	0	21
TOTAL	10	96	92	53	3	0	254

PERIODS OF CALM(HOURS): 72
VARIABLE DIRECTION 0
HOURS OF MISSING DATA: 940

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD = 00010101-00123124
STABILITY CLASS: D DT/DZ
ELEVATION: SPEED:WS33 DIRECTION:WD33 LAPSE:DEL T

WIND SPEED(MPH)

WIND DIRECTION	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	23	89	75	49	10	1	247
NNE	6	26	31	8	0	0	71
NE	4	54	97	18	0	0	173
ENE	11	57	60	3	0	0	131
E	19	111	71	4	0	0	205
ESE	14	153	52	2	0	0	221
SE	9	117	56	3	0	0	185
SSE	13	76	61	13	0	0	163
S	7	66	70	8	1	0	152
SSW	10	41	34	13	1	0	99
SW	7	39	36	11	1	0	94
WSW	8	24	31	10	1	0	74
W	5	15	49	28	6	2	105
WNW	4	20	64	38	19	8	154
NW	8	56	66	81	17	3	240
NNW	4	33	174	145	21	0	377
TOTAL	152	977	1027	434	77	14	2691

PERIODS OF CALM(HOURS): 72
VARIABLE DIRECTION 0
HOURS OF MISSING DATA: 940

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD = 00010101-00123124
STABILITY CLASS: E DT/DZ
ELEVATION: SPEED:WS33 DIRECTION:WD33 LAPSE:DEL T

WIND SPEED(MPH)

WIND DIRECTION	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	42	87	35	25	14	0	204
NNE	10	32	22	11	2	0	77
NE	8	50	54	23	0	0	135
ENE	10	32	8	1	0	1	52
E	29	59	8	1	0	0	97
ESE	23	97	16	0	0	0	136
SE	19	93	9	0	0	0	121
SSE	22	112	43	6	0	0	183
S	21	156	107	6	0	0	290
SSW	20	46	41	4	0	0	111
SW	23	37	21	8	0	0	89
WSW	21	32	7	0	0	0	60
W	14	28	38	9	1	0	90
WNW	5	42	46	14	2	0	109
NW	7	67	54	23	3	0	155
NNW	9	48	95	34	0	0	188
TOTAL	283	1018	604	165	22	1	2097

PERIODS OF CALM(HOURS): 72
VARIABLE DIRECTION 0
HOURS OF MISSING DATA: 940

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD = 00010101-00123124
STABILITY CLASS: F DT/DZ
ELEVATION: SPEED:WS33 DIRECTION:WD33 LAPSE:DEL T

WIND SPEED(MPH)

WIND DIRECTION	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	24	8	2	5	2	0	43
NNE	4	12	5	3	0	0	24
NE	9	38	5	0	0	0	53
ENE	17	24	0	0	0	0	41
E	20	10	0	0	0	0	30
ESE	11	18	6	1	0	0	39
SE	23	39	5	0	0	0	68
SSE	34	32	2	0	0	0	68
S	34	58	2	0	0	0	94
SSW	28	28	0	3	0	0	60
SW	26	26	1	0	0	0	53
WSW	25	17	2	0	0	0	44
W	13	22	6	2	0	0	44
WNW	13	9	10	3	1	0	37
NW	5	18	7	0	1	0	31
NNW	2	10	3	0	0	0	16
TOTAL	288	369	56	17	4	0	745

PERIODS OF CALM(HOURS): 72
VARIABLE DIRECTION 0
HOURS OF MISSING DATA: 940

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD = 00010101-00123124
STABILITY CLASS: G DT/DZ
ELEVATION: SPEED:WS33 DIRECTION:WD33 LAPSE:DEL T

WIND SPEED(MPH)

WIND DIRECTION	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	12	0	0	1	0	0	17
NNE	13	6	1	0	0	0	24
NE	39	42	6	0	0	0	87
ENE	45	10	1	0	0	0	57
E	31	4	0	0	0	0	39
ESE	29	1	0	0	0	0	34
SE	24	4	1	0	0	0	39
SSE	48	6	0	1	0	0	57
S	74	12	4	0	0	0	92
SSW	90	10	1	0	0	0	105
SW	106	18	0	0	0	0	126
WSW	55	10	0	0	0	0	69
W	28	6	0	0	0	0	35
WNW	11	0	0	0	0	0	12
NW	6	2	0	0	0	0	10
NNW	9	0	2	1	0	0	12
TOTAL	620	131	16	3	0	0	815

PERIODS OF CALM(HOURS): 72
VARIABLE DIRECTION 0
HOURS OF MISSING DATA: 940

HOURS AT EACH WIND SPEED AND DIRECTION
PERIOD OF RECORD = 00010101-00123124
STABILITY CLASS: ALL DT/DZ
ELEVATION: SPEED:WS33 DIRECTION:WD33 LAPSE:DEL T

WIND DIRECTION	WIND SPEED(MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	124	277	176	111	43	2	742
NNE	35	94	83	25	2	0	243
NE	62	207	195	45	0	0	510
ENE	87	138	82	7	0	1	316
E	103	215	92	5	0	0	419
ESE	82	306	94	4	0	0	493
SE	81	369	99	3	0	0	563
SSE	122	296	158	35	0	0	613
S	138	340	283	39	7	0	809
SSW	150	155	136	57	3	0	506
SW	165	131	86	36	1	0	421
WSW	113	93	59	17	1	0	287
W	64	81	112	49	8	2	318
WNW	34	82	137	74	30	8	368
NW	30	167	151	139	37	4	540
NNW	24	110	315	219	25	0	696
TOTAL	1414	3061	2258	865	157	17	7844

PERIODS OF CALM(HOURS): 72
VARIABLE DIRECTION 0
HOURS OF MISSING DATA: 940

Wind Rose 33'

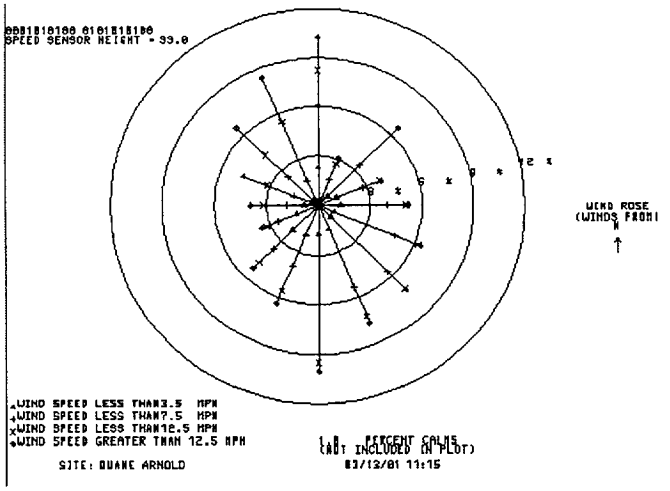

Figure 1 33' Wind Rose (Direction From)

Stability Class Data 156'

TEMPERATURE DIFFERENCE DEG.F/100 FT

TABLE	GREATER THAN	LESS THAN OR EQUAL TO
1(A)	------	-1.045
2(B)	-1.045	-0.935
3(C)	-0.935	-0.825
4(D)	-0.825	-0.275
5(E)	-0.275	0.825
6(F)	0.825	2.200
7(G)	2.200	------
8	ALL LAPSE GROUPS IN ONE TABLE	

SITE: DUANE ARNOLD 03/06/01 16:36

HOURS AT EACH WIND SPEED AND DIRECTION
PERIOD OF RECORD = 00010101-00123124
STABILITY CLASS: A DT/DZ
ELEVATION: SPEED:WS156 DIRECTION:WD156 LAPSE:DEL T

WIND DIRECTION	WIND SPEED(MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	2	11	13	8	5	2	42
NNE	0	6	19	7	1	0	33
NE	0	12	13	8	0	0	33
ENE	4	11	8	6	0	0	29
E	1	21	6	1	0	0	29
ESE	2	12	23	8	1	0	47
SE	3	13	29	58	0	0	104
SSE	1	10	44	52	11	0	120
S	4	9	60	59	26	6	166
SSW	1	3	31	36	24	6	103
SW	1	3	14	14	4	1	38
WSW	1	6	10	11	1	0	30
W	0	5	3	5	2	0	16
WNW	1	12	12	4	20	5	55
NW	1	10	23	12	13	3	63
NNW	2	6	31	14	7	0	60
TOTAL	24	150	339	303	115	23	968

PERIODS OF CALM(HOURS): 133
VARIABLE DIRECTION 0
HOURS OF MISSING DATA: 1474

SITE: DUANE ARNOLD 03/06/01 16:36

HOURS AT EACH WIND SPEED AND DIRECTION
PERIOD OF RECORD = 00010101-00123124
STABILITY CLASS: B DT/DZ
ELEVATION: SPEED:WS156 DIRECTION:WD156 LAPSE:DEL T

WIND DIRECTION	WIND SPEED(MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	1	1	4	4	7	0	17
NNE	1	2	2	1	0	0	6
NE	0	2	8	3	0	0	13
ENE	0	2	0	3	0	0	5
E	1	6	1	2	0	0	10
ESE	0	1	4	3	0	0	8
SE	1	2	3	6	0	0	12
SSE	0	0	6	9	3	0	18
S	1	4	9	10	4	0	30
SSW	1	3	2	5	5	0	16
SW	1	0	4	4	2	0	11
WSW	0	2	5	3	1	0	11
W	0	0	3	1	0	1	5
WNW	1	5	3	6	1	1	17
NW	0	3	5	5	9	2	24
NNW	0	3	11	17	1	1	34
TOTAL	8	36	70	82	33	5	237

PERIODS OF CALM(HOURS): 133
VARIABLE DIRECTION 0
HOURS OF MISSING DATA: 1474

SITE: DUANE ARNOLD 03/06/01 16:36

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD = 00010101-00123124
STABILITY CLASS: C DT/DZ
ELEVATION: SPEED:WS156 DIRECTION:WD156 LAPSE:DEL T

WIND DIRECTION	WIND SPEED(MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0	3	5	2	1	0	11
NNE	0	5	3	1	0	0	9
NE	0	3	3	1	0	0	7
ENE	1	2	3	0	0	0	6
E	0	3	3	0	0	0	6
ESE	0	2	5	3	0	0	10
SE	1	1	7	2	0	0	11
SSE	1	2	13	17	3	0	36
S	0	6	7	9	4	0	26
SSW	0	3	4	8	1	0	16
SW	0	1	3	4	1	0	11
WSW	0	3	5	2	0	0	10
W	0	1	7	3	1	0	12
WNW	0	1	2	4	3	0	10
NW	1	5	11	2	3	0	22
NNW	0	5	29	10	3	0	47
TOTAL	4	46	110	68	20	0	250

PERIODS OF CALM(HOURS): 133
VARIABLE DIRECTION 0
HOURS OF MISSING DATA: 1474

SITE: DUANE ARNOLD 03/06/01 16:36

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD = 00010101-00123124
STABILITY CLASS: E DT/DZ
ELEVATION: SPEED:WS156 DIRECTION:WD156 LAPSE:DEL T

WIND DIRECTION	WIND SPEED(MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	7	13	43	51	7	1	126
NNE	5	10	45	44	10	2	117
NE	2	9	28	16	2	0	61
ENE	1	7	20	5	0	0	33
E	7	41	34	4	1	0	87
ESE	5	22	78	15	0	0	120
SE	0	23	83	16	1	0	125
SSE	3	10	87	83	11	1	198
S	3	27	103	142	17	5	303
SSW	5	16	33	39	7	2	110
SW	3	18	37	18	7	1	86
WSW	1	22	22	9	0	0	57
W	1	18	24	35	3	1	85
WNW	3	13	36	43	14	2	115
NW	4	16	69	50	9	3	153
NNW	6	27	79	58	16	0	188
TOTAL	56	292	821	628	105	18	1964

PERIODS OF CALM(HOURS): 133
VARIABLE DIRECTION 0
HOURS OF MISSING DATA: 1474

SITE: DUANE ARNOLD 03/06/01 16:36

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD = 00010101-00123124
STABILITY CLASS: D DT/DZ
ELEVATION: SPEED:WS156 DIRECTION:WD156 LAPSE:DEL T

WIND DIRECTION	WIND SPEED(MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	10	27	44	45	22	0	150
NNE	8	14	39	27	5	0	94
NE	3	29	71	46	3	0	152
ENE	4	25	58	24	1	1	113
E	11	35	110	26	3	0	185
ESE	2	25	161	36	3	0	227
SE	4	29	108	51	3	0	196
SSE	3	25	44	73	19	0	165
S	3	20	72	58	18	6	178
SSW	3	21	26	28	10	1	91
SW	4	14	36	34	8	5	106
WSW	0	16	19	24	2	3	66
W	2	10	40	36	19	10	117
WNW	4	17	28	60	23	17	153
NW	5	38	71	76	48	12	252
NNW	1	19	87	173	68	9	360
TOTAL	67	364	1014	817	255	64	2605

PERIODS OF CALM(HOURS): 133
VARIABLE DIRECTION 0
HOURS OF MISSING DATA: 1474

SITE: DUANE ARNOLD 03/06/01 16:36

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD = 00010101-00123124
STABILITY CLASS: F DT/DZ
ELEVATION: SPEED:WS156 DIRECTION:WD156 LAPSE:DEL T

WIND DIRECTION	WIND SPEED(MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	7	5	7	6	1	0	27
NNE	4	7	22	5	3	0	44
NE	2	6	9	0	0	0	17
ENE	2	5	7	2	0	0	16
E	5	15	4	0	0	0	24
ESE	0	5	22	7	1	0	35
SE	1	7	35	4	0	0	49
SSE	1	10	36	6	0	0	55
S	2	19	45	11	1	0	80
SSW	2	12	18	6	1	0	39
SW	3	13	18	2	2	0	42
WSW	3	15	7	6	1	0	34
W	5	11	14	4	0	1	40
WNW	7	17	18	13	0	1	58
NW	4	14	18	1	1	0	38
NNW	2	19	16	4	0	0	43
TOTAL	50	180	296	77	11	2	641

PERIODS OF CALM(HOURS): 133
VARIABLE DIRECTION 0
HOURS OF MISSING DATA: 1474

SITE: DUANE ARNOLD 03/06/01 16:36

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD = 00010101-00123124
STABILITY CLASS: G DT/DZ
ELEVATION: SPEED:WS156 DIRECTION:WD156 LAPSE:DEL T

WIND DIRECTION	WIND SPEED(MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	15	19	12	1	0	0	49
NNE	7	16	10	5	0	0	38
NE	5	16	12	0	0	0	33
ENE	3	12	7	1	0	0	24
E	7	12	4	0	0	0	24
ESE	9	16	7	0	0	0	33
SE	6	23	25	1	0	0	57
SSE	5	14	34	3	0	1	58
S	11	32	28	2	0	0	74
SSW	7	34	9	1	0	0	51
SW	9	23	7	1	0	0	40
WSW	9	17	3	1	0	0	31
W	5	21	2	0	0	0	32
WNW	10	19	9	3	0	0	44
NW	7	11	6	2	0	0	27
NNW	8	15	3	1	0	0	30
TOTAL	123	300	178	22	0	1	645

PERIODS OF CALM(HOURS): 133
VARIABLE DIRECTION 0
HOURS OF MISSING DATA: 1474

Wind Rose 156'

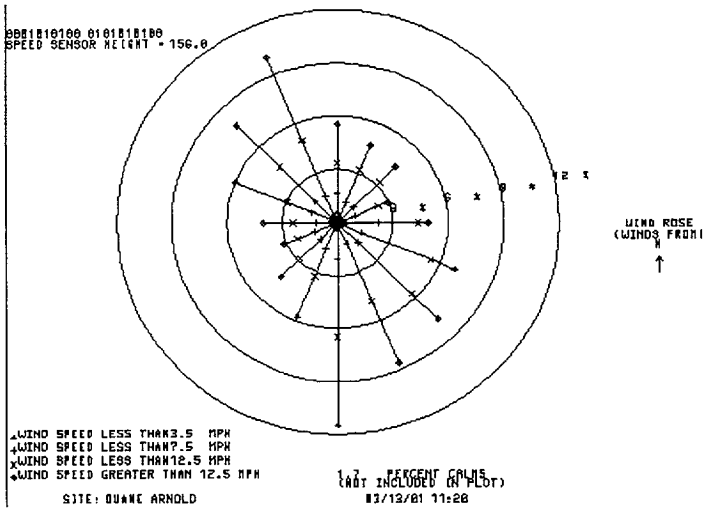

Figure 2 156' Wind Rose (Direction From)

SITE: DUANE ARNOLD 03/06/01 16:36

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD = 00010101-00123124
STABILITY CLASS: ALL DT/DZ
ELEVATION: SPEED:WS156 DIRECTION:WD156 LAPSE:DEL T

WIND DIRECTION	WIND SPEED(MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	42	79	128	117	43	3	422
NNE	25	60	140	90	19	2	341
NE	12	77	144	74	5	0	316
ENE	15	64	103	41	1	1	226
E	32	133	162	33	4	0	365
ESE	18	83	300	72	5	0	480
SE	16	98	290	138	4	0	554
SSE	14	71	264	243	47	2	650
S	24	117	324	291	70	17	857
SSW	19	92	123	123	48	9	426
SW	21	72	119	77	24	7	334
WSW	14	81	71	56	5	3	239
W	13	66	93	84	25	13	307
WNW	26	84	108	133	61	26	452
NW	22	97	203	148	83	20	579
NNW	19	94	256	277	95	10	762
TOTAL	332	1368	2828	1997	539	113	7310

PERIODS OF CALM(HOURS): 133
VARIABLE DIRECTION 0
HOURS OF MISSING DATA: 1474

SUMMARY OF THE DAEC CHEMISTRY LAB CROSS CHECK PROGRAM

The Duane Arnold Energy Center's Chemistry department has participated in an Interlaboratory Cross-Check program with Analytics Inc. for more than 15 years.

Listed below is a summary of the results of the program in 2000.

	SAMPLE	ANALYSIS	DAEC Value micro Ci/cc	Analytics Value micro ci/cc	Ratio: DAEC/Analytics	RESOLUTION	Comparison
Q1-2000	A12882-70 LIQUID	Ce-141	2.58E-02	2.57E-02	1.00	20	AGREEMENT
		Cr-51	1.58E-02	1.63E-02	0.97	20	AGREEMENT
		Cs-134	3.66E-03	4.17E-03	0.88	20	AGREEMENT
		Cs-137	3.89E-03	3.75E-03	1.04	20	AGREEMENT
		Co-58	1.80E-03	1.78E-03	1.01	20	AGREEMENT
		Mn-54	5.24E-03	5.01E-03	1.05	20	AGREEMENT
		Fe-59	4.75E-03	4.57E-03	1.04	20	AGREEMENT
		Zn-65	6.68E-03	6.19E-03	1.08	20	AGREEMENT
		Co-60	3.44E-03	3.43E-03	1.00	20	AGREEMENT
Q1-2000	A12883-70 FILTER	Ce-141	1.18E-01	1.27E-01	0.93	20	AGREEMENT
		Cr-51	7.10E-02	8.03E-02	0.88	20	AGREEMENT
		Cs-134	1.65E-02	2.06E-02	0.80	20	AGREEMENT
		Cs-137	1.78E-02	1.85E-02	0.96	20	AGREEMENT
		Co-58	8.11E-03	8.78E-03	0.92	20	AGREEMENT
		Mn-54	2.42E-02	2.47E-02	0.98	20	AGREEMENT
		Fe-59	2.29E-02	2.26E-02	1.01	20	AGREEMENT
		Zn-65	3.03E-02	3.06E-02	0.99	20	AGREEMENT
		Co-60	1.61E-02	1.69E-02	0.95	20	AGREEMENT
Q1-2000	A12880-70 LIQUID	Gross Alpha	2.67E-04	2.11E-04	1.26	12.5	AGREEMENT
Q1-2000	A12881-70 LIQUID	Tritium	2.00E-03	2.06E-03	0.97	12.5	AGREEMENT
Q1-2000	A12879-70 LIQUID	Gross Beta	2.71E-03	2.85E-03	0.95	17	AGREEMENT
Q1-2000	A12885-70 GAS	Xe-133	7.33E-01	6.65E-01	1.10	20	AGREEMENT
		Kr-85	1.03E+01	9.09E+00	1.13	20	AGREEMENT
Q1-2000	A12884-70 CARTRIDGE	I-131	2.33E-01	2.51E-01	0.93	20	AGREEMENT
Q2-2000	A13109-70* LIQUID	Ce-141	4.97E-03	4.95E-03	1.00	20	AGREEMENT
		Cr-51	1.83E-02	1.76E-02	1.04	20	AGREEMENT
		Cs-134	2.65E-03	2.83E-03	0.93	20	AGREEMENT
		Cs-137	6.22E-03	5.71E-03	1.09	20	AGREEMENT
		Co-58	4.96E-03	4.64E-03	1.07	20	AGREEMENT
		Mn-54	4.22E-03	3.88E-03	1.09	20	AGREEMENT
		Fe-59	3.17E-03	2.85E-03	1.11	20	AGREEMENT
		Zn-65	5.43E-03	4.96E-03	1.09	20	AGREEMENT
		Co-60	4.63E-03	4.34E-03	1.07	20	AGREEMENT
Q2-2000	A13110-70 FILTER	Ce-141	2.56E-02	2.75E-02	0.93	20	AGREEMENT
		Cr-51	9.09E-02	9.81E-02	0.93	20	AGREEMENT
		Cs-134	1.33E-02	1.58E-02	0.84	20	AGREEMENT
		Cs-137	3.24E-02	3.17E-02	1.02	20	AGREEMENT
		Co-58	2.51E-02	2.58E-02	0.97	20	AGREEMENT
		Mn-54	2.14E-02	2.16E-02	0.99	20	AGREEMENT
		Fe-59	1.65E-02	1.59E-02	1.04	20	AGREEMENT
		Zn-65	2.86E-02	2.76E-02	1.04	20	AGREEMENT
		Co-60	2.40E-02	2.41E-02	1.00	20	AGREEMENT
Q2-2000	A13111-70 CARTRIDGE	I-131	**2.33E-01**	5.03E-01	0.46	20	DISAGREEMENT
	Note: Typographical Error in Correspondence to Analytics. Corrected Values shown. →		4.95E-01	5.03E-01	0.98	20	AGREEMENT
Q2-2000	A13112-70 GAS	Xe-133	7.89E+00	7.65E+00	1.03	20	AGREEMENT
		Kr-85	7.45E-01	7.42E-01	1.00	20	AGREEMENT

Q2-2000	A13107-70* LIQUID	Gross Alpha	5.61E-04	5.04E-04	1.11	12.5	AGREEMENT
Q2-2000	A13108-70* LIQUID	Tritium	9.18E-04	9.34E-04	0.98	12.5	AGREEMENT
Q2-2000	A13106-70*	Gross Beta	8.92E-04	8.48E-04	1.05	17	AGREEMENT
Q3-2000	A13346-70 LIQUID	Ce-141	1.15E-02	1.18E-02	0.98	20	AGREEMENT
		Cr-51	1.56E-02	1.66E-02	0.94	20	AGREEMENT
		Cs-134	3.01E-03	3.42E-03	0.88	20	AGREEMENT
		Cs-137	5.81E-03	5.65E-03	1.03	20	AGREEMENT
		Co-58	2.25E-03	2.30E-03	0.98	20	AGREEMENT
		Mn-54	2.68E-03	2.53E-03	1.06	20	AGREEMENT
		Fe-59	2.90E-03	2.64E-03	1.10	20	AGREEMENT
		Zn-65	4.04E-03	3.89E-03	1.04	20	AGREEMENT
		Co-60	6.51E-03	6.46E-03	1.01	20	AGREEMENT
Q3-2000	A13347-70* FILTER	Ce-141	5.81E-02	5.99E-02	0.97	20	AGREEMENT
		Cr-51	7.90E-02	8.40E-02	0.94	20	AGREEMENT
		Cs-134	1.48E-02	1.73E-02	0.85	20	AGREEMENT
		Cs-137	2.89E-02	2.86E-02	1.01	20	AGREEMENT
		Co-58	1.13E-02	1.17E-02	0.97	20	AGREEMENT
		Mn-54	1.34E-02	1.28E-02	1.04	20	AGREEMENT
		Fe-59	1.41E-02	1.34E-02	1.05	20	AGREEMENT
		Zn-65	2.09E-02	1.97E-02	1.06	20	AGREEMENT
		Co-60	3.27E-02	3.28E-02	1.00	20	AGREEMENT
Q3-2000	A13348-70* CARTRIDGE	I-131	7.15E-01	7.50E-01	0.95	20	AGREEMENT
Q3-2000	A13349-70* GAS	Xe-133	7.67E-01	7.04E-01	1.09	20	AGREEMENT
Q3-2000	A13344-70 LIQUID	Gross Alpha	1.72E-03	1.52E-03	1.13	12	AGREEMENT
Q3-2000	A13345-70 Liquid	Tritium	1.36E-04	1.43E-04	0.95	12.5	AGREEMENT
Q3-2000	A13343-70	Gross Beta	3.38E-03	3.12E-03	1.08	17	AGREEMENT
Q4-2000	A13677-70 LIQUID	Ce-141	1.83E-02	1.82E-02	1.00	20	AGREEMENT
		Cr-51	2.84E-02	2.84E-02	1.00	20	AGREEMENT
		Cs-134	2.38E-03	2.50E-03	0.95	20	AGREEMENT
		Cs-137	6.11E-03	5.73E-03	1.07	20	AGREEMENT
		Co-58	2.98E-03	2.86E-03	1.04	20	AGREEMENT
		Mn-54	5.06E-03	4.65E-03	1.09	20	AGREEMENT
		Fe-59	3.90E-03	3.57E-03	1.09	20	AGREEMENT
		Zn-65	4.87E-03	4.58E-03	1.06	20	AGREEMENT
		Co-60	5.48E-03	5.34E-03	1.03	20	AGREEMENT
Q4-2000	A13678-70 FILTER	Ce-141*	9.20E-02	1.01E-01	0.91	20	AGREEMENT
		Cr-SI*	1.42E-01	1.58E-01	0.90	20	AGREEMENT
		Cs-134*	1.18E-02	1.39E-02	0.85	20	AGREEMENT
		Cs-137*	3.09E-02	3.18E-02	0.97	20	AGREEMENT
		Co-58*	1.54E-02	1.59E-02	0.97	20	AGREEMENT
		Mn-54*	2.63E-02	2.58E-02	1.02	20	AGREEMENT
		Fe-59*	2.10E-02	1.98E-02	1.06	20	AGREEMENT
		Zn-65*	2.59E-02	2.54E-02	1.02	20	AGREEMENT
		Co-60*	2.88E-02	2.96E-02	0.97	20	AGREEMENT
							AGREEMENT
Q4-2000	A13679-70 CARTRIDGE	I-131*	1.97E-01	1.97E-01	1.00	20	AGREEMENT
Q4-2000	A13680-70 GAS	Xe-133*	6.45E-01	6.64E-01	0.97	20	AGREEMENT
		Kr-85*	9.05E+00	9.01E+00	1.00	20	AGREEMENT
Q4-2000	A13675-70 LIQUID	Gross Alpha	3.41E-04	2.70E-04	1.26	12.5	AGREEMENT
Q4-2000	A13676-70 LIQUID	Tritium	1.12E-03	1.17E-03	0.95	12.50	AGREEMENT
Q4-2000	A13674-70 LIQUID	Gross Beta	2.91E-03	2.71E-03	1.07	17.00	AGREEMENT

ATTACHMENT 1: ADDITIONAL INFORMATION ON 1999 ODAM CHANGES

This attachment provides additional information regarding changes made to the ODAM in 1999 that were related to a plant modification to the offgas system. EMA44812 removed the automatic trip function on CV4108 that isolates offgas post-treatment on RM-4101 A/B Triple High, INOP or downscale. The modification made air controller valve SV4108 a normally de-energized valve for scram frequency reduction. The change also resulted in a modification to the operability requirements of the ODAM.

Equipment ID	Equipment Name
CV4108	OFFGAS ISOLATION VALVE
SV4108	CV-4108 CONTROL AIR SUPPLY ISOLATION
RM4101A	RAD MONITOR, OFFGAS POSTREAT 1C134
RM4101B	RAD MONITOR, OFFGAS POSTREAT 1C134

Safety Evaluation 99-027 was performed prior to implementation of the plant modification.

The offgas system is designed to treat gaseous wastes such that releases are less than 1% of 10CFR20. This is accomplished by providing sufficient holdup volume to allow short lived Isotopes to decay and by retaining halogen and particulate activity through the use of activated charcoal filters.

The offgas post-treat rad monitors, RM4101A/B, detect activity levels being released through the offgas treatment system and initiate annunciators to ensure releases are maintained within the design basis limits. Exceeding the post-treat HI setpoint causes a control room alarm. Exceeding the HI-HI setpoint causes the charcoal vaults to align to the TREAT mode. Exceeding the HI-HI-HI, DOWNSCALE, or INOP setpoints **previously** caused CV4108 to automatically isolate.

The original GE Offgas system design (pre-RECHAR) involved only a 30 minute holdup line and the HI-HI-HI, DOWNSCALE, or INOP post-treat alarms initiated a 15 minute time delay isolation to give the control room operator time it take action before the isolation took effect.

The DAEC offgas system is an early RECHAR design that incorporated elements of both designs, including the 30 minute holdup line and an isolation valve (CV4108) from the original design in addition to hydrogen recombiners and charcoal adsorbers found in later RECHAR designs. By GE letter dated 1974 (Nesbitt), the additional volume reduction and holdup capability of the DAEC Offgas System made the need for CV4108 "highly questionable". The letter was the basis for making CV4108 a fail-open valve on loss of control air.

Safety evaluation 99-027 justified the removal of the automatic isolation of CV4108. The modification did in no way modify the operation of the HI-HI-HI, Downscale, or INOP Rad. Monitor alarms (other than the elimination of the isolation). The change did not affect the Offgas Gas Treatment system in any other ways.

In addition to the plant modification, Safety Evaluation 99-027 justified changes to ODAM Table 3.2.2. This change involved the effective "LCO" associated with having both post-treat radiation monitors inoperable (Table 6.2-2). The LCO has been extended from 72 hours (provided charcoal beds are not bypassed and the offgas stack noble gas monitor is operable) to 30 days which is consistent with other Rad. monitor operability requirements in the ODAM.

The safety evaluation concluded that the change would not affect the plant's ability to maintain the level of radioactive effluent control required by 10CFR20.1302, 40CFR90, 10CFR50.36a and 10CF50 Appendix I.

ODAM Changes:

Table 6.2-2	was changed to reflect the removal of the auto-isolate feature by the modification and changes to the length of LCOs associated with both post-treat monitors INOP.
Section 6/7.2.1	Bases: Reference to the auto-isolate feature were removed.
Section 7.2.1.3	The requirement for a Surveillance on the Steam Jet Air Ejector Offgas Auto Isolation system was removed.

ATTACHMENT 2: ODAM CHANGES IN 2000

Revision 13 → Revision 14

Revision 14 of the ODAM was made effective on May 15th, 2000. Changes implemented were:

- A typographical type error in Table 6.3-1 (which describes the REMP program) was corrected. Column three, Row two previously read: "Continuous operation of sampler with sample" The following phase was appended: " collection at least once per week."
- The Table Notations to table 6.2-1 lists actions to take when Gaseous Effluent Monitors are declared INOP. Previous revisions had a different requirement for alternate Particulate and Iodine sampling at the Turbine building release point. Revision 14 made these "back-up" sampling requirements uniform for all gaseous release points.

Revision 14 → Revision 15

Revision 15 of the ODAM was made effective on August 1st, 2000. Changes implemented were:

- Any references to IES Utilities or Alliant Energy were changed to Duane Arnold Energy Center or DAEC. Pages 1, 6, 59, and 97 were affected.

ATTACHMENT 3: CURRENT REVISION OF THE ODAM