



Nuclear Consulting
Services, Inc.
IODINE-131 REMOVAL
EFFICIENCY DETERMINATION
OF ADSORBENT SAMPLES

PERFORMED BY:

NUCLEAR CONSULTING SERVICES, INC.
COLUMBUS, OHIO 43229

PERFORMED FOR:

COMMONWEALTH EDISON COMPANY, BYRON STATION
POST OFFICE BOX 767
CHICAGO, ILLINOIS 60690

P.O. NO. 266364

DISTRIBUTION:

EXTERNAL

- (2) DAN CHRISTIANA
- (1) BRUCE BYRNE

INTERNAL

- (1) PROJECT MASTER FILE
- (1) J-LAB FILE
- (1) QA FILE

NUCON 13CE413/01

8410160489 841010
PDR ADOCK 05000454
A FDR

CERTIFICATE OF CALIBRATION

CLIENT: COMMONWEALTH EDISON COMPANY
 BYRON STATION
 POST OFFICE BOX 767
 CHICAGO, ILLINOIS 60690

P.O. No.: 266364

NUCON PROJECT No.: 13CE413

DATE: 11 APR 1984

TEST EQUIPMENT		CALIBRATION STANDARDS	
LOG No.	LAST CAL. DATE	LOG No.	NRS No. (IF APPLICABLE)
L0635	15 DEC 1983	L0350	522/223339
		L0351	221482
L0299	08 MAR 1984	L0414	NRS CIRCULAR # 36
L0286	15 NOV 1983	L0416	213.12/216242
		L0420	731/220788
		L0421	731/220788
L0287	15 NOV 1983	L0416	213.12/216242
		L0420	731/220788
		L0421	731/220788
L0485	11 MAR 1984	L0560	NRS SRM 4241-2

THIS IS TO CERTIFY THAT THE ABOVE LISTED EQUIPMENT HAS BEEN CALIBRATED TRACEABLE TO THE NATIONAL BUREAU OF STANDARDS, HAS BEEN DERIVED FROM ACCEPTED VALUES OF NATURAL PHYSICAL CONSTANTS, OR HAS BEEN DERIVED BY THE RATIO-TYPE OF SELF CALIBRATION TECHNIQUE AND MEETS THE REQUIREMENTS OF MJL STD 45662.

BY *Michael J. Toeppe*
 MICHAEL J. TOEPPE

FOR QUALITY ASSURANCE DEPT.
 NUCLEAR CONSULTING SERVICES, INC

QA5



NUCLEAR CONSULTING SERVICES, INC.

P. O. Box 29151 Columbus, Ohio 43229

(614) 846-5710
TWX 810-337-2007

CERTIFICATION OF COMPLIANCE

Client: Commonwealth Edison Company
Byron Station

Date: 12 April 84

Address: P O Box 767
Chicago IL 60690

Project: 13CE413

Purchase Order: 256364

Date: 10 Jan 1983

NUCON PRODUCT/SERVICE: Methyl Iodide Testing

This is to certify that product/service supplied conforms to specification(s)
of CLIENT: of NUCON:
US NRC Reg Guide 1.52 Rev 2 NUCON QA Manual

And is so documented by NUCON QUALITY ASSURANCE with any exceptions noted.

Exceptions: None

Quality Assurance
Nuclear Consulting Services, Inc. (NUCON)

THESE REPORT SHEETS CONTAIN THE IODINE FISSION PRODUCT TEST DATA OBTAINED FROM ADSORBENT SAMPLES TESTED BY NUCON.

COUNTING WAS PERFORMED AT 0.364 MEV GAMMA LEVEL, IN A 4.0" THALLIUM ACTIVATED SODIUM IODIDE WELL CRYSTAL. CALIBRATION OF THE COUNTING CRYSTAL HAS BEEN PERFORMED BY THE USE OF AN NBS TRACEABLE ^{131}I STANDARD.

COUNTING DATA FOR SAMPLE #8899

AIR COUNT DATA *PRE-LOADING*

CPM=	546.2	STD DEV=	7.4
COUNTER EFFICIENCY=	1.000		
DPM=	546.2	STD DEV=	7.4

POST-LOADING

CPM=	546.2	STD DEV=	7.4
COUNTER EFFICIENCY=	1.000		
DPM=	546.2	STD DEV=	7.4

TB1 COUNT DATA *PRE-LOADING*

CPM=	627.0	STD DEV=	7.9
COUNTER EFFICIENCY=	.580		
DPM=	1,081.0	STD DEV=	13.7
DPM-AIR=	534.8	STD DEV=	15.5

POST-LOADING

CPM=	1,023,769.3	STD DEV=	320.0
COUNTER EFFICIENCY=	.580		
DPM=	1,765,119.3	STD DEV=	551.7
DPM-AIR=	1,764,573.0	STD DEV=	551.7

NET

NET DPM=	1,764,038.3	STD DEV=	551.9
----------	-------------	----------	-------

GB1 COUNT DATA *PRE-LOADING*

CPM=	600.7	STD DEV=	7.8
COUNTER EFFICIENCY=	.580		
DPM=	1,035.7	STD DEV=	13.4
DPM-AIR=	489.5	STD DEV=	15.3

POST-LOADING

CPM=	819.4	STD DEV=	9.1
COUNTER EFFICIENCY=	.580		
DPM=	1,412.8	STD DEV=	15.6
DPM-AIR=	866.6	STD DEV=	17.3

NET

NET DPM=	377.1	STD DEV=	23.1
----------	-------	----------	------

COUNTING DATA FOR SAMPLE #8899

GB2 COUNT DATA *PRE-LOADING*

CPM=	600.7	STD DEV=	7.8
COUNTER EFFICIENCY=	.580		
DPM=	1,035.7	STD DEV=	13.4
DPM-AIR=	489.5	STD DEV=	15.3

POST-LOADING

CPM=	731.8	STD DEV=	8.6
COUNTER EFFICIENCY=	.580		
DPM=	1,261.7	STD DEV=	14.7
DPM-AIR=	715.5	STD DEV=	16.5

NET

NET DPM=	226.0	STD DEV=	22.5
----------	-------	----------	------

TEST REPORT: METHYL IODIDE DATE PERFORMED: 29 MAR 1984

CLIENT: COMMONWEALTH EDISON COMPANY, BYRON STATION
POST OFFICE BOX 767

SAMPLE: #8899

P.O. NO.: 266364

TEST CONDITIONS:

BED DEPTH= 5.08 CM. (2.00 IN.)

BED DIAMETER= 5.08 CM. (2.00 IN.)

TEMPERATURES

PRE-EQUILIBRATION= 25.0 C (77.0 F)

LOADING= 25.0 C (77.0 F)

POST-LOADING= 25.0 C (77.0 F)

RELATIVE HUMIDITY= 95.0 %

FACE VELOCITY= 20.32 CM./SEC (40.0 FPM)

MEI LOADING= 1.75 MG./CU.M.

TEST TIMES

PRE-EQUILIBRATION= 16. HRS.

LOADING= 2.0 HRS.

POST-SWEEP= 2.0 HRS.

MEI-131 CONTENT= .80 MICROCURIES

PRESSURE= 1.0 ATM.

TEST REPORT: METHYL IODIDE DATE PERFORMED: 29 MAR 1984

EFFICIENCY: 1ST RFD= 99.97% (STD. DEV.= .005%)

THE RESULTS ARE THE BEST OBTAINABLE UNDER CURRENT EXPERIMENTAL
TECHNIQUES AND ACCORDING TO OUR BEST KNOWLEDGE.

PERFORMED BY Mark P. King
MARK P. KING NUCLEAR CONSULTING SERVICES, INC.

APPROVED BY W. Peter Freeman
W. PETER FREEMAN NUCLEAR CONSULTING SERVICES, INC.

COUNTING DATA FOR SAMPLE #9360

AIR COUNT DATA *PRE-LOADING*

CPM=	555.0	STD DEV=	7.4
COUNTER EFFICIENCY=	1.000		
DPM=	555.0	STD DEV=	7.4

POST-LOADING

CPM=	555.0	STD DEV=	7.4
COUNTER EFFICIENCY=	1.000		
DPM=	555.0	STD DEV=	7.4

TB1 COUNT DATA *PRE-LOADING*

CPM=	598.4	STD DEV=	7.7
COUNTER EFFICIENCY=	.580		
DPM=	1,031.7	STD DEV=	13.3
DPM-AIR=	476.7	STD DEV=	15.3

POST-LOADING

CPM=	2,191,702.5	STD DEV=	468.2
COUNTER EFFICIENCY=	.580		
DPM=	3,778,797.0	STD DEV=	807.2
DPM-AIR=	3,778,242.0	STD DEV=	807.2

NET

NET DPM=	3,777,765.5	STD DEV=	807.3
----------	-------------	----------	-------

GB1 COUNT DATA *PRE-LOADING*

CPM=	576.2	STD DEV=	7.6
COUNTER EFFICIENCY=	.580		
DPM=	993.4	STD DEV=	13.1
DPM-AIR=	438.4	STD DEV=	15.1

POST-LOADING

CPM=	3,617.9	STD DEV=	19.0
COUNTER EFFICIENCY=	.580		
DPM=	6,237.8	STD DEV=	32.8
DPM-AIR=	5,682.8	STD DEV=	33.6

NET

NET DPM=	5,244.3	STD DEV=	36.8
----------	---------	----------	------

COUNTING DATA FOR SAMPLE #9360

GB2 COUNT DATA *PRE-LOADING*

CPM=	576.2	STD DEV=	7.6
COUNTER EFFICIENCY=	.580		
DPM=	993.4	STD DEV=	13.1
DPM-AIR=	438.4	STD DEV=	15.1

POST-LOADING

CPM=	781.6	STD DEV=	8.8
COUNTER EFFICIENCY=	.580		
DPM=	1,347.6	STD DEV=	15.2
DPM-AIR=	792.6	STD DEV=	17.0

NET

NET DPM=	354.1	STD DEV=	22.7
----------	-------	----------	------

TEST REPORT: METHYL IODIDE DATE PERFORMED: 29 MAR 1984

EFFICIENCY: 1ST BED= 99.85% (STD. DEV.= .004%)

THE RESULTS ARE THE BEST OBTAINABLE UNDER CURRENT EXPERIMENTAL
TECHNIQUES AND ACCORDING TO OUR BEST KNOWLEDGE.

PERFORMED BY Mark P. King
MARK P. KING NUCLEAR CONSULTING SERVICES, INC.

APPROVED BY W. Peter Freeman
W. PETER FREEMAN NUCLEAR CONSULTING SERVICES, INC.

COUNTING DATA FOR SAMPLE #9620

AIR COUNT DATA *PRE-LOADING*

CPM=	648.0	STD DEV=	8.0
COUNTER EFFICIENCY=	.1000		
DPM=	648.0	STD DEV=	8.0

POST-LOADING

CPM=	648.0	STD DEV=	8.0
COUNTER EFFICIENCY=	.1000		
DPM=	648.0	STD DEV=	8.0

TR1 COUNT DATA *PRE-LOADING*

CPM=	687.9	STD DEV=	8.3
COUNTER EFFICIENCY=	.580		
DPM=	1,186.0	STD DEV=	14.3
DPM-AIR=	538.0	STD DEV=	16.4

POST-LOADING

CPM=	1,135,101.5	STD DEV=	336.9
COUNTER EFFICIENCY=	.580		
DPM=	1,957,071.5	STD DEV=	580.9
DPM-AIR=	1,956,423.5	STD DEV=	580.9

NET

NET DPM=	1,955,885.5	STD DEV=	581.2
----------	-------------	----------	-------

GB1 COUNT DATA *PRE-LOADING*

CPM=	693.6	STD DEV=	8.3
COUNTER EFFICIENCY=	.580		
DPM=	1,195.9	STD DEV=	14.4
DPM-AIR=	547.9	STD DEV=	16.5

POST-LOADING

CPM=	5,499.1	STD DEV=	23.5
COUNTER EFFICIENCY=	.580		
DPM=	9,481.2	STD DEV=	40.4
DPM-AIR=	8,833.2	STD DEV=	41.2

NET

NET DPM=	8,285.3	STD DEV=	44.4
----------	---------	----------	------

COUNTING DATA FOR SAMPLE #9620

GB2 COUNT DATA *PRE-LOADING*

CPM=	693.6	STD DEV=	8.3
COUNTER EFFICIENCY=	.580		
DPM=	1,195.9	STD DEV=	14.4
DPM-AIR=	547.9	STD DEV=	16.5

POST-LOADING

CPM=	782.2	STD DEV=	8.8
COUNTER EFFICIENCY=	.580		
DPM=	1,348.6	STD DEV=	15.2
DPM-AIR=	700.6	STD DEV=	17.2

NET

NET DPM=	152.8	STD DEV=	23.8
----------	-------	----------	------

TEST REPORT: METHYL IODIDE DATE PERFORMED: 03 APR 1984

CLIENT: COMMONWEALTH EDISON COMPANY, BYRON STATION
 POST OFFICE BOX 767

SAMPLE: #9620

P.O. NO.: 266364

TEST CONDITIONS:

BED DEPTH= 5.08 CM. (2.00 IN.)

BED DIAMETER= 5.08 CM. (2.00 IN.)

TEMPERATURES

PRE-EQUILIBRATION= 25.0 C (77.0 F)

LOADING= 25.0 C (77.0 F)

POST-LOADING= 25.0 C (77.0 F)

RELATIVE HUMIDITY= 95.0 %

FACE VELOCITY= 20.32 CM./SEC (40.0 FPM)

MEI LOADING= 1.75 MG./CU.M.

TEST TIMES

PRE-EQUILIBRATION= 16. HRS.

LOADING= 2.0 HRS.

POST-SWEEP= 2.0 HRS.

MEI-131 CONTENT= .89 MICROCURIES

PRESSURE= 1.0 ATM.

TEST REPORT: METHYL IODIDE DATE PERFORMED: 03 APR 1984

EFFICIENCY: 1ST RED= 99.57% (STD. DEV.= .005%)

THE RESULTS ARE THE BEST OBTAINABLE UNDER CURRENT EXPERIMENTAL
TECHNIQUES AND ACCORDING TO OUR BEST KNOWLEDGE.

PERFORMED BY Mark P. King
MARK P. KING NUCLEAR CONSULTING SERVICES, INC.

APPROVED BY W. Peter Freeman
W. PETER FREEMAN NUCLEAR CONSULTING SERVICES, INC.

COUNTING DATA FOR SAMPLE #8989

AIR COUNT DATA *PRE-LOADING*

CPM=	569.2	STD DEV=	7.5
COUNTER EFFICIENCY=	1.000		
DPM=	569.2	STD DEV=	7.5

POST-LOADING

CPM=	569.2	STD DEV=	7.5
COUNTER EFFICIENCY=	1.000		
DPM=	569.2	STD DEV=	7.5

TB1 COUNT DATA *PRE-LOADING*

CPM=	592.4	STD DEV=	7.7
COUNTER EFFICIENCY=	.580		
DPM=	1,021.4	STD DEV=	13.3
DPM-AIR=	452.2	STD DEV=	15.3

POST-LOADING

CPM=	994,210.8	STD DEV=	315.3
COUNTER EFFICIENCY=	.580		
DPM=	1,714,156.3	STD DEV=	543.6
DPM-AIR=	1,713,587.0	STD DEV=	543.7

NET

NET DPM=	1,713,134.8	STD DEV=	543.9
----------	-------------	----------	-------

GB1 COUNT DATA *PRE-LOADING*

CPM=	593.5	STD DEV=	7.7
COUNTER EFFICIENCY=	.580		
DPM=	1,023.3	STD DEV=	13.3
DPM-AIR=	454.1	STD DEV=	15.3

POST-LOADING

CPM=	4,985.8	STD DEV=	22.3
COUNTER EFFICIENCY=	.580		
DPM=	8,596.2	STD DEV=	38.5
DPM-AIR=	8,027.0	STD DEV=	39.2

NET

NET DPM=	7,572.9	STD DEV=	42.1
----------	---------	----------	------

COUNTING DATA FOR SAMPLE #8989

GB2 COUNT DATA *PRE-LOADING*

CPM=	593.5	STD DEV=	7.7
COUNTER EFFICIENCY=	.580		
DPM=	1,023.3	STD DEV=	13.3
DPM-AIR=	454.1	STD DEV=	15.3

POST-LOADING

CPM=	686.1	STD DEV=	8.3
COUNTER EFFICIENCY=	.580		
DPM=	1,182.9	STD DEV=	14.3
DPM-AIR=	613.7	STD DEV=	16.2

NET

NET DPM=	159.7	STD DEV=	22.2
----------	-------	----------	------

TEST REPORT: METHYL IODIDE DATE PERFORMED: 04 APR 1984

EFFICIENCY: 1ST RED= 99.55% (STD. DEV.= .005%)

THE RESULTS ARE THE BEST OBTAINABLE UNDER CURRENT EXPERIMENTAL
TECHNIQUES AND ACCORDING TO OUR BEST KNOWLEDGE.

PERFORMED BY Mark P. King
MARK P. KING NUCLEAR CONSULTING SERVICES, INC.

APPROVED BY W. Peter Freeman
W. PETER FREEMAN NUCLEAR CONSULTING SERVICES, INC.

COUNTING DATA FOR SAMPLE #9275

AIR COUNT DATA *PRE-LOADING*

CPM=	570.9	STD DEV=	7.6
COUNTER EFFICIENCY=	1.000		
DPM=	570.9	STD DEV=	7.6

POST-LOADING

CPM=	570.9	STD DEV=	7.6
COUNTER EFFICIENCY=	1.000		
DPM=	570.9	STD DEV=	7.6

TB1 COUNT DATA *PRE-LOADING*

CPM=	613.0	STD DEV=	7.8
COUNTER EFFICIENCY=	.580		
DPM=	1,056.9	STD DEV=	13.5
DPM-AIR=	486.0	STD DEV=	15.5

POST-LOADING

CPM=	934,386.3	STD DEV=	305.7
COUNTER EFFICIENCY=	.580		
DPM=	1,611,010.8	STD DEV=	527.0
DPM-AIR=	1,610,439.8	STD DEV=	527.1

NET

NET DPM=	1,609,953.8	STD DEV=	527.3
----------	-------------	----------	-------

GB1 COUNT DATA *PRE-LOADING*

CPM=	652.5	STD DEV=	8.1
COUNTER EFFICIENCY=	.580		
DPM=	1,125.0	STD DEV=	13.9
DPM-AIR=	554.1	STD DEV=	15.8

POST-LOADING

CPM=	17,926.1	STD DEV=	42.3
COUNTER EFFICIENCY=	.580		
DPM=	30,907.1	STD DEV=	73.0
DPM-AIR=	30,336.2	STD DEV=	73.4

NET

NET DPM=	29,782.1	STD DEV=	75.1
----------	----------	----------	------

COUNTING DATA FOR SAMPLE #9275

GB2 COUNT DATA *PRE-LOADING*

CPM=	652.5	STD DEV=	8.1
COUNTER EFFICIENCY=	.580		
DPM=	1,125.0	STD DEV=	13.9
DPM-AIR=	554.1	STD DEV=	15.8

POST-LOADING

CPM=	929.4	STD DEV=	9.6
COUNTER EFFICIENCY=	.580		
DPM=	1,602.4	STD DEV=	16.6
DPM-AIR=	1,031.5	STD DEV=	18.3

NET

NET DPM=	477.4	STD DEV=	24.2
----------	-------	----------	------

TEST REPORT: METHYL IODIDE DATE PERFORMED: 04 APR 1984

CLIENT: COMMONWEALTH EDISON COMPANY, BYRON STATION
POST OFFICE BOX 767

SAMPLE: #9275

P.O. NO.: 266364

TEST CONDITIONS:

BED DEPTH= 5.08 CM. (2.00 IN.)

BED DIAMETER= 5.08 CM. (2.00 IN.)

TEMPERATURES

PRE-EQUILIBRATION= 25.0 C (77.0 F)

LOADING= 25.0 C (77.0 F)

POST-LOADING= 25.0 C (77.0 F)

RELATIVE HUMIDITY= 95.0 %

FACE VELOCITY= 20.32 CM./SEC (40.0 FPM)

MEI LOADING= 1.75 MG./CU.M.

TEST TIMES

PRE-EQUILIBRATION= 16. HRS.

LOADING= 2.0 HRS.

POST-SWEEP= 2.0 HRS.

MEI-131 CONTENT= .75 MICROCURIES

PRESSURE= 1.0 ATM.

TEST REPORT: METHYL IODIDE DATE PERFORMED: 04 APR 1984

EFFICIENCY: 1ST BED= 98.16% (STD. DEV.= .006%)

THE RESULTS ARE THE BEST OBTAINABLE UNDER CURRENT EXPERIMENTAL
TECHNIQUES AND ACCORDING TO OUR BEST KNOWLEDGE.

PERFORMED BY Mark P. King
MARK P. KING NUCLEAR CONSULTING SERVICES, INC.

APPROVED BY W. Peter Freeman
W. PETER FREEMAN NUCLEAR CONSULTING SERVICES, INC.

COUNTING DATA FOR SAMPLE #2364-9

AIR COUNT DATA *PRE-LOADING*

CPM=	600.0	STD DEV=	5.9
COUNTER EFFICIENCY=	1.000		
DPM=	600.0	STD DEV=	5.9

POST-LOADING

CPM=	600.0	STD DEV=	5.9
COUNTER EFFICIENCY=	1.000		
DPM=	600.0	STD DEV=	5.9

TB1 COUNT DATA *PRE-LOADING*

CPM=	674.0	STD DEV=	6.7
COUNTER EFFICIENCY=	.580		
DPM=	1,162.1	STD DEV=	11.6
DPM-AIR=	562.1	STD DEV=	13.0

POST-LOADING

CPM=	344,828.0	STD DEV=	415.2
COUNTER EFFICIENCY=	.580		
DPM=	594,531.0	STD DEV=	715.9
DPM-AIR=	593,931.0	STD DEV=	715.9

NET

NET DPM=	593,368.9	STD DEV=	716.1
----------	-----------	----------	-------

GB1 COUNT DATA *PRE-LOADING*

CPM=	672.0	STD DEV=	6.7
COUNTER EFFICIENCY=	.580		
DPM=	1,158.6	STD DEV=	11.5
DPM-AIR=	558.6	STD DEV=	13.0

POST-LOADING

CPM=	1,488.0	STD DEV=	14.6
COUNTER EFFICIENCY=	.580		
DPM=	2,565.5	STD DEV=	25.1
DPM-AIR=	1,965.5	STD DEV=	25.8

NET

NET DPM=	1,406.9	STD DEV=	28.9
----------	---------	----------	------

COUNTING DATA FOR SAMPLE #2364-9

GB2 COUNT DATA *PRE-LOADING*

CPM=	672.0	STD DEV=	6.7
COUNTER EFFICIENCY=	.580		
DPM=	1,158.6	STD DEV=	11.5
DPM-AIR=	558.6	STD DEV=	13.0

POST-LOADING

CPM=	719.0	STD DEV=	7.2
COUNTER EFFICIENCY=	.580		
DPM=	1,239.7	STD DEV=	12.4
DPM-AIR=	639.7	STD DEV=	13.7

NET

NET DPM=	81.0	STD DEV=	18.9
----------	------	----------	------

TEST REPORT: METHYL IODIDE DATE PERFORMED:

CLIENT: COMMONWEALTH EDISON COMPANY, BYRON STATION
POST OFFICE BOX 767

SAMPLE: # 2364-9

P.O. NO.: 266364

TEST CONDITIONS:

BED DEPTH= 5.08 CM. (2.00 IN.)

BED DIAMETER= 5.08 CM. (2.00 IN.)

TEMPERATURES

PRE-EQUILIBRATION= 25.0 C (77.0 F)

LOADING= 25.0 C (77.0 F)

POST-LOADING= 25.0 C (77.0 F)

RELATIVE HUMIDITY= 95.0 %

FACE VELOCITY= 20.32 CM./SEC (40.0 FPM)

MEI LOADING= 1.75 MG./CU.M.

TEST TIMES

PRE-EQUILIBRATION= 16. HRS.

LOADING= 2.0 HRS.

POST-SWEEP= 2.0 HRS.

MEI-131 CONTENT= .27 MICROCURIES

PRESSURE= 1.0 ATM.

TEST REPORT: METHYL IODIDE DATE PERFORMED:

EFFICIENCY: 1ST BED= 99.75% (STD. DEV.= .083%)

THE RESULTS ARE THE BEST OBTAINABLE UNDER CURRENT EXPERIMENTAL
TECHNIQUES AND ACCORDING TO OUR BEST KNOWLEDGE.

PERFORMED BY Mark P. King
MARK P. KING NUCLEAR CONSULTING SERVICES, INC.

APPROVED BY W. Peter Freeman
W. PETER FREEMAN NUCLEAR CONSULTING SERVICES, INC.

BJB

PO BOX 29151 COLUMBUS OHIO 43229

(614) 846-5710 - TWX 810-337-2007



Nuclear Consulting Services, Inc.

IODINE-131 REMOVAL
EFFICIENCY DETERMINATION
OF ADSORBENT SAMPLES

PERFORMED BY:

NUCLEAR CONSULTING SERVICES, INC.
COLUMBUS, OHIO 43229

DATE:

30 MAY 1984

PERFORMED FOR:

COMMONWEALTH EDISON COMPANY, BYRON STATION
POST OFFICE BOX 767
CHICAGO, ILLINOIS 60690

P.O. NO. 266364

DISTRIBUTION:

EXTERNAL

(2) DAN CHRISTIANA
(1) BRUCE BYRNE

INTERNAL

(1) PROJECT MASTER FILE
(1) I-LAB FILE
(1) QA FILE
(1) J. W. Jacox

NUCON[®] 13CF413/02

*REGISTERED TRADEMARK OF
NUCLEAR CONSULTING SERVICES, INC.

CERTIFICATE OF COMPLIANCE

CLIENT: COMMONWEALTH EDISON COMPANY, BYRON STATION

DATE: 28 MAY 1984

ADDRESS: POST OFFICE BOX 767
CHICAGO, ILLINOIS 60690

PROJECT: 13CE413/02

PURCHASE ORDER: 266364

DATE: 10 JAN 1983

NUCON PRODUCT/SERVICE: METHYL. IODIDE TESTING PERFORMED ON

4641 BATCH 4
4784 BATCH 5
4053 BATCH 1
5205 BATCH 6

THIS IS TO CERTIFY THAT PRODUCT/SERVICE CONFORMS TO SPECIFICATION(S)

OF CLIENT:

OF NUCON:

US NRC REG. GUIDE 1.52 REV. 2

NUCON QA MANUAL

AND IS SO DOCUMENTED BY NUCON QUALITY ASSURANCE WITH ANY EXCEPTIONS NOTED.

EXCEPTIONS:

NONE

REVIEWED IN ACCORDANCE WITH CHECKLIST OF
NUCON PROCEDURE 95 (QA38 ATTACHED).

BY Michael J. Toeppe
MICHAEL J. TOEPPF

FOR QUALITY ASSURANCE DEPT.
NUCLEAR CONSULTING SERVICES, INC

P.O. No.: 266364

NUCON PROJECT No.: 13CF413

DATE: MAY 30, 1984

TEST EQUIPMENT		CALIBRATION STANDARDS	
LOG No.	CAL. DUE	LOG No.	NBS No. (IF APPLICABLE)
L0251	6 SEP 1984	L0350	522/223339
		L0351	221482
L0263	11 JUN 1984	L0561	NBS JOUR OF RES 81A
		L0563	NBS JOUR OF RES 81A
		L0565	NBS JOUR OF RES 81A
L0288	26 SEP 1984	L0414	NBS CIRCULAR # 36
L0485	11 JUN 1984	L0560	NBS SRM 4241-2

THIS IS TO CERTIFY THAT THE ABOVE LISTED EQUIPMENT HAS BEEN CALIBRATED TRACEABLE TO THE NATIONAL BUREAU OF STANDARDS, HAS BEEN DERIVED FROM ACCEPTED VALUES OF NATURAL PHYSICAL CONSTANTS, OR HAS BEEN DERIVED BY THE RATIO-TYPE OF SELF CALIBRATION TECHNIQUE AND MEETS THE REQUIREMENTS OF MJI. STD 45662.

BY


MICHAEL J. TOFFE

FOR QUALITY ASSURANCE DEPT.
NUCLEAR CONSULTING SERVICES, INC.

QA CHECKLIST FOR REVIEW OF INSPECTION TEST DOCUMENTS

- 1. IS THE REPORT SIGNED BY PERSON PERFORMING INSPECTION OR TEST? Y N
- 2. HAS THE REPORT BEEN REVIEWED AND SIGNED BY AN AUTHORIZED PERSON? Y N
- 3. IS ACCEPTANCE CRITERIA SPECIFIED? Y N
- 3a. IF SO, DOES IT MEET THE CUSTOMERS REQUIREMENTS? Y N
- 4. ARE INSPECTIONS OR TEST RESULTS SATISFACTORY? Y N
- 4a. IF NOT, WAS A NON-CONFORMANCE REPORT GENERATED? Y N
- 5. IF A NON-CONFORMANCE REPORT WAS NOT GENERATED, EXPLAIN BELOW.
- 6. COMMENTS: None

SIGNATURE IN REVIEW SECTION OF DOCUMENT INDICATES SATISFACTORY REVIEW.

THESE REPORT SHEETS CONTAIN THE IODINE FISSION PRODUCT TEST DATA OBTAINED FROM ADSORBENT SAMPLES TESTED BY NUCON.

COUNTING WAS PERFORMED AT 0.364 MEV GAMMA LEVEL, IN A 4.0" THALLIUM ACTIVATED SODIUM IODIDE WELL CRYSTAL. CALIBRATION OF THE COUNTING CRYSTAL HAS BEEN PERFORMED BY THE USE OF AN NBS TRACEABLE 131-I STANDARD.

TEST REPORT: METHYL IODIDE

DATE PERFORMED: 25 MAY 1984

SAMPLE: 4641 BATCH 4

SUMMARY OF RESULTS
 =====

BED No.	RETENTION	PENETRATION	STD. DEV.
1	99.370%	.630%	.0151%

THE RESULTS ARE THE BEST OBTAINABLE UNDER CURRENT EXPERIMENTAL TECHNIQUES AND ACCORDING TO OUR BEST KNOWLEDGE.

PERFORMED BY Donald P. Whiting
 DONALD P. WHITING NUCLEAR CONSULTING SERVICES, INC.

APPROVED BY W.P. Freeman
 W. P. FREEMAN NUCLEAR CONSULTING SERVICES, INC.

TEST REPORT: METHYL IODIDE

DATE PERFORMED: 25 MAY 1984

CLIENT: COMMONWEALTH EDISON COMPANY, BYRON STATION
POST OFFICE BOX 767

SAMPLE: 4641 BATCH 4

P.O. NO.: 266364

TEST CONDITIONS:

BED DEPTH	5.08 CM. (2.00 IN.)
BED DIAMETER	5.08 CM. (2.00 IN.)
TEMPERATURES	
PRE-LOADING	25.0 °C (77.0 °F)
LOADING	25.0 °C (77.0 °F)
POST-LOADING	25.0 °C (77.0 °F)
RELATIVE HUMIDITY	95.0 %
FACE VELOCITY	20.32 CM./SEC (40.0 FPM)
CHALLENGE AGENT CONCENTRATION	
METHYL IODIDE	1.75 MG./CU.M.
TEST TIMES	
PRE-LOADING	16. HRS.
LOADING	2. HRS.
POST-LOADING	2. HRS.
CAPTURED RADIOACTIVITY	.33 MICROCURIES
PRESSURE	1.00 ATM. (101.30 kPA)

COUNTING DATA FOR SAMPLE 4641 BATCH 4

AIR COUNT DATA *PRE-LOADING*

CPM=	1,353.0	STD DEV=	14.0
------	---------	----------	------

POST-LOADING

CPM=	1,353.0	STD DEV=	14.0
------	---------	----------	------

TB1 COUNT DATA *PRE-LOADING*

CPM=	1,381.0	STD DEV=	14.0
CPM-AIR=	28.0	STD DEV=	20.0

POST-LOADING

CPM=	342,470.0	STD DEV=	480.0
CPM-AIR=	341,120.0	STD DEV=	480.0

NET

NET CPM=	341,090.0	STD DEV=	480.0
----------	-----------	----------	-------

GB1 COUNT DATA *PRE-LOADING*

CPM=	1,368.0	STD DEV=	14.0
CPM-AIR=	15.0	STD DEV=	20.0

POST-LOADING

CPM=	3,559.0	STD DEV=	36.0
CPM-AIR=	2,206.0	STD DEV=	39.0

NET

NET CPM=	2,191.0	STD DEV=	44.0
----------	---------	----------	------

COUNTING DATA FOR SAMPLE 4641 BATCH 4

GB2 COUNT DATA *PRE-LOADING*

CPM=	1,368.0	STD DEV=	14.0
CPM-ATR=	15.0	STD DEV=	20.0

POST-LOADING

CPM=	1,339.0	STD DEV=	13.0
CPM-ATR=	-14.0	STD DEV=	19.0

NET

NET CPM=	-29.0	STD DEV=	28.0
----------	-------	----------	------

TEST REPORT: METHYL IODIDE

DATE PERFORMED: 26 MAY 1984

SAMPLE: 4784 BATCH 5

SUMMARY OF RESULTS

=====

RED No.	RETENTION	PENETRATION	STD. DEV.
1	99.592%	.408%	.0079%

THE RESULTS ARE THE BEST OBTAINABLE UNDER CURRENT EXPERIMENTAL TECHNIQUES AND ACCORDING TO OUR BEST KNOWLEDGE.

PERFORMED BY

Donald P. Whiting
DONALD P. WHITING NUCLEAR CONSULTING SERVICES, INC.

APPROVED BY

W.P. Freeman
W. P. FREEMAN NUCLEAR CONSULTING SERVICES, INC.

TEST REPORT: METHYL IODIDE

DATE PERFORMED: 26 MAY 1984

CLIENT: COMMONWEALTH EDISON COMPANY, BYRON STATION
POST OFFICE BOX 767

SAMPLE: 4784 BATCH 5

P.O. NO.: 266364

TEST CONDITIONS:

BED DEPTH 5.08 CM. (2.00 IN.)

BED DIAMETER 5.08 CM. (2.00 IN.)

TEMPERATURES

PRE-LOADING 25.0 °C (77.0 °F)

LOADING 25.0 °C (77.0 °F)

POST-LOADING 25.0 °C (77.0 °F)

RELATIVE HUMIDITY 95.0 %

FACE VELOCITY 20.32 CM./SEC (40.0 FPM)

CHALLENGE AGENT CONCENTRATION

METHYL IODIDE 1.75 MG./CU.M.

TEST TIMES

PRE-LOADING 16. HRS.

LOADING 2. HRS.

POST-LOADING 2. HRS.

CAPTURED RADIOACTIVITY .67 MICROCURIES

PRESSURE 1.00 ATM. (101.30 KPA)

COUNTING DATA FOR SAMPLE 4784 BATCH 5

AIR COUNT DATA *PRE-LOADING*

CPM=	1,264.0	STD DEV=	13.0
------	---------	----------	------

POST-LOADING

CPM=	1,264.0	STD DEV=	13.0
------	---------	----------	------

TB1 COUNT DATA *PRE-LOADING*

CPM=	1,279.0	STD DEV=	13.0
CPM-AIR=	15.0	STD DEV=	18.0

POST-LOADING

CPM=	694,440.0	STD DEV=	980.0
CPM-AIR=	693,180.0	STD DEV=	980.0

NET

NET CPM=	693,160.0	STD DEV=	980.0
----------	-----------	----------	-------

GB1 COUNT DATA *PRE-LOADING*

CPM=	1,368.0	STD DEV=	14.0
CPM-AIR=	104.0	STD DEV=	19.0

POST-LOADING

CPM=	4,219.0	STD DEV=	42.0
CPM-AIR=	2,955.0	STD DEV=	44.0

NET

NET CPM=	2,851.0	STD DEV=	48.0
----------	---------	----------	------

COUNTING DATA FOR SAMPLE 4784 BATCH 5

GB2 COUNT DATA *PRE-LOADING*

CPM=	1,368.0	STD DEV=	14.0
CPM-AJR=	104.0	STD DEV=	19.0

POST-LOADING

CPM=	1,359.0	STD DEV=	14.0
CPM-AJR=	95.0	STD DEV=	19.0

NET

NET CPM=	-9.0	STD DEV=	27.0
----------	------	----------	------

TEST REPORT: METHYL IODIDE

DATE PERFORMED: 27 MAY 1984

SAMPLE: 4053 BATCH 1

SUMMARY OF RESULTS
=====

BED No.	RETENTION	PENETRATION	STD. DEV.
1	99.965%	.095%	.0061%

THE RESULTS ARE THE BEST OBTAINABLE UNDER CURRENT EXPERIMENTAL TECHNIQUES AND ACCORDING TO OUR BEST KNOWLEDGE.

PERFORMED BY

Donald P. Whiting
DONALD P. WHITING NUCLEAR CONSULTING SERVICES, INC.

APPROVED BY

W. P. Freeman
W. P. FREEMAN NUCLEAR CONSULTING SERVICES, INC.

TEST REPORT: METHYL IODIDE

DATE PERFORMED: 27 MAY 1984

CLIENT: COMMONWEALTH EDISON COMPANY, BYRON STATION
POST OFFICE BOX 767

SAMPLE: 4053 BATCH 1

P.O. NO.: 266364

TEST CONDITIONS:

BED DEPTH	5.08 CM. (2.00 IN.)
BED DIAMETER	5.08 CM. (2.00 IN.)
TEMPERATURES	
PRE-LOADING	25.0 °C (77.0 °F)
LOADING	25.0 °C (77.0 °F)
POST-LOADING	25.0 °C (77.0 °F)
RELATIVE HUMIDITY	95.0 %
FACE VELOCITY	20.32 CM./SEC (40.0 FPM)
CHALLENGE AGENT CONCENTRATION	
METHYL IODIDE	1.75 MG./CU.M.
TEST TIMES	
PRE-LOADING	16. HRS.
LOADING	2. HRS.
POST-LOADING	2. HRS.
CAPTURED RADIOACTIVITY	.50 MICROCURIES
PRESSURE	1.00 ATM. (101.30 KPA)

COUNTING DATA FOR SAMPLE 4053 BATCH 1

AIR COUNT DATA *PRE-LOADING*

CPM=	1,041.0	STD DEV=	10.0
------	---------	----------	------

POST-LOADING

CPM=	1,041.0	STD DEV=	10.0
------	---------	----------	------

TB1 COUNT DATA *PRE-LOADING*

CPM=	1,044.0	STD DEV=	10.0
CPM-AIR=	3.0	STD DEV=	14.0

POST-LOADING

CPM=	526,320.0	STD DEV=	740.0
CPM-AIR=	525,280.0	STD DEV=	740.0

NET

NET CPM=	525,280.0	STD DEV=	740.0
----------	-----------	----------	-------

GB1 COUNT DATA *PRE-LOADING*

CPM=	1,068.0	STD DEV=	11.0
CPM-AIR=	27.0	STD DEV=	15.0

POST-LOADING

CPM=	1,572.0	STD DEV=	16.0
CPM-AIR=	531.0	STD DEV=	19.0

NET

NET CPM=	504.0	STD DEV=	24.0
----------	-------	----------	------

COUNTING DATA FOR SAMPLE 4053 BATCH 1

GB2 COUNT DATA *PRE-LOADING*

CPM=	1,068.0	STD DEV=	11.0
CPM-AIR=	27.0	STD DEV=	15.0

POST-LOADING

CPM=	1,065.0	STD DEV=	11.0
CPM-AIR=	24.0	STD DEV=	15.0

NET

NET CPM=	-3.0	STD DEV=	21.0
----------	------	----------	------

TEST REPORT: METHYL IODIDE

DATE PERFORMED: 28 MAY 1984

SAMPLE: 5205 BATCH 6

SUMMARY OF RESULTS
=====

BED No.	RETENTION	PENETRATION	STD. DEV.
1	99.622%	.378%	.0084%

THE RESULTS ARE THE BEST OBTAINABLE UNDER CURRENT EXPERIMENTAL TECHNIQUES AND ACCORDING TO OUR BEST KNOWLEDGE.

PERFORMED BY Donald P. Whiting
DONALD P. WHITING NUCLEAR CONSULTING SERVICES, INC.

APPROVED BY W.P. Freeman
W. P. FREEMAN NUCLEAR CONSULTING SERVICES, INC.

TEST REPORT: METHYL IODIDE

DATE PERFORMED: 23 MAY 1984

CLIENT: COMMONWEALTH EDISON COMPANY, BYRON STATION
POST OFFICE BOX 767

SAMPLE: 5205 BATCH 6

P.O. NO.: 266364

TEST CONDITIONS:

BED DEPTH	5.08 CM. (2.00 IN.)
BED DIAMETER	5.08 CM. (2.00 IN.)
TEMPERATURES	
PRE-LOADING	25.0 °C (77.0 °F)
LOADING	25.0 °C (77.0 °F)
POST-LOADING	25.0 °C (77.0 °F)
RELATIVE HUMIDITY	95.0 %
FACE VELOCITY	20.32 CM./SEC (40.0 FPM)
CHALLENGE AGENT CONCENTRATION	
METHYL IODIDE	1.75 MG./CU.M.
TEST TIMES	
PRE-LOADING	16. HRS.
LOADING	2. HRS.
POST-LOADING	2. HRS.
CAPTURED RADIOACTIVITY	.47 MICROCURIES
PRESSURE	1.00 ATM. (101.30 kPA)

COUNTING DATA FOR SAMPLE 5205 BATCH 6

AIR COUNT DATA *PRE-LOADING*

CPM=	1,053.0	STD DEV=	11.0
------	---------	----------	------

POST-LOADING

CPM=	1,053.0	STD DEV=	11.0
------	---------	----------	------

TB1 COUNT DATA *PRE-LOADING*

CPM=	1,054.0	STD DEV=	11.0
CPM-AIR=	1.0	STD DEV=	16.0

POST-LOADING

CPM=	495,050.0	STD DEV=	700.0
CPM-AIR=	494,000.0	STD DEV=	700.0

NET

NET CPM=	494,000.0	STD DEV=	700.0
----------	-----------	----------	-------

GB1 COUNT DATA *PRE-LOADING*

CPM=	1,068.0	STD DEV=	11.0
CPM-AIR=	15.0	STD DEV=	16.0

POST-LOADING

CPM=	2,890.0	STD DEV=	29.0
CPM-AIR=	1,837.0	STD DEV=	31.0

NET

NET CPM=	1,822.0	STD DEV=	35.0
----------	---------	----------	------

COUNTING DATA FOR SAMPLE 5205 BATCH 6

GB2 COUNT DATA *PRE-LOADING*

CPM=	1,068.0	STD DEV=	11.0
CPM-AIR=	15.0	STD DEV=	16.0

POST-LOADING

CPM=	1,120.0	STD DEV=	11.0
CPM-AIR=	67.0	STD DEV=	16.0

NET

NET CPM=	52.0	STD DEV=	23.0
----------	------	----------	------