Iowa Electric Light and Power Company
August 29, 1985

DAEC-85-0773

50-331

Mr. Holtzman
U.S. Nuclear Regulatory Commission
Region III
799 Roosevelt Road
Glen Ellyn, Illinois 60137

Re: Duane Arnold Energy Center
Subject: Split Sample Audit
File: NRC-6, A-103

Dear Mr. Holtzman:

The purpose of this letter is to transfer to your office information regarding the August 1985, Split Sample Audit of the Duane Arnold Energy Center.

The three (3) documents enclosed deal with 1) the Kr-85M activity calculated for the Off-Gas pretreatment split sample, 2) the library modifications which have been implemented on our gamma spectrophotometer, and 3) a copy of a Gamma 2 peak search analysis from our gamma spectrophotometer.

If you have any further questions regarding this material, please feel free to contact either Lou Kriege at extension 291 or Alex Feldman at extension 285.

Sincerely,

Daniel L. Mineck
Plant Superintendent - Nuclear

DLM/AF/hc

Attachments

cc: R. McGaughy/P. Ward
K. Young
H. Giorgio

8510100019 850829
PDR ADOCK 05000331
P PDR

I&E ltr delete KDL
IE01
1/1

ISEP 9 1985

IOWA ELECTRIC LIGHT AND POWER COMPANY

P. O. Box 351 CEDAR RAPIDS, IOWA 52406

TELEPHONE MEMO

Date: August 9, 1985 **Time:** 15:30

From: Dick Holtzman **Company:** NRC

To: Alex Feldman **Company:** I.E. (Contractor)

Project: Duane Arnold Energy Center

Subject: NRC Split Sample Audit of August 1985

File Reference: NRC-4a

I received a phone call from Dick Holtzman of the NRC. He was attempting to resolve the disagreement for Kr-85M on the gas sample analysis. I agreed to reanalyze the spectrum and key on the 304.5 Kev peak.

The result was an increase in indicated activity for Kr-85m from 2.15E-4 to 3.05E-4 μCi/cc. The NRC value was 3.1E-4 μCi/cc. This information was relayed to Mr. Holtzman in a subsequent phone call. The analysis of Kr-85m is now in agreement.

Alex

Alex Feldman
Radiological Engineer

AF/hc

Memo Distribution: L. Kriege, H. Giorgio, K. Young

SPECTRUM	ACQUISITION STARTED	LIVE	REAL
0013090.SPC	06-AUG-85 14:53:42	1000	1012

SAMPLE
OFFGAS PRETREATMENT 85-1879 NRC SPLIT
8-6-85 1345 22MR/HR 18.5CFM HOLDUP FLOW

DETECTOR SYSTEM
EG&G ORTEC (HPGE) DETECTOR
SN #21-P-74ZA

CALIBRATION 14MLG1C1.CLB
14ML VIAL COUNTED ON 1CM SHELF WITH 1ML OF SOURCE
12356A-70 DET NR. 1 CHEM

LIBRARY SY:OFFGAS1.LIB
START,STOP 25, 4095 SENS(%) 44 MULTIPLIER 0.7092199E-01
DECAY CORRECTED TO 6-AUG-85 13:45
SORPTION (IN) 1.950000 LINMUAIR.SOR
RANDOM SUMMING 0.1200E+07

********** SUMMARY OF NUCLIDES IN SAMPLE **********

NUCLIDE	TIME OF COUNT ACTIVITY UC	TIME CORRECTED ACTIVITY UC	PERCENT UNCERTAINTY COUNTING 2 S
XE-133	5.344E-05	5.378E-05	34.7
KR-85M	2.556E-04	3.050E-04	22.7
KR-88	6.522E-04	8.820E-04	5.1
XE-135	9.894E-04	1.080E-03	1.9
KR-87	8.069E-04	1.503E-03	3.9
XE-138	9.345E-04	2.698E-02	4.8
AR-41	5.260E-05	8.108E-05	32.0
N-13	4.352E-04	5.136E-02	5.1
XE-135M	2.566E-04	5.397E-03	9.6
KR-85	< 1.6E-02	< 1.6E-02	
XE-133M	< 1.6E-04	< 1.6E-04	
RB-88	9.571E-04	1.381E-02	11.6
CS-138	3.600E-03	1.575E-02	2.2
I-131	< 1.9E-05	< 1.9E-05	
I-132	< 2.2E-05	< 3.1E-05	
I-133	< 4.4E-05	< 4.6E-05	
I-134	< 4.4E-05	< 1.1E-04	
I-135	< 1.1E-04	< 1.2E-04	
XE-131M	< 5.1E-04	< 5.1E-04	

← Kr-85m keyed from 304.5 Kev peak.

********** UNUSED PEAKS **********

304.47 * KR-85M	462.79 - CS-138	834.83 * KR-88
1529.77 + KR-88	1768.26 * XE-138	2015.82 + XE-138

ELAPSED TIME: 105.81 SECONDS
=GASVIL/IN

August 15, 1985

TO: Lou Kriege
Chemistry Coordinator

FROM: Alex Feldman
Radiological Engineer

SUBJECT: Split Sample Audit
of August 1985

FILE: NRC-4a

The purpose of this memo is to document the modifications which have been made to the Ortec spectrophotometer libraries.

These changes include the inclusion of the following data into the RESIN1.LIB, RADWASTE1.LIB and PARTIOD1.LIB libraries.

Isotopes Added	Energy	γ/d
Nb-97 72.1 minutes	657.92	98.34
As-76 1.097 days	559.10 657.04	44.7 6.08
Y-92 3.54 hours	934.50 1405.4	13.9 4.8
Y-91M	Change 557.57 to 555.57 Kev	

These changes have been completed.

As discussed during the NRC exit interview, I have contacted Analytics and spoke with Mr. Montgomery. He is unaware of any possible reasons for a step change in the IE to Analytics analysis ratio. He also stated that no recent calibration of their gamma spectrophotometer has been performed.

We will be receiving the NRC split from Idaho shortly, as well as performing calibration checks. This data will be useful for future trending.

Alex Feldman
Radiological Engineer

AF/hc

cc: H. Giorgio

SPECTRUM	ACQUISITION STARTED	LIVE	REAL
0013294.SPC	21-AUG-85 12:39:00	2500	2516

SAMPLE
RX H2O IODINE 85-2057 8-21-85 0755
10 ML FILT 1589 MWT A & B CU'S ON

DETECTOR SYSTEM
EG&G ORTEC (HPGE) DETECTOR
SN #21-P-74ZA

CALIBRATION 10MLVL1C1.CLB
10ML VIAL CONTAINING 1ML OF SOURCE 12356A-70
COUNTED ON 1CM SHELF DET NO. 1 CHEM

LIBRARY SY:RADWASTE1.LIB PBC
START,STOP 25, 4095 SENS(%) 44 MULTIPLIER 0.1000000
DECAY CORRECTED TO 21-AUG-85 07:55
RANDOM SUMMING 0.1200E+07

********** SUMMARY OF PEAKS IN SAMPLE **********

CENTROID CHANNEL	ENERGY KEV	BACKGROUND COUNTS	NET AREA COUNTS	INTENSITY CTS/SEC	UNCERT %	FWHM KEV	
310.69	155.21	3546.	1199.	4.797E-01	7.6	2.46U	unused peaks
500.11	249.73	2262.	1567.	6.267E-01	5.0	2.04U	
1045.78	522.27	401.	213.	8.500E-02	15.0	2.10U	
1093.65	546.78	555.	224.	8.973E-02	16.3	2.54U	
1672.75	836.32	370.	227.	9.080E-02	13.7	4.78U	
2430.92	1215.87	231.	228.	9.120E-02	11.5	5.68U	
2456.93	1228.37	139.	88.	3.527E-02	21.7	3.89U	
2914.88	1457.39	63.	128.	5.120E-02	12.5	4.19U	
3356.03	1677.91	43.	120.	4.813E-02	11.9	4.98U	
3463.72	1731.91	46.	333.	1.332E-01	6.2	6.14U	
281.72	140.51	6384.	94502.	3.780E+01	0.3	4.68	used peak D = doublet
0.00	143.76	103152.	0.	0.000E-01	*****	4.69D	
332.73	165.80	3328.	212.	8.467E-02	39.2	1.73	
363.04	181.09	3322.	496.	1.984E-01	17.0	3.47	
456.11	228.16	2088.	174.	6.947E-02	38.0	2.61	
0.00	319.24	20608.	258.	1.032E-01	78.9	5.33D	
640.70	320.07	2055.	18811.	7.524E+00	0.8	5.34D	
729.59	364.48	1534.	196.	7.840E-02	29.1	2.20	
0.00	507.63	21466.	306.	1.223E-01	68.0	6.01D	
1022.34	511.00	9550.	12222.	4.889E+00	1.4	6.03D	
1022.34	511.00	9545.	12227.	4.891E+00	1.4	6.03D	
1022.34	511.00	9545.	12227.	4.891E+00	1.4	6.03D	
1060.23	529.89	677.	1324.	5.298E-01	3.9	6.09	
0.00	531.00	2132.	0.	0.000E-01	*****	6.10D	
0.00	555.57	5194.	407.	1.626E-01	25.6	6.19D	
1118.58	559.10	1229.	4372.	1.749E+00	1.9	6.20D	

1243.25	621.80	[illegible]0.	73.	2.920E-02	44.0	4.00
1260.11	630.22	[illegible]9.	167.	6.680E-02	21.1	4.32
0.00	652.90	1180.	48.	1.916E-02	102.4	6.53D
1314.49	657.04	720.	508.	2.033E-01	8.7	6.55D
1314.49	657.75	1205.	23.	9.159E-03	215.4	6.55D
1314.49	657.92	1576.	0.	0.000E-01	*****	6.55D
0.00	661.64	1427.	0.	0.000E-01	*****	6.56D
0.00	664.00	1806.	0.	0.000E-01	*****	6.57D
1335.69	667.69	533.	1082.	4.330E-01	4.3	6.58
0.00	722.00	554.	13.	5.179E-03	258.6	6.78D
1449.12	724.18	463.	104.	4.172E-02	30.8	6.78D
1449.12	724.20	1184.	0.	0.000E-01	*****	6.78D
1479.23	739.47	353.	211.	8.460E-02	14.3	6.84
0.00	743.36	572.	0.	0.000E-01	*****	6.85D
1499.75	749.80	284.	151.	6.047E-02	17.7	3.43
1545.44	772.61	338.	736.	2.943E-01	5.1	3.15
1621.73	810.75	544.	732.	2.928E-01	5.8	7.09D
0.00	815.80	1254.	22.	8.851E-03	227.3	7.10D
1693.91	846.60	328.	649.	2.596E-01	5.6	3.97
0.00	881.60	590.	12.	4.763E-03	289.9	7.33D
1768.50	884.08	451.	151.	6.030E-02	21.5	7.34D
0.00	884.67	554.	48.	1.911E-02	71.2	7.34D
1868.85	934.50	491.	77.	3.087E-02	42.2	2.84
1909.08	954.55	425.	131.	5.240E-02	23.9	3.04
2048.95	1024.30	341.	167.	6.667E-02	17.5	5.25
2262.97	1131.51	405.	303.	1.211E-01	11.0	3.50
2346.50	1173.23	446.	637.	2.547E-01	6.1	3.43
2520.66	1260.41	125.	371.	1.483E-01	6.7	4.50
2665.02	1332.51	89.	599.	2.397E-01	4.6	3.77
2736.97	1368.55	109.	2795.	1.118E+00	2.0	3.93
2767.57	1383.90	87.	390.	1.560E-01	6.1	4.09
3621.24	1811.20	28.	50.	2.000E-02	20.6	3.67

********** SUMMARY OF NUCLIDES IN SAMPLE **********

NUCLIDE	TIME OF COUNT ACTIVITY UC/ML	UNCERTAINTY COUNTING +/- 2 SIGMA	TIME CORRECTED ACTIVITY UC/ML	UNCERTAINTY COUNTING +/- 2 SIGMA
CO-58	6.574E-05	+/- 7.6E-06	6.587E-05	+/- 7.7E-06
CO-60	8.163E-05	+/- 6.6E-06	8.164E-05	+/- 6.6E-06
CR-51	6.895E-03	+/- 1.1E-04	6.929E-03	+/- 1.1E-04
I-132	9.122E-05	+/- 5.9E-06	3.622E-04	+/- 2.4E-05
I-133	9.096E-05	+/- 7.0E-06	1.069E-04	+/- 8.2E-06
I-134	2.943E-05	+/- 1.2E-05	1.243E-03	+/- 5.2E-04
I-135	1.849E-04	+/- 2.3E-05	3.038E-04	+/- 3.7E-05
MN-56	6.814E-05	+/- 7.4E-06	2.436E-04	+/- 2.7E-05
MO-99	1.350E-04	+/- 3.8E-05	1.419E-04	+/- 4.0E-05
NA-24	4.386E-04	+/- 1.7E-05	5.457E-04	+/- 2.1E-05
SR-91	5.951E-05	+/- 2.0E-05	8.355E-05	+/- 2.9E-05
SR-92	7.435E-05	+/- 8.9E-06	2.496E-04	+/- 3.0E-05
TC-99M	1.793E-03	+/- 1.2E-05	3.093E-03	+/- 2.1E-05
AS-76	6.172E-04	+/- 2.3E-05	6.992E-04	+/- 2.6E-05

********** UNUSED PEAKS **********

181.09 * MO-99	511.00 + CO-58	531.00 ! ND-147
657.92 ! NB-97	661.64 ! CS-137	724.20 ! RU-105
743.36 ! ZR-97	749.80 * SR-91	846.60 * MN-56
155.21 155.21	155.21 155.21	155.21 155.21

Shorthand notation for peak utilization ←

ELAPSED TIME: 248.15 SECONDS
=10MLIEQ.SPC

[redacted]

SPECTRUM	ACQUISITION STARTED	LIVE	REAL
0013294.SPC	21-AUG-85 12:39:00	2500	2516

SAMPLE
RX H2O IODINE 85-2057 8-21-85 0755
10 ML FILT 1589 MWT A & B CU'S ON

DETECTOR SYSTEM
EG&G ORTEC (HPGE) DETECTOR
SN #21-P-74ZA

CALIBRATION 10MLVL1C1.CLB
10ML VIAL CONTAINING 1ML OF SOURCE 12356A-70
COUNTED ON 1CM SHELF DET NO. 1 CHEM

LIBRARY SY:RADWASTE1.LIB FBC
START,STOP 25, 4095 SENS(%) 44 MULTIPLIER 0.1000000
DECAY CORRECTED TO 21-AUG-85 07:55
RANDOM SUMMING 0.1200E+07

********** SUMMARY OF NUCLIDES IN SAMPLE **********

NUCLIDE	TIME OF COUNT ACTIVITY UC/ML	UNCERTAINTY COUNTING +/- 2 SIGMA	TIME CORRECTED ACTIVITY UC/ML	UNCERTAINTY COUNTING +/- 2 SIGMA
AG-110M	< 1.8E-05		< 1.8E-05	
AR-41	< 7.4E-06		< 4.5E-05	
BA-139	< 4.5E-05		< 4.5E-04	
BA-140	< 2.4E-05		< 2.4E-05	
BR-84	< 5.9E-05		< 2.9E-02	
CE-141	< 1.0E-05		< 1.0E-05	
CE-143	< 1.5E-06		< 1.7E-06	
CE-144	< 4.2E-05		< 4.2E-05	
CO-58	6.574E-05	+/- 7.6E-06	6.587E-05	+/- 7.7E-06
CO-60	8.163E-05	+/- 6.6E-06	8.164E-05	+/- 6.6E-06
CR-51	6.912E-03	+/- 1.1E-04	6.947E-03	+/- 1.1E-04
CS-134	< 6.1E-06		< 6.1E-06	
CS-136	< 5.4E-06		< 5.4E-06	
CS-137	< 2.2E-05		< 2.2E-05	
CS-138	< 8.4E-06		< 3.8E-03	
CU-64	< 2.0E-03		< 2.6E-03	
FE-59	< 2.1E-05		< 2.2E-05	
I-131	< 1.3E-05		< 1.3E-05	
I-132	9.122E-05	+/- 5.9E-06	3.622E-04	+/- 2.4E-05
I-133	9.096E-05	+/- 7.0E-06	1.069E-04	+/- 8.2E-06
I-134	2.943E-05	+/- 1.2E-05	1.243E-03	+/- 5.2E-04
I-135	1.849E-04	+/- 2.3E-05	3.038E-04	+/- 3.7E-05
K-40	< 7.6E-05		< 7.6E-05	
K-42	< 2.4E-05		< 3.1E-05	
LA-140	< 1.1E-05		< 1.2E-05	
MN-54	< 1.3E-05		< 1.3E-05	
MN-56	6.814E-05	+/- 7.4E-06	2.436E-04	+/- 2.7E-05
MO-99	1.350E-04	+/- 3.8E-05	1.419E-04	+/- 4.0E-05
NA-24	4.386E-04	+/- 1.7E-05	5.457E-04	+/- 2.1E-05
NB-94	< 9.6E-06		< 9.6E-06	
NB-95	< 1.0E-05		< 1.0E-05	
ND-147	< 1.3E-04		< 1.3E-04	
ND-149	< 8.9E-05		< 5.9E-04	
NI-65	< 3.9E-05		< 1.4E-04	

NP-239	< 3.5E-05		< 3.8E-05		
PM-149	< 1.4E-04		< 1.5E-04		
RA-226	< 1.4E-04		< 1.4E-04		
RB-88	< 5.2E-05		>12 HALF-LIVES		
RB-89	< 5.6E-05		>12 HALF-LIVES		
RH-103M	< 5.1E-04		< 1.7E-02		
RH-105	< 1.7E-04		< 1.9E-04		
RU-103	< 7.7E-06		< 7.7E-06		
RU-105	< 4.0E-05		< 8.3E-05		
RU-106	< 1.1E-04		< 1.1E-04		
SR-91	5.951E-05	+/- 2.0E-05	8.355E-05	+/- 2.9E-05	
SR-92	7.435E-05	+/- 8.9E-06	2.496E-04	+/- 3.0E-05	
TA-182	< 1.9E-05		< 1.9E-05		
TC-99M	1.793E-03	+/- 1.2E-05	3.093E-03	+/- 2.1E-05	
TE-132	< 8.7E-06		< 9.1E-06		
U-235	< 1.2E-05		< 1.2E-05		
W-187	< 3.9E-05		< 4.5E-05		
Y-91	< 3.1E-03		< 3.1E-03		
Y-93	< 8.9E-05		< 1.2E-04		
ZN-65	< 3.1E-05		< 3.1E-05		
ZR-95	< 2.7E-05		< 2.7E-05		
ZR-97	< 1.4E-05		< 1.7E-05		
CO-57	< 8.5E-06		< 8.5E-06		
NB-97	< 2.4E-05		< 3.7E-04		
AS-76	6.168E-04	+/- 2.3E-05	6.987E-04	+/- 2.6E-05	
Y-92	< 1.2E-04		< 3.1E-04		
Y-91M	< 4.0E-05		< 2.1E-03		

********** UNUSED PEAKS **********

181.09 * MO-99	511.00 + CO-58	531.00 ! ND-147
657.92 ! NB-97	661.64 ! CS-137	724.20 ! RU-105
743.36 ! ZR-97	749.80 * SR-91	846.60 * MN-56

ELAPSED TIME: 169.12 SECONDS
=10MLIEQ.SPC