INTERNATIONAL NUTRONICS, INC.

[redacted]

October 13, 1983

U.S. Nuclear Regulatory Commission
Region I
631 Park Avenue
King of Prussia, PA 19406

Attn: Dr. John Glenn

RE: LICENSE NO. 29-13848-01

Dear Dr. Glenn:

To update, I have contracted Hydro Nuclear Services in Medford, New Jersey for whole body counting and quantitive fit testing of our respiratory protective equipment. Attached is a copy of our Respiratory Protective Program, whole body counting results and respiratory fit test results.

We plan to commence our waste action plan as soon as our Respiratory Protective Program is satisfied (10/14/83).

Regarding our waste shipment, we now have a definite date of October 25th for pick up. Phase II of our waste action plan will be submitted some time next week.

If you have any questions, please call.

Sincerely,

James A. Welsh
Radiation Safety Officer

JAW/bt
Attachments: Respiratory Protective Program
Quantitive Respirator Fit Tests
Whole Body Counts

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U.S. HIGHWAY 46 AND SCHLEY STREET, DOVER, NEW JERSEY 07801
(201) 361-0583

RESPIRATORY PROTECTIVE PROGRAM

1.) ADMINISTRATION:

The responsibility and authority for administrating the Respiratory Protection Program at the Dover Facility is assigned to Mr. James Welsh, Radiation Safety Officer. Mr. Welsh has completed 68 hours of training in Industrial Hygiene including respiratory protection at N.I.O.S.H. in Cincinnati in 1981.

2.) ASSESSMENT OF RESPIRATORY HAZARD:

It has been determined that the respiratory hazard is particulate (dust), containing the isotope Cobalt 60, and cannot be effectively controlled by process and engineering design.

3.) RESPIRATORY PROTECTIVE DEVICE (air purifying device)

We employ the Willson 3195 full face mask with NIOSH/MSHA TC-23C-142 approved filter. We also employ the Norton 100 disposable half mask with NIOSH/MSHA TC-21C-251 approved filter.

4.) REQUIREMENTS:

To become certified to wear respiratory protective equipment, the following must be satisfied:

a) The person has satisfactorily passed a quantitive respiratory fit test on half and full face masks.

b) The individual has been examined by a Physician for this purpose and found physically acceptable to wear air purifying equipment.

c) The individual has been instructed in use (qualitative fit testing), identification and maintenance of these protective devices.

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5.) CONTROL:

a) Training and use will be under the direction of the Radiation Protection Officer.

b) The protection device filters stated in Item #3 will not be used against gases, vapors or oxygen deficient situations.

c) Only color coded canisters with NIOSH/MSHA approval will be used.

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QUANTITATIVE RESPIRATOR FIT TEST
CALCULATION FORM

(Please Print)

Hydro Nuclear Services

[redacted]

Date 12/11/83
Mo. Day Yr.

Company IN.I Dept. _____

Test Operator William Doherty Analyst William Doherty

Type Test _____ DOP (Corn Oil) X

Respirator Type	HALF MASK [redacted]	WILSON [redacted]		
Avg. Upstream	95%	95%		
Avg. Clear	.05%	.05%		
Normal Breathing	.15%	.01%		
Deep Breathing	.35%	.03%		
Head Side-to-Side	.28%	.03%		
Head Up-and-Down	.27%	.02%		
Frowning	.46%	.02%		
Talking	.53%	.02%		
Deep Knee Bends	1%	.04%		
Normal Breathing	.15%	.03%		
Maximum Allow. (%)	10%	2%		
Protection Factor	10	200		
Fit: Satisfactory / Unsatisfactory	Sat.	Sat.		
Comfort Rating	1	1		

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QUANTITATIVE RESPIRATOR FIT TEST
CALCULATION FORM

(Please Print)

Hydronuclear Services

Name [redacted] Date 10 / 11 / 83 (Mo. Day Yr.)

Soc.Sec. [redacted] Company INI Dept. Production

Test Operator W. Doherty Analyst W. Doherty

Type Test _____ DOP (Corn Oil) X

Respirator Type	Half Mask ~~Fiber~~	Wilson ~~Airline~~		
Avg. Upstream	94%	97%		
Avg. Clear	.05%	.05%		
Normal Breathing	.05%	.065%		
Deep Breathing	.02%	.14%		
Head Side-to-Side	.04%	.07%		
Head Up-and-Down	.07%	.09%		
Frowning	.65%	.05%		
Talking	<.01%	.05%		
Deep Knee Bends	.15%	.045%		
Normal Breathing	.3%	.09		
Maximum Allow. (%)	10%	2%		
Protection Factor	10	200		
Fit: Satisfactory / Unsatisfactory	Sat.	Sat.		
Comfort Rating	1	1		

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QUANTITATIVE RESPIRATOR FIT TEST
CALCULATION FORM
(Please Print)

Hydro Nuclear Services

Name [redacted] Date 10 / 11 / 85
Mo. Day Yr.

Soc.Sec.# [redacted] Company I.V.I Dept. MARKETING

Test Operator Doherty Analyst Schroeder

Type Test _____ DOP (Corn Oil) X

Respirator Type	~~Half Mask Filter~~	~~Wilson Air line~~		
Avg. Upstream	94	99		
Avg. Clear	.04 %	05 %		
Normal Breathing	.16	3[illegible]0		
Deep Breathing	.10	5.0		
Head Side-to-Side	1.0 %	6.5		
Head Up-and-Down	1.0 %	6.5		
Frowning	1.0 %	4.0		
Talking	1.0 %	5.0		
Deep Knee Bends	7 10 %	5.0		
Normal Breathing	.2	5.0		
Maximum Allow. (%)	10 %	2 %		
Protection Factor	10	200		
Fit: Satisfactory / Unsatisfactory	UNSAT	UNSAT		
Comfort Rating	—	—		

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HYDRO NUCLEAR SERVICES

WHOLE BODY COUNTING
RADIO-NUCLIDE ANALYSIS PROGRAM

10 CFR 2.790 INFORMATION

11-OCT-83 13:42:16

[redacted]

TLD BADGE: NA PLANT BADGE #: INT. NO.

UPTAKE DATE: 11-OCT-83 00:00:00
COUNT DATE: 11-OCT-83 13:29:28

ELAPSED LIVE TIME: 600. ELAPSED REAL TIME: 601.

THYROID: 21.50 FRONT-TO-BACK: 3.00
SEAT HEIGHT: 10.50 OPERATOR'S INITIALS: [redacted]

WHOLE BODY SCREEN REPORT (REV 04)

********** THYROID **********
ENERGY WINDOW 99.95 TO 778.83

PK	IT	ENERGY	AREA	BKGND	FWHM	CHANNEL	LEFT	PW	CTS/SEC	%ERR	FIT
** NO PEAKS **											

********** LUNGS **********
ENERGY WINDOW 124.27 TO 2042.96

PK	IT	ENERGY	AREA	BKGND	FWHM	CHANNEL	LEFT	PW	CTS/SEC	%ERR	FIT
1	0	1179.55	10.	707.	6.50	404.00	395	28W	1.73E-02	****	
2	0	1446.28	326.	248.	39.70	437.36	423	30	5.44E-01	8.8	

NUCLIDE	KEY ENERGY	ACTIVITY UCI /UNIT	1 SIGMA ERROR	MPC-HOUR	%DOB	H-50 MREM
CO-60	1173.20	2.730E-04	9.930E-04	0.20	0.02	0.00

TOTALS:
ACTIVITY= 2.730E-04 MPC-HOUR= 0.20 %DOB= 0.02 H-50= 0.00

********** LOWER TORSO **********
ENERGY WINDOW 95.53 TO 2014.73

PK	IT	ENERGY	AREA	BKGND	FWHM	CHANNEL	LEFT	PW	CTS/SEC	%ERR	FIT
1	1	1174.74	407.	507.	87.90	657.15	647	21	6.78E-01	9.3	2.46E 00
2	5	1342.57	237.	194.	52.06	677.70	668	64W	3.94E-01	10.6	3.44E 00
3	5	1470.25	327.	181.	59.80	693.33	668	64W	5.45E-01	8.0	

NUCLIDE	KEY ENERGY	ACTIVITY UCI /UNIT	1 SIGMA ERROR	MPC-HOUR	%DOB	H-50 MREM
CO-60	1173.20	6.341E-03	5.870E-04	0.94	0.88*	0.00

TOTALS:
ACTIVITY= 6.341E-03 MPC-HOUR= 0.94 %DOB= 0.88 H-50= 0.00

ALL ORGANS:
TOTAL ACTIVITY= 6.614E-03 AVG MPC-HOUR= 0.38 TOTAL H-50= 0.00

REVIEWED BY:
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10 CFR 2.790 INFORMATION

SIGNATURE

HYDRO [redacted] CLEAR SERVICES [redacted]

WHOLE BODY COUNTING
RADIO-NUCLIDE ANALYSIS PROGRAM

11-OCT-83 12:41:41

[redacted]

TLD BADGE: NA PLANT BADGE #: INT. NU.

UPTAKE DATE: 11-OCT-83 00:00:00
COUNT DATE: 11-OCT-83 12:29:37

ELAPSED LIVE TIME: 600. ELAPSED REAL TIME: 601.

THYROID: 20.20 FRONT-TO-BACK: 0.50
SEAT HEIGHT: 11.90 OPERATOR'S INITIALS: [redacted]

WHOLE BODY SCREEN REPORT (REV 04)

THYROID

ENERGY WINDOW 99.95 TO 998.83

PK	IT	ENERGY	AREA	BKGND	FWHM	CHANNEL	LEFT	PW	CTS/SEC	%ERR	FIT
1	1	806.29	43.	397.	50.33	100.80	78	28	7.17E-02	67.2	1.61E 00

NUCLIDE	KEY ENERGY	ACTIVITY UCI /UNIT	1 SIGMA ERROR	MPC-HOUR	%DOB	H-50 MREM
CO-58	810.76	6.129E-04	4.121E-04	0.00	0.00	0.00

TOTALS:
ACTIVITY= 6.129E-04 MPC-HOUR= 0.00 %DOB= 0.00 H-50= 0.00

LUNGS

ENERGY WINDOW 124.27 TO 2042.96

PK	IT	ENERGY	AREA	BKGND	FWHM	CHANNEL	LEFT	PW	CTS/SEC	%ERR	FIT
1	5	1175.01	776.	910.	73.61	403.43	387	58	1.29E 00	6.6	6.06E 00
2	5	1321.59	304.	416.	46.60	421.77	387	58W	5.07E-01	11.1	
3	5	1350.76	279.	378.	46.54	425.42	387	58W	4.65E-01	11.5	

NUCLIDE	KEY ENERGY	ACTIVITY UCI /UNIT	1 SIGMA ERROR	MPC-HOUR	%DOB	H-50 MREM
CO-60	1173.20	2.037E-02	1.338E-03	15.09	1.74*	0.00

TOTALS:
ACTIVITY= 2.037E-02 MPC-HOUR= 15.09 %DOB= 1.74 H-50= 0.00

LOWER TORSO

ENERGY WINDOW 95.53 TO 2014.73

PK	IT	ENERGY	AREA	BKGND	FWHM	CHANNEL	LEFT	PW	CTS/SEC	%ERR	FIT
1	4	1182.82	3277.	1078.	61.61	658.14	647	41	5.46E 00	2.2	2.05E 00
2	4	1342.06	2911.	766.	60.35	677.63	647	41	4.85E 00	2.3	
3	1	1479.27	173.	790.	34.44	694.43	687	16	2.89E-01	21.2	9.93E-01

NUCLIDE	KEY ENERGY	ACTIVITY UCI /UNIT	1 SIGMA ERROR	MPC-HOUR	%DOB	H-50 MREM
CO-60	1173.20	3.118E-02	1.151E-03	7.58	23.27*	0.00

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10 CFR 2.790 INFORMATION

TOTALS:
ACTIVITY= 3.118E-02 MPC-HOUR= 7.58 %DOB= 23.27 H-50= 0.00

L ORGANS:
OTAL ACTIVITY= 7.217E-02 AVG MFC-HOUR= 7.56 TOTAL H-[illegible] 0.00

REVIEWED BY:

_____ _____

SIGNATURE DATE

ELAPSED PROGRAM EXECUTION TIME = 51 SECONDS.

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HYDRO NUCLEAR SERVICES

WHOLE BODY COUNTING
RADIO-NUCLIDE ANALYSIS PROGRAM

82

10 CFR 2.790 INFORMATION

11-OCT-83 14:19:42

[redacted]

TLD BADGE: NA PLANT BADGE #: INT. NU.

UPTAKE DATE: 11-OCT-83 00:00:00
COUNT DATE: 11-OCT-83 13:57:43

ELAPSED LIVE TIME: 600. ELAPSED REAL TIME: 601.

THYROID: 20.20 FRONT-TO-BACK: 0.39
SEAT HEIGHT: 11.90 OPERATOR'S INITIALS: [redacted]

WHOLE BODY SCREEN REPORT (REV 04)

THYROID

ENERGY WINDOW 99.95 TO 998.83

PK	IT	ENERGY	AREA	BKGND	FWHM	CHANNEL	LEFT	PW	CTS/SEC	%ERR	FIT
** NO PEAKS **											

LUNGS

ENERGY WINDOW 124.27 TO 2042.96

PK	IT	ENERGY	AREA	BKGND	FWHM	CHANNEL	LEFT	PW	CTS/SEC	%ERR	FIT
1	0	1171.30	350.	563.	52.01	402.97	395	19	3.84E-01	11.0	
2	5	1330.26	257.	203.	51.48	422.85	415	52	4.29E-01	10.0	3.39E 00
3	5	1450.80	311.	160.	53.45	437.93	415	52	5.18E-01	8.1	

NUCLIDE	KEY ENERGY	ACTIVITY UCI /UNIT	1 SIGMA ERROR	MPC-HOUR	%DOB	H-50 MREM
CO-60	1173.20	9.179E-03	1.007E-03	6.80	0.78	0.00

TOTALS:
ACTIVITY= 9.179E-03 MPC-HOUR= 6.80 %DOB= 0.78 H-50= 0.00

LOWER TORSO

ENERGY WINDOW 95.53 TO 2014.73

PK	IT	ENERGY	AREA	BKGND	FWHM	CHANNEL	LEFT	PW	CTS/SEC	%ERR	FIT
1	1	916.19	46.	1023.	42.22	625.49	617	18	7.72E-02	98.8	1.68E 00
2	1	1178.05	591.	693.	62.86	657.55	645	21	9.86E-01	7.5	1.53E 00
3	5	1343.14	560.	251.	62.31	677.77	669	34	9.34E-01	5.8	1.57E 00
4	5	1468.25	496.	181.	63.29	693.08	669	34	8.26E-01	5.9	

NUCLIDE	KEY ENERGY	ACTIVITY UCI /UNIT	1 SIGMA ERROR	MPC-HOUR	%DOB	H-50 MREM
CO-60	1173.20	9.222E-03	6.934E-04	1.37	4.19*	0.00

TOTALS:
ACTIVITY= 9.222E-03 MPC-HOUR= 1.37 %DOB= 4.19 H-50= 0.00

ALL ORGANS:
TOTAL ACTIVITY= 1.840E-02 AVG MPC-HOUR= 1.72 TOTAL H-50= 0.00

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REVIEWED BY: [redacted]

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HYDRO NUCLEAR SERVICES

WHOLE BODY COUNTING
RADIO-NUCLIDE ANALYSIS PROGRAM

11-OCT-83 12:55:12

[redacted]

TLD BADGE: NA PLANT BADGE #: INT. NU.

UPTAKE DATE: 11-OCT-83 00:00:00
COUNT DATE: 11-OCT-83 12:43:11

ELAPSED LIVE TIME: 600. ELAPSED REAL TIME: 601.

THYROID: 22.00 FRONT-TO-BACK: 1.60
SEAT HEIGHT: 13.50 OPERATOR'S INITIALS: [redacted]

WHOLE BODY SCREEN REPORT (REV 04)

THYROID
ENERGY WINDOW 99.95 TO 998.83

PK	IT	ENERGY	AREA	BKGND	FWHM	CHANNEL	LEFT	PW	CTS/SEC	%ERR	FIT
** NO PEAKS **											

LUNGS
ENERGY WINDOW 124.27 TO 2042.96

PK	IT	ENERGY	AREA	BKGND	FWHM	CHANNEL	LEFT	PW	CTS/SEC	%ERR	FIT
1	0	1443.68	478.	258.	85.03	437.04	416	33	7.97E-01	6.6	

NUCLIDE	KEY ENERGY	ACTIVITY UCI /UNIT	1 SIGMA ERROR	MPC-HOUR	%DOB	H-50 MREM
** NONE **						

LOWER TORSO
ENERGY WINDOW 95.53 TO 2014.73

PK	IT	ENERGY	AREA	BKGND	FWHM	CHANNEL	LEFT	PW	CTS/SEC	%ERR	FIT
1	1	1168.70	94.	1130.	45.33	656.41	647	40	1.56E-01	51.9	2.21E 00
2	1	1470.70	380.	326.	63.46	693.38	687	21	6.33E-01	8.5	2.20E 00

NUCLIDE	KEY ENERGY	ACTIVITY UCI /UNIT	1 SIGMA ERROR	MPC-HOUR	%DOB	H-50 MREM
CO-60	1173.20	1.454E-03	7.542E-04	0.22	0.66	0.00

TOTALS:
ACTIVITY= 1.454E-03 MPC-HOUR= 0.22 %DOB= 0.66 H-50= 0.00

ALL ORGANS:
TOTAL ACTIVITY= 1.454E-03 AVG MPC-HOUR= 0.07 TOTAL H-50= 0.00

REVIEWED BY:

SIGNATURE DATE

ELAPSED PROGRAM EXECUTION TIME = 40 SECONDS.

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~~10 CFR 2.790 INFORMATION~~

HYDRO NUCLEAR SERVICES

WHOLE BODY COUNTING
RADIO-NUCLIDE ANALYSIS PROGRAM

11-OCT-83 12:27:44

[redacted]

TLD BADGE: NA PLANT BADGE #: INT. NU.

UPTAKE DATE: 11-OCT-83 00:00:00
COUNT DATE: 11-OCT-83 12:15:40

ELAPSED LIVE TIME: 600. ELAPSED REAL TIME: 601.

THYROID: 21.30 FRONT-TO-BACK: 1.50
SEAT HEIGHT: 12.30 OPERATOR'S INITIALS: [redacted]

WHOLE BODY SCREEN REPORT (REV 04)

THYROID
ENERGY WINDOW 99.95 TO 998.83

PK	IT	ENERGY	AREA	BKGND	FWHM	CHANNEL	LEFT	PW	CTS/SEC	%ERR	FIT
** NO PEAKS **											

LUNGS
ENERGY WINDOW 124.27 TO 2042.96

PK	IT	ENERGY	AREA	BKGND	FWHM	CHANNEL	LEFT	PW	CTS/SEC	%ERR	FIT
1	S	1424.33	146.	83.	37.29	434.62	420	52W	2.43E-01	12.1	3.39E 00
2	S	1470.75	216.	76.	37.03	440.42	420	52W	3.59E-01	8.9	

NUCLIDE	KEY ENERGY	ACTIVITY UCI /UNIT	1 SIGMA ERROR	MPC-HOUR	%DOB	H-50 MREM
** NONE **						

LOWER TORSO
ENERGY WINDOW 95.53 TO 2014.73

PK	IT	ENERGY	AREA	BKGND	FWHM	CHANNEL	LEFT	PW	CTS/SEC	%ERR	FIT
1	I	1468.49	425.	401.	79.41	693.11	681	30	7.09E-01	8.2	3.02E 00

NUCLIDE	KEY ENERGY	ACTIVITY UCI /UNIT	1 SIGMA ERROR	MPC-HOUR	%DOB	H-50 MREM
** NONE **						

ALL ORGANS:
TOTAL ACTIVITY= 0.000E-01 AVG MPC-HOUR= 0.00 TOTAL H-50= 0.00

REVIEWED BY:

SIGNATURE DATE

ELAPSED PROGRAM EXECUTION TIME = 31 SECONDS.

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~~10 CFR 2.790 INFORMATION~~

HYDRO NUCLEAR SERVICES

WHOLE BODY COUNTING [redacted]
RADIO-NUCLIDE ANALYSIS PROGRAM

11-OCT-83 13:28:19

[redacted]

TLD BADGE: NA PLANT BADGE #: INT. NU.

UPTAKE DATE: 11-OCT-83 00:00:00
COUNT DATE: 11-OCT-83 13:16:15

ELAPSED LIVE TIME: 600. ELAPSED REAL TIME: 601.

THYROID: 22.80 FRONT-TO-BACK: 0.30
SEAT HEIGHT: 12.10 OPERATOR'S INITIALS: [redacted]

WHOLE BODY SCREEN REPORT (REV 04)

THYROID
ENERGY WINDOW 99.95 TO 998.83

PK	IT	ENERGY	AREA	BKGND	FWHM	CHANNEL	LEFT	PW	CTS/SEC	%ERR	FIT
** NO PEAKS **											

LUNGS
ENERGY WINDOW 124.27 TO 2042.96

PK	IT	ENERGY	AREA	BKGND	FWHM	CHANNEL	LEFT	PW	CTS/SEC	%ERR	FIT
1	3	1174.14	903.	905.	64.39	403.32	393	40	1.51E 00	5.8	3.10E 00
2	3	1335.13	740.	573.	62.82	423.46	393	40	1.23E 00	5.9	

NUCLIDE	KEY ENERGY	ACTIVITY UCI /UNIT	1 SIGMA ERROR	MPC-HOUR	%DOB	H-50 MREM
CO-60	1173.20	2.371E-02	1.367E-03	17.57	2.03*	0.00

TOTALS:
ACTIVITY= 2.371E-02 MPC-HOUR= 17.57 %DOB= 2.03 H-50= 0.00

LOWER TORSO
ENERGY WINDOW 95.53 TO 2014.73

PK	IT	ENERGY	AREA	BKGND	FWHM	CHANNEL	LEFT	PW	CTS/SEC	%ERR	FIT
1	5	1181.05	1100.	521.	64.49	657.92	647	59	1.83E 00	4.2	5.94E 00
2	5	1345.21	1024.	329.	63.62	678.02	647	59	1.71E 00	4.0	

NUCLIDE	KEY ENERGY	ACTIVITY UCI /UNIT	1 SIGMA ERROR	MPC-HOUR	%DOB	H-50 MREM
CO-60	1173.20	1.716E-02	7.224E-04	2.54	7.80*	0.00

TOTALS:
ACTIVITY= 1.716E-02 MPC-HOUR= 2.54 %DOB= 7.80 H-50= 0.00

ALL ORGANS:
TOTAL ACTIVITY= 4.087E-02 AVG MPC-HOUR= 5.70 TOTAL H-50= 0.00

REVIEWED BY:

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SIGNATURE B150 DATE

ELAPSED PROGRAM EXEC [redacted]

HYDRO NUCLEAR SERVICES

WHOLE BODY COUNTING [redacted]
RADIO-NUCLIDE ANALYSIS PROGRAM

11-OCT-83 13:56:08

[redacted]

TLD BADGE: NA PLANT BADGE #: INT. NU.

UPTAKE DATE: 11-OCT-83 00:00:00
COUNT DATE: 11-OCT-83 13:42:12

ELAPSED LIVE TIME: 600. ELAPSED REAL TIME: 601.

THYROID: 22.50 FRONT-TO-BACK: 0.00
SEAT HEIGHT: 11.50 OPERATOR'S INITIALS: [redacted]

WHOLE BODY SCREEN REPORT (REV 04)

THYROID
ENERGY WINDOW 99.95 TO 998.83

PK	IT	ENERGY	AREA	BKGND	FWHM	CHANNEL	LEFT	PW	CTS/SEC	%ERR	FIT
** NO PEAKS **											

LUNGS
ENERGY WINDOW 124.27 TO 2042.96

PK	IT	ENERGY	AREA	BKGND	FWHM	CHANNEL	LEFT	PW	CTS/SEC	%ERR	FIT
1	0	1175.01	998.	1303.	66.31	403.43	388	25	1.66E 00	6.0	
2	0	1333.01	778.	675.	69.09	423.20	414	19	1.30E 00	5.9	

NUCLIDE	KEY ENERGY	ACTIVITY UCI /UNIT	1 SIGMA ERROR	MPC-HOUR	%DOB	H-50 MREM
CO-60	1173.20	2.620E-02	1.576E-03	19.41	2.24*	0.00

TOTALS:
ACTIVITY= 2.620E-02 MPC-HOUR= 19.41 %DOB= 2.24 H-50= 0.00

LOWER TORSO
ENERGY WINDOW 95.53 TO 2014.73

PK	IT	ENERGY	AREA	BKGND	FWHM	CHANNEL	LEFT	PW	CTS/SEC	%ERR	FIT
1	1	1179.65	448.	499.	65.04	657.75	650	17	7.46E-01	8.5	1.08E 00
2	1	1407.69	779.	500.	195.26	685.67	669	36	1.30E 00	5.4	7.04E 00

NUCLIDE	KEY ENERGY	ACTIVITY UCI /UNIT	1 SIGMA ERROR	MPC-HOUR	%DOB	H-50 MREM
CO-60	1173.20	6.982E-03	5.933E-04	1.03	3.17*	0.00

TOTALS:
ACTIVITY= 6.982E-02 MPC-HOUR= 1.03 %DOB= 3.17 H-50= 0.00

ALL ORGANS:
TOTAL ACTIVITY= 3.318E-02 AVG MPC-HOUR= 6.81 TOTAL H-50= 0.00

REVIEWED BY:

B150

SIGNATURE B150 [redacted] DATE

ELAPSED PROGRAM EXECUTION TIME = 35 SECONDS.

INTERNATIONAL NUTRONICS, INC.

August 24, 1982

TO: FILE

FROM: Bruce J. Thomas
Plant Manager, Dover Facility

SUBJECT: INTER-OFFICE MEMOS DATED 8/17/82
FROM E.T. O'SULLIVAN

With the resignation of [redacted] on August 16, 1982, I feel the Dover Facility has become understaffed as regards to professional technical people. Not only does this occurrence leave us with only one qualified Radiation Safety Officer, but leaves us with only two Licensed Operators for routine operations. I feel we are also running thin of people who have a good sound knowledge of the Radiation Business. I recommend the acquisition of another person of academic and professional qualities comparable to myself, but with less industry experience.

I am somewhat disturbed by the Memo requesting that I proceed to qualify [redacted] as Radiation Safety Officer (RSO). I in no way intend to degrade [redacted] character, but becoming an RSO takes considerable time and effort (years) as well as the proper academics. Regulatory Guide for Comment - "Qualifications for the Radiation Safety Officer in a Large Scale Non-Fuel-Cycle Radionuclide Program" Division 8 shows the formal education requirement minimum as requiring a B.S. in Health Physics or Radiological Health. I sincerely hope that I can bring [redacted] to the training required for job-related experienced, but I am perplexed as to how we can qualify him regarding his educational background.

When requested to visit the Palo Alto facility by James Parker, President, and Eugene O'Sullivan, Vice President, on August 16th, I informed them it was totally unwise on several counts. It left no RSO at the Dover Facility and left only three persons to man operations as well as having no one with the technical expertise to handle customer contacts. With the disposition of [redacted] to the Dover Facility, I feel somewhat more at ease in

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my absence, but still have reservations. [redacted] has not been an RSO at an operational facility. I am also disturbed by the Memo requesting an audit of the Dover Facility by [redacted] who I feel is unqualified to perform the audit requested. I will make it perfectly clear that I have the highest esteem for the [redacted] qualities as Corporate Radiation Safety Officer and Radiation Protection Board Chairman and would shine his boots regarding Radiation Safety, but I am perplexed as to his memos.

It is with reservations that I leave this Facility for several days in what I will term an understaffed (professionally) condition.

Bruce J. Thomas

Bruce J. Thomas

BJT/bt

cc: E.T. O'Sullivan

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Closeout of 10-6-82 + 10-?-82 inspection to INI

1. Survey roof

a. Radiation levels extensive

✓ Roof was surveyed with a μR meter at 8 foot interval over the entire ...

b. Wipe tests extensive

✓ The following areas were wiped: side wall, inside + outside of ... , roof surface around ozone vent

c. All penetrations ... test

✓ all penetrations were wiped

Review old exhaust systems flow meters cfm. Any filtration ... Include ... as well.

✓ There are two ozone stacks; the oldest is sealed off. The current ozone system ... it was operating at 800-1000 cfm. There was no filtration system on the ozone, heat or ... stacks.

3. Do extensive survey of front building. Look for contaminated tools, etc.

✓ Check all drains + commodes etc.

Extensive survey was performed at front building, including tools drains etc.

4. Review requirements of respiratory protection program with licensee.

✓ Reg Guide 8.15 Acceptable Programs for Respiratory Protection was reviewed with licensee.

5. Survey all cars

✓ Cars were surveyed with a μR meter. No significant findings. B151

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Rad concentrations over last 10 years.

✓ Licensee provided data from 6/1/72 to date.

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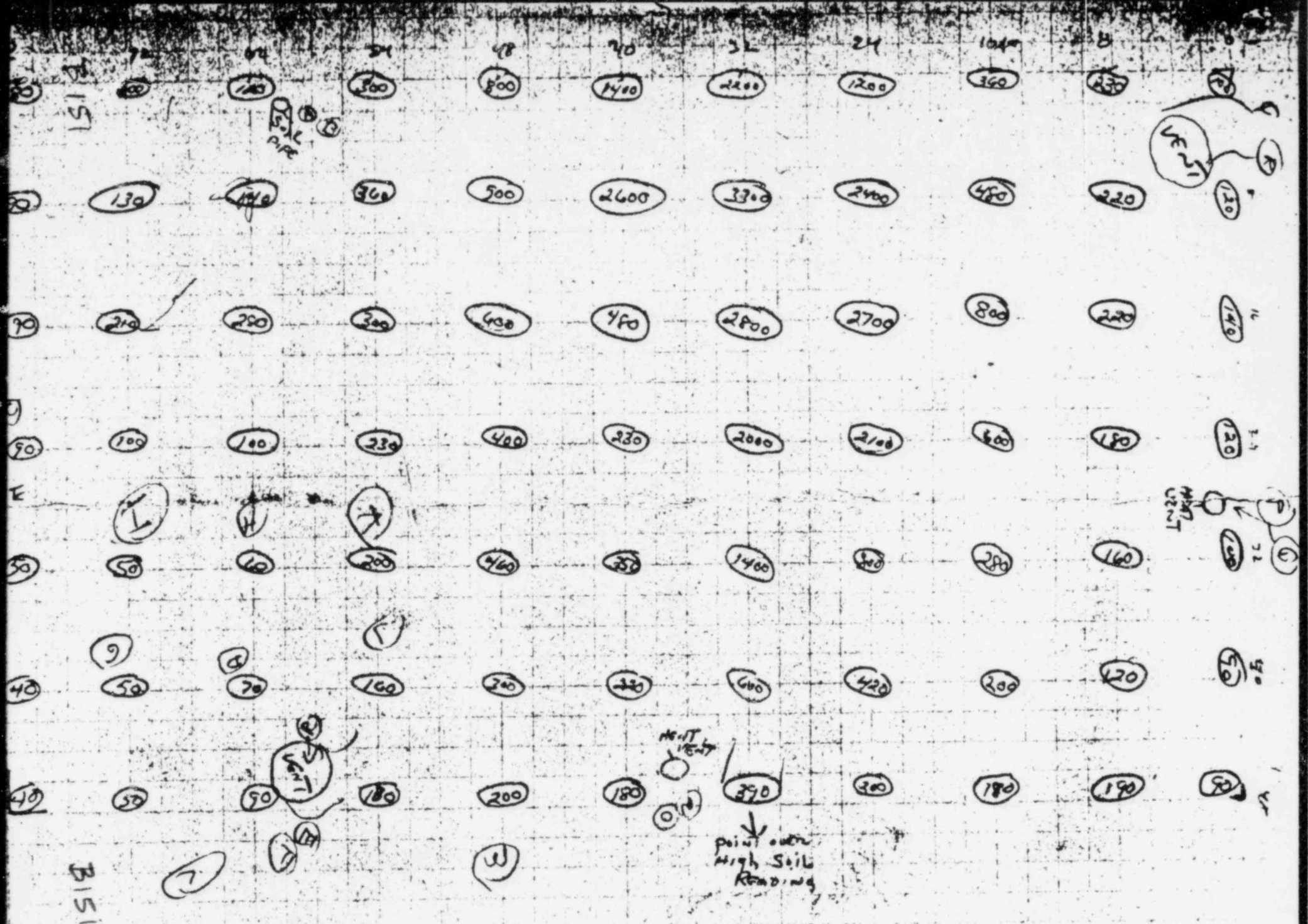

External radiation survey of roof (μR/hr.)
Letters indicate points where were taken.

N

Friday 10-7-83
(INL, Doom, NJ irradiator building

U.S. NUCLEAR REGULATORY COMMISSION

REGULATORY GUIDE

OFFICE OF STANDARDS DEVELOPMENT

October 1976

REGULATORY GUIDE 8.15

ACCEPTABLE PROGRAMS FOR RESPIRATORY PROTECTION

A. INTRODUCTION

Section 20.103, "Exposure of individuals to concentrations of radioactive materials in air in restricted areas," of 10 CFR Part 20, "Standards for Protection Against Radiation," permits licensees to make allowance for the use of respiratory protective equipment in estimating exposures of individuals to airborne radioactive materials provided the protective equipment is used as stipulated in this guide, which describes the elements of respiratory protection programs acceptable to the NRC staff.

B. DISCUSSION

This guide specifies elements of acceptable respiratory protection programs. More detailed advice, including technical needs and background information, may be found in NUREG-0041, "Manual of Respiratory Protection Against Airborne Radioactive Materials,"[a] sections of which are referenced and keyed to appropriate portions of this guide.

The NRC staff will use information in NUREG-0041 in assessing the adequacy of respiratory protection programs pursuant to the guidance provided herein (NUREG-0041, Section 3).

C. REGULATORY POSITION

Pursuant to §20.103 of 10 CFR Part 20, a licensee may make allowance for the use of respiratory protective equipment in estimating exposures of individuals to airborne radioactive materials if the equipment is used according to the following guidance:

1. A written policy statement on respirator usage is to be issued from a high management level. Strong management backing is considered essential to an adequate respiratory protection program. Techniques are to be provided and measures taken to ensure that management policy is carried out. Subjects to be covered by the policy statement include the use of practicable engineering controls instead of respirators; routine, nonroutine, and emergency situations; and periods of respirator use and relief from respirator use (NUREG-0041, Sections 2, 3.2, 12.1).

2. Respiratory protective equipment is to be selected to provide a protection factor greater than the multiple by which peak concentrations of radioactive materials are expected to exceed the values specified in Table I, Column 1 of Appendix B to 10 CFR Part 20. The equipment selected is to be used so that the average concentration of radioactive material in the air that is inhaled during any period of uninterrupted use in an airborne radioactivity area, on any day, by any individual using the equipment, will not exceed the values specified in Table I, Column 1 of Appendix B to 10 CFR Part 20. For the purposes of this guide, the concentration of radioactive material in the air that is inhaled when respirators are worn may be initially estimated by dividing the ambient concentration in air by the protection factor specified in Table 1. If a respirator user's intake of radioactive materials is later determined by other measurements to have been greater than that expected from initial estimates of radioactive materials in the air the user inhales, the greater quantity is to be used in evaluating exposures; if it is less than that initially estimated, the lesser quantity may be used in evaluating exposures (NUREG-0041, Sections 5, 6).

3. The licensee is to advise each respirator user that he may leave the area at any time for relief from respirator use in the event of equipment malfunction, physical or psychological distress, procedural or communication failure, significant deterioration of operating conditions, or any other condition that might require such relief (NUREG-0041, Section 2.2).

[a]NUREG-0041 is available from the National Technical Information Service, Springfield, Virginia 22161.

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4. The licensee is to maintain and implement a respiratory protection program that includes, as a minimum, the following items (NUREG-0041, Section 3.1.5):

a. Air sampling and other surveys sufficient to identify the hazard, to evaluate individual exposures, and to permit proper selection of respiratory protective equipment (NUREG-0041, Sections 4, 5, 11).

b. Written procedures to ensure proper selection, supervision, and training of personnel using such protective equipment (NUREG-0041, Sections 8, 12).

c. Written procedures to ensure the adequate individual fitting of respirators, as well as such procedures to ensure the testing of respiratory protective equipment for operability immediately prior to each use (NUREG-0041, Sections 7, 8, 12).

d. Written procedures for maintenance to ensure full effectiveness of respiratory protective equipment, including procedures for cleaning and disinfection, decontamination, inspection, repair, and storage (NUREG-0041, Sections 9, 10).

e. Written operational and administrative procedures for control, issuance, proper use, and return of respiratory protective equipment, including provisions for planned limitations on duration of respirator use for any individual as necessitated by operational conditions (NUREG-0041, Sections 2, 9, 10, 12).

f. Bioassays and other surveys, as appropriate, to evaluate individual exposures and to assess protection actually provided (NUREG-0041, Sections 4, 11).

g. Records sufficient to permit periodic evaluation of the adequacy of the respiratory protection program (NUREG-0041, Section 12).

h. Determination prior to assignment of any individual to tasks requiring the use of respirators that such an individual is physically able to perform the work and use the respiratory protective equipment. A physician is to determine what health and physical conditions are pertinent. The medical status of each respirator user is to be reviewed at least annually (NUREG-0041, Section 7.4).

5. The licensee is to use equipment approved under appropriate Approval Schedules in 30 CFR Part 11 of the U.S. Bureau of Mines/National Institute for Occupational Safety and Health and as set forth in Table 1.

5. Where no equipment of a particular type has been approved under the schedules in 30 CFR Part 11 or where there is no existing schedule for approval of certain equipment, such equipment is not to be used without specific authorization by the Commission. An application for such authorization is expected to include a demonstration by testing or on the basis of reliable test information that the material and performance characteristics of the equipment are capable of providing an acceptable degree of protection under anticipated conditions of use.

7. Unless otherwise authorized by the Commission, the licensee is not to assign protection factors in excess of those specified in Table 1 in selecting and using respiratory protective equipment.[a] The Commission may authorize a licensee to use higher protection factors on receipt of an application (a) describing the situation for which a need exists for higher protection factors and (b) demonstrating that the respiratory protective equipment will provide such higher protection factors under the proposed conditions of use.

8. As a minimum, the following additional technical items are to be observed:

a. Respirable air of approved quality and quantity is to be provided and oxygen deficiency is to be avoided (NUREG-0041, Sections 4.1.1, 5.1.2, 5.1.3, 5.2.4.1, 5.2.4.1.1, 5.2.4.1.4, 9.8).

b. There is to be a standby rescue person equipped with self-contained breathing apparatus and communications equipment when supplied-air suits are used (NUREG-0041, Section 5.1.3).

c. No credit is to be taken for use of sorbents against radioactive materials (NUREG-0041, Sections 5.2.2, 5.2.2.2, 5.2.3.5, 5.6.6).

d. Filter media in air-purifying respirators are to be of the high-efficiency type (NUREG-0041, Sections 5.2.2.1, 5.2.2.3, 5.2.3.2, 5.6.1).

e. Air-purifying respirators are not to be used in oxygen-deficient atmospheres (NUREG-0041, Sections 4.1.1, 4.2.3, 5.2.3.1).

f. Adequate skin protection is to be provided (NUREG-0041, Sections 1.2, 5.2.3.2).

g. Air-purifying respirators are not to be used in atmospheres immediately hazardous to life or health (NUREG-0041, Section 5.2.3.4).

---

[a] The factors listed are intended as guides for selection and use of respirators in protection against radioactive materials. Additional precautions must be taken as necessary to protect against concurrent hazards other than radiation.

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h. Canisters and cartridges are not to be used beyond service-life limitations (NUREG-0041, Section 5.2.3.5).

i. Facelets are not to be used (NUREG-0041, Section 5.2.3.6).

j. Oxygen and breathing air are not to be used in the same apparatus (NUREG-0041, Sections 5.2.4.1, 5.2.4.1.4, 5.2.4.2).

k. Proper fittings are to be used with supplied-air equipment (NUREG-0041, Sections 5.2.4.1.1, 5.2.4.1.2, 5.2.4.1.3).

l. Equipment is to be used within limitations for type and mode of use (NUREG-0041, Sections 5.2.3, 5.2.4).

m. Only specified equipment is to be used as emergency devices (NUREG-0041, Sections 5.2.4.1.4, 5.2.4.2.1, 5.2.4.2.4, 5.5).

n. Appropriate equipment with proper visual, communication, and other special capabilities is to be provided (NUREG-0041, Sections 7.1, 13).

D. IMPLEMENTATION

The purpose of this section is to provide information to applicants and licensees regarding the NRC staff's plans for using this regulatory guide.

This guide reflects current NRC staff practice. Therefore, except in those cases in which the licensee or applicant proposes an acceptable alternative method for complying with specified portions of the Commission's regulations, the methods described herein are being and will continue to be used in the evaluation of the respiratory protection programs of licensees who are subject to the requirements of §20.103 of 10 CFR Part 20 until this guide is revised as a result of suggestions from the public or additional staff review.

TABLE 1
PROTECTION FACTORS FOR RESPIRATORS[a]

DESCRIPTION[b]	MODES[c]	PROTECTION FACTORS[d] PARTICULATES ONLY	PROTECTION FACTORS[d] PARTICULATES, GASES & VAPORS[e]	SELECTION OF TESTED & CERTIFIED EQUIPMENT BUREAU OF MINES/NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH APPROVALS
I. AIR-PURIFYING RESPIRATORS				
Facepiece, half-mask[f]	NP	10		30 CFR Part 11 Subpart K
Facepiece, full	NP	50		
Facepiece, half-mask, full, or hood	PP	1000		
II. ATMOSPHERE-SUPPLYING RESPIRATORS				
1. Air-line respirator				
Facepiece, half-mask	CF		1000	30 CFR Part 11 Subpart J
Facepiece, half-mask	D		10	
Facepiece, full	CF		2000	
Facepiece, full	D		50	
Facepiece, full	PD		2000	
Hood	CF		2000[g]	
Suit	CF		h	i
2. Self-contained breathing apparatus (SCBA)				
Facepiece, full	D		50	30 CFR Part 11 Subpart H
Facepiece, full	PD		10,000[j]	
Facepiece, full	R		50	
III. COMBINATION RESPIRATOR				
Any combination of air-purifying and atmosphere-supplying respirators		Protection factor for type and mode of operation as listed above		30 CFR Part 11 § 11.63(b)

---

[a] For use in the selection of respiratory protective devices to be used where the contaminant has been identified and the concentration (or possible concentration) is known.

[b] Only for shaven faces and where nothing interferes with the seal of tight-fitting facepieces against the skin. (Hoods and suits are excepted.)

[c] The mode symbols are defined as follows:

- CF = continuous flow
- D = demand
- NP = negative pressure (i.e., negative phase during inhalation)
- PD = pressure demand (i.e., always positive pressure)
- PP = positive pressure
- R = demand, recirculating (closed circuit)

[d] 1. The protection factor is a measure of the degree of protection afforded by a respirator, defined as the ratio of the concentration of airborne radioactive material outside the respiratory protective equipment to that inside the equipment (usually inside the facepiece) under conditions of use. It is applied to the ambient airborne concentration to estimate the concentration inhaled by the wearer according to the following formula:

$$\text{Concentration Inhaled} = \frac{\text{Ambient Airborne Concentration}}{\text{Protection Factor}}$$

2. The protection factors apply:

(a) Only for trained individuals wearing properly fitted respirators used and maintained under supervision in a well-planned respiratory protective program.

(b) For air-purifying respirators only when high efficiency particulate filters [above 99.97% removal efficiency by thermally generated 0.3 μm dioctyl phthalate (DOP) test] are used in atmospheres not deficient in oxygen and not containing radioactive gas or vapor respiratory hazards.

(c) For atmosphere-supplying respirators only when supplied with adequate respirable air.

[e] Excluding radioactive contaminants that present an absorption or submersion hazard. For tritium oxide, approximately one half of the intake occurs by absorption through the skin so that an overall protection factor of less than 2 is appropriate when atmosphere-supplying respirators are used to protect against tritium oxide; for example:

If the protection factor for a device is:	PF overall for tritium oxide is:
10	1.82
100	1.98
1,000	1.99

(Continued)

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(Continued)

Air-purifying respirators are not suitable for protection against tritium oxide. See also footnote g concerning supplied-air suits.

[f]Under-chin type only. This type of respirator is not satisfactory for use where it might be possible (e.g., if an accident or emergency were to occur) for the ambient airborne concentration to reach instantaneous values greater than 10 times the pertinent values in Table I, Column 1 of Appendix B to 10 CFR Part 20, "Standards for Protection Against Radiation." This type of respirator is not suitable for protection against plutonium or other high-toxicity materials. The mask is to be tested for fit with irritant smoke, prior to use, each time it is donned.

[g]The design of the supplied-air hood or helmet (with a minimum flow of 6 cfm of air) may determine its overall efficiency and the protection it provides. For example, some hoods aspirate contaminated air into the breathing zone when the wearer works with hands-over-head. Such aspiration may be overcome if a short cape-like extention to the hood is worn under a coat or coveralls. Other limitations specified by the approval agency must be considered before using a hood in certain types of atmospheres (see footnote h). Manufacturers' recommended pressure settings for the air supply cannot always be relied on to ensure a minimum 6 cfm air flow. Equipment must be operated in a manner that ensures proper flow rates are maintained.

[h]Appropriate protection factors must be determined, taking into account the design of the suit and its permeability to the contaminant under conditions of use.

[i]No approval schedules are currently available for this equipment. Equipment is to be evaluated by testing or on the basis of reliable test information.

[j]This type of respirator may provide greater protection and be used as an emergency device in unknown concentrations for protection against inhalation hazards. External radiation hazards and other limitations to permitted exposure such as skin absorption must be taken into account in such circumstances.

Note 1: Protection factors for respirators, as may be approved by the U.S. Bureau of Mines/National Institute for Occupational Safety and Health (NIOSH) according to applicable approvals for respirators to protect against airborne radionuclides, may be used to the extent that they do not exceed the protection factors listed in this table. The protection factors listed in this table may not be appropriate to circumstances where chemical or other respiratory hazards exist in addition to radioactive hazards. The selection and use of respirators for such circumstances should take into account applicable approvals of the U.S. Bureau of Mines/NIOSH.

Note 2: Radioactive contaminants for which the concentration values in Table I of Appendix B to 10 CFR Part 20 are based on internal dose due to inhalation may, in addition, present external exposure hazards at higher concentrations. Under such circumstances, limitations on occupancy may have to be governed by external dose limits.

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Fire Control

There are four propane tanks on the [illegible] of the [illegible] building. On the other side of the building there are three [illegible] [illegible] heating oil tanks with a pumping station. The propane tanks are about twenty feet from the building and the oil tanks are about fifty feet. The licensee stated that in the event of fire, the fire company [illegible] [illegible] the building. This was discussed with Dr. John [illegible] and [illegible].

Development Officer Don Costanzo)

[illegible] was not an external hazard [illegible] radiation [illegible] the [illegible] [illegible] there is no [illegible] [illegible] out from the building & that measurements were taken down to four feet depths and the activity [illegible]

[illegible] INI stated that they would not be able to [illegible] [illegible]

The [illegible] was notified by [illegible] of the current situation.

[illegible] [illegible] to [illegible] people for [illegible] training. [illegible] stressed the importance of meeting the October [illegible], [illegible] date for waste shipment. INI stated a [illegible] of the floor of the [illegible] building showed [illegible] samples [illegible] <200 dpm [illegible] [illegible] than 200 dpm.

Licensee believed that they did not violate 10CFR 20.403 notification requirements.

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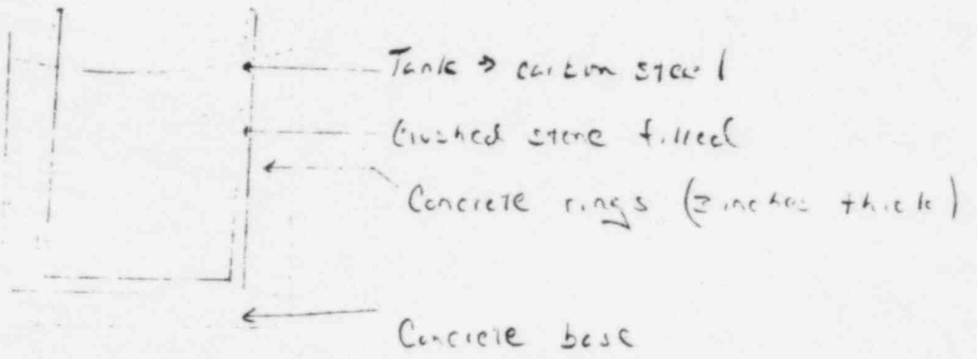
Jim Welsh (RSO) submitted a plan to for preparing waste for shipment to Barnwell, S.C. A copy is enclosed in these notes.

Pool system in old irradiator.

(53" diameter) (16 ft depth) (1500 gallons - total volume)

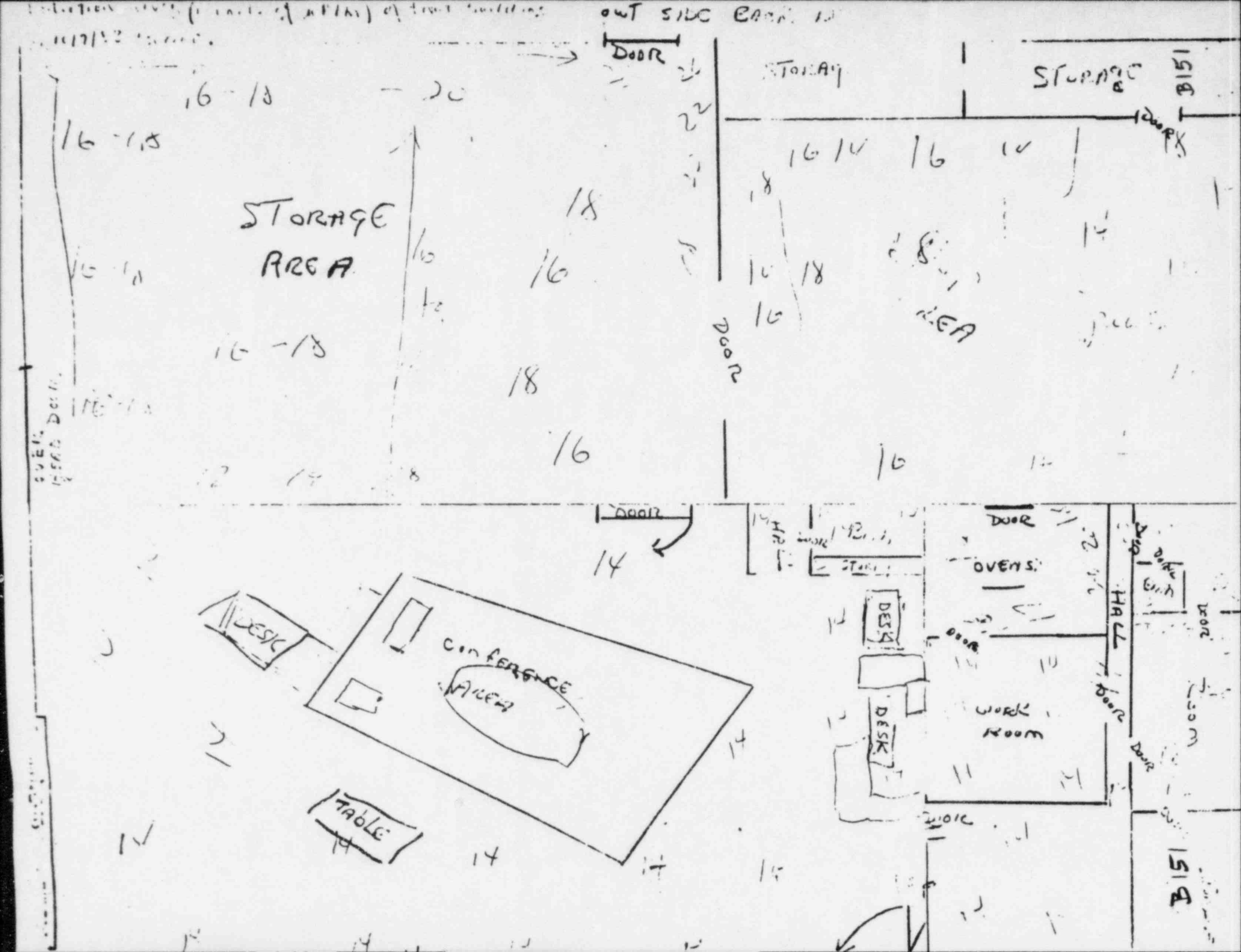


The licensee stated that the water spill was a magnitude of a factor of 1000 less than the release descheduling dust release. INI has used a polymer flocculating agent "Perkall 720" to get all material in the pool settled to the bottom of the pool. While under radiation exposure, the material will fall and rise to the top. There are 56,000 to 60,000 curies of ^{60}Co still in the pool.

[redacted]

B. Thomas mentioned that a representative from the Letterman Arsenal was given soil sample dirt before INI.

The ozone vent was not attached to the heating elements. The heaters have their own exhaust ports. The old ozone system operated at 800-1000 cfm B151 and was continuously in the "on" position. There was no periodic [illegible] on the ozone B151


STORAGE AREA
DOOR
STORAGE
B151
DOOR
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OVENS
DESK
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WORK ROOM
HALL
DOOR
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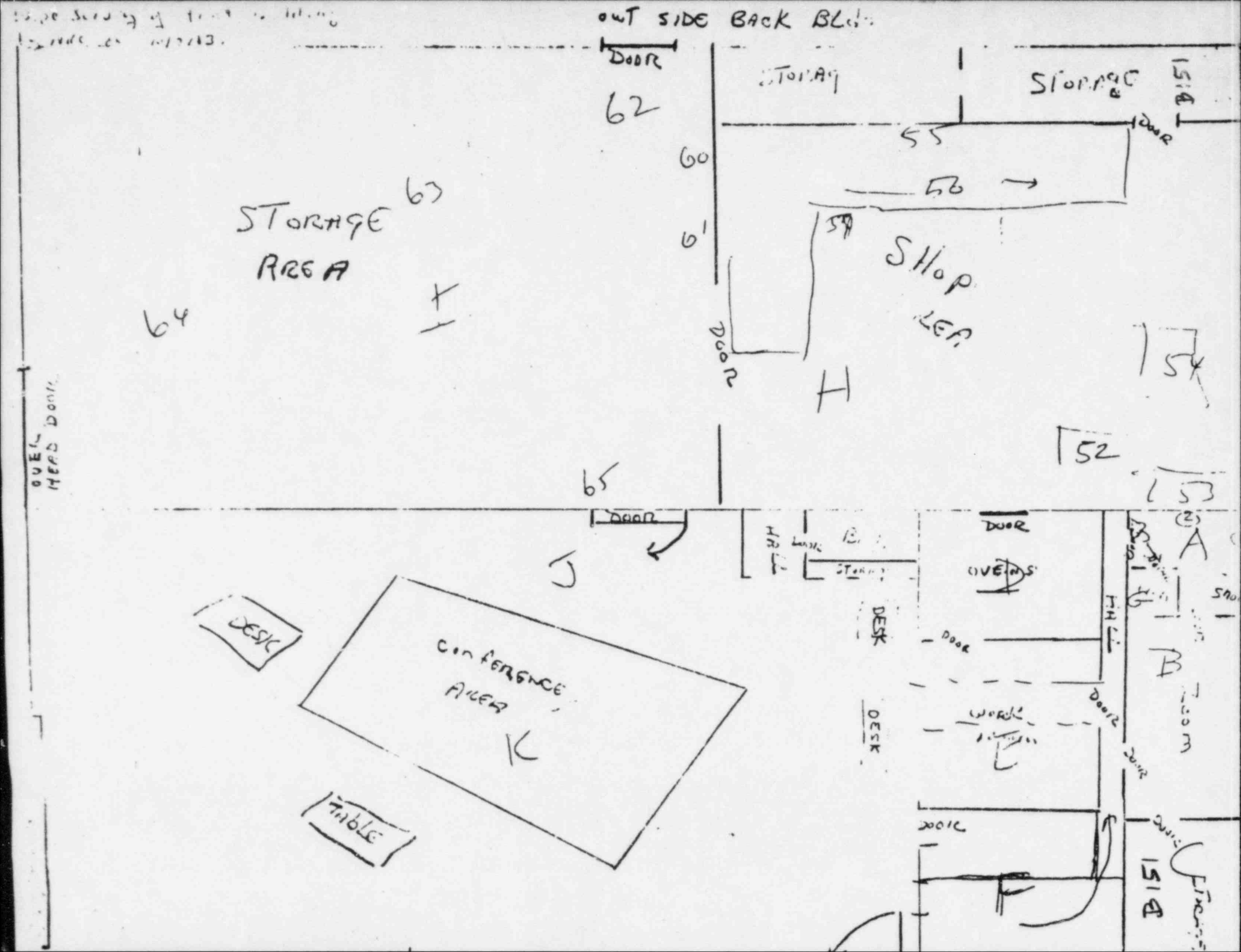
DOOR
DESK
CONFERENCE AREA
TABLE
B151


OUT SIDE BACK BLDG
DOOR
62
STORAGE
STORAGE
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DOOR
60
56
59
61
STORAGE
AREA
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SHOP
AREA
64
DOOR
H
151
52
OVER HEAD DOOR
65
DOOR
J
DOOR
OVENS
A
DESK
CONFERENCE
AREA
K
DESK
DOOR
B
DOOR
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DOOR
DOOR
TABLE
DOOR
151A

Discussion with B. Thomas on Th. Oct. 6, 1983

Licensees initial response to the NRC's call

As of Sept. 21, 1983 irradiations were discontinued.
As of Sept. 23, 1983 AECL took out ^{60}Co in new irradiator. Wipe test results: all the shipping tests were negative.

In the next two weeks: continued descheduling of cell, more smear surveys of floor areas + horizontal and vertical cell areas. Specific details on the irradiator descheduling plan may not be included since we do not know what problems we (AECL) may encounter until we reach that point. B. Thomas believes that the water lost from the 10 Dec 82 spill was 'soaked' up in the irradiator shielding.

2. Smear surveys of IN IT removals

There is a possibility of setting a portable rig and drill their own holes closer than four feet to the building wall and go down twelve feet. Then put down a core tube to continue to drill samples. (As of 1/83, the ground water table was 11 feet)
The environmental samples may be sent to Teledyne Environmental

3. Bioassay Problem
INI plans to send employees to Hydronuclear Systems, Medford, N.J. Get employee respiratory training and qualify the respirators.
* The respiratory training provided may be in the "grey" area in order to get the waste out of the building.

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6 No changes in water filtration system will be made.

7. No attempt to put a system on to release effluents to the outside. Licensee plans to keep the ventilation in the building to a closed system. (or if people are working may put a system on inside building to clean air etc.) The cell and return back (within building).

8. OK

9 OK

10. OK

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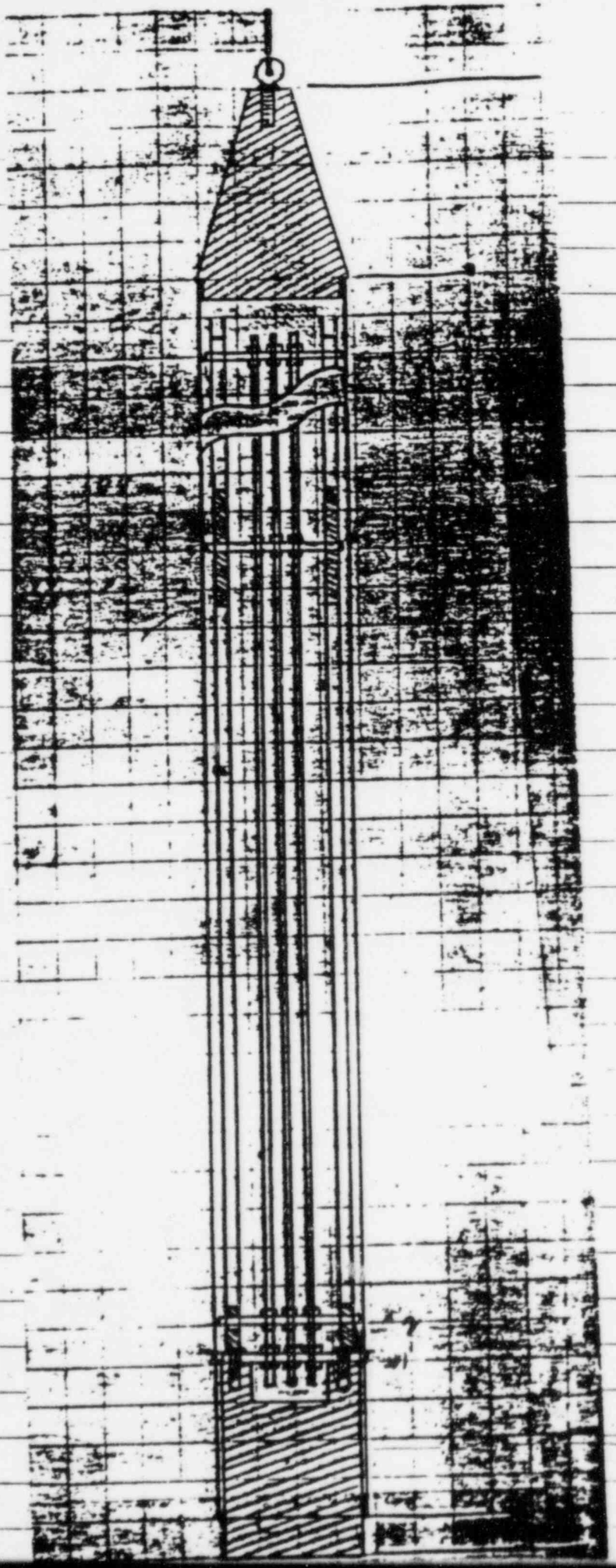
Smith Chapel

Scale: 0.25" = 1.0"

Rise of Base = 4" Vin 55

#3



Rock ~ 6 ft. tall
+ 2.5 inches in
diameter

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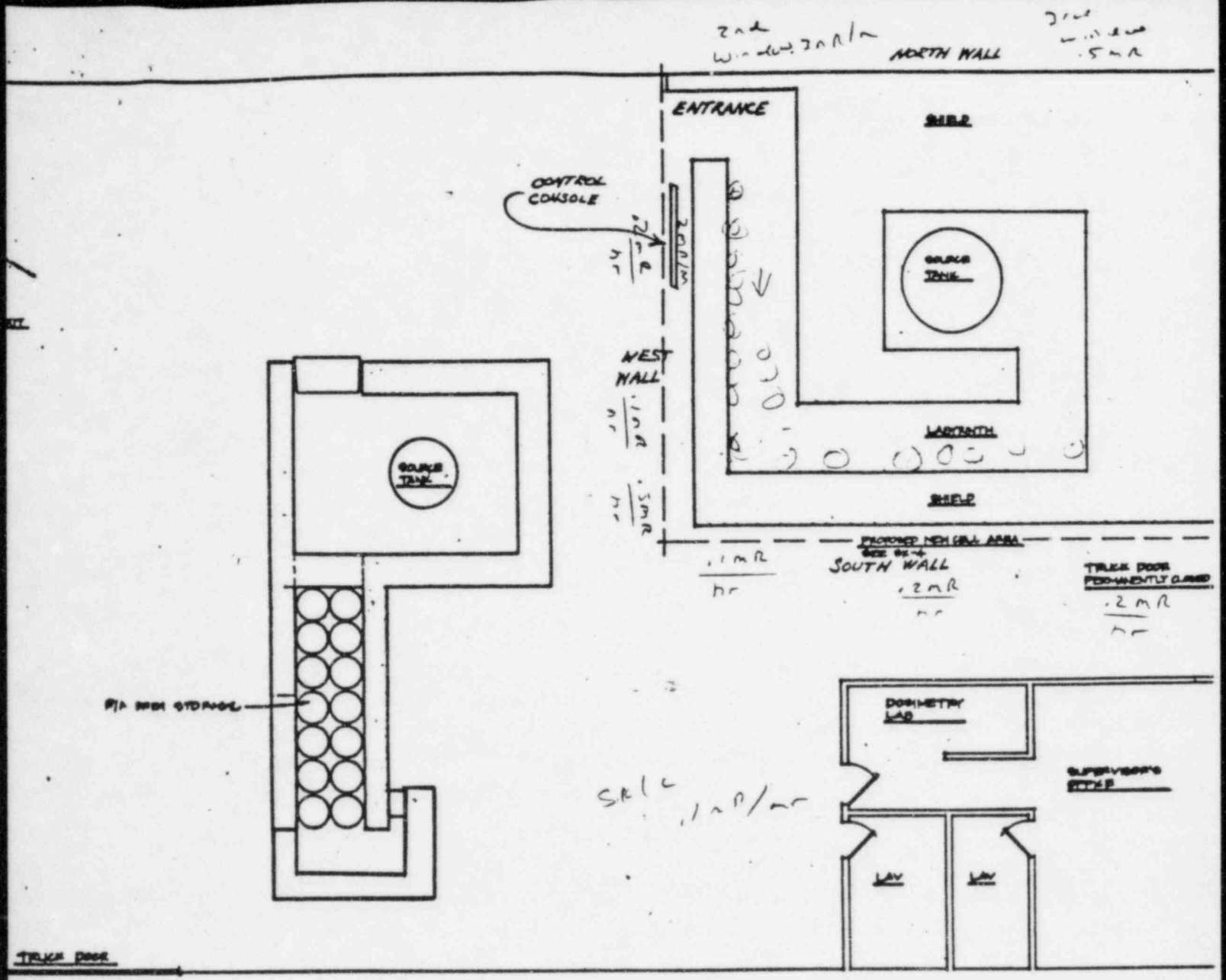
Concrete
brick
Wall MT

B152



DATE	SAMPLE #	time	COUNTS TOTAL	DKg	NET TOTAL	CPM	EFF	DPM	REMARKS
									B152
	B152								

Date of screening: [redacted]

When will they be back? 10/21/83

Friday first went into cell. Eisen A area. Respirators were used.

Took out six drums

-Took down 3 courses of brick along vertical wall at A

" " 2 " " " Above point A

Mon.

barrel taken to E short shield area cleanup, cemented tops of barrel ~~and~~ taken out of short shield, wiped ~~ed~~ them got done reading ~~and~~ at surface + two meters. Placed into new cell area as per plan in 10/05/83 correspondence.

~~Once they were in the~~

(The last 5-6 barrels on Mon were cemented in the new cell area)

~~Tue~~ Mon 2pm Welsh noted airborne was generated. Dust came from in between the block (Air pump ~~you~~ Welsh ordered did not come in)

Used a hair dryer and blew up a 13 gallon plastic bag.

Paper filter was put on the input side of the hair dryer. B152

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4:20 dpm activity on air filters taken off the hairdryer

Also [illegible] panel wipes were taken

[redacted]

10 CFR 2.790 INFORMATION

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Tuesday

Back-ground
5 min count 2291
Aug. 458

		DPM
1.	$637-\frac{(179)}{0.201}$	= 890.5
2.	796-(338)	= 1681.6
3.	575-(117)	= 582.1
4.	667-(209)	= 1039.8
5.	657-(199)	= 990.1
6.	772-(314)	= 1562.2
7.	888-(436)	= 2169.2
8.	1098-(640)	= 3184.1
9.	783-(325)	= 1616.9
10.	814-(356)	= 1771.1
11.	1022-(564)	= 2805.9
12.	992-(534)	= 2656.7
13.	847-(389)	= 1935.3
14.	1112-(654)	= 3253.7
15.	891-(433)	= 2154.2
16.	825-(367)	= 1825.9
17.	691-(233)	= 1159.2
18.	1024-(566)	= 2 B159
19.	1024-(398) B152 B54	= 1980.1
20.	1007-(549)	= 2731.3
21.	1513-(1055)	= 5248.6
22.	822-(364)	= 1810.9
23.	835-(377)	= 1875.15
24.	792-(334)	= 1661.7
25.	715-(257)	= 1278.6
26.	860-(402)	= 2000
27.	843-(385)	= 1915.4
28.	884-(426)	= 2119.4
29.	892-(434)	= 2159.2
30.	905-(447)	= 2223.9

* 10/24/83 telecon between J. Glenn (WRC) and B. Thomas (INL) stated that wipes were taken wet and over an area of one sq. ft. Values should be divide by nine based on assumption of one sq. ft

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Friday
10/21/83

On Friday 10/14/83 INI began removing the drums from the old irradiator area. Six barrels of waste that were stored in the old decontamination area were removed from the old [illegible] area to the new cell area. Three concourses of bricks were removed from Section B of the old labyrinth (See diagram). A fork lift was used to pick up the barrels (two 55 gallon drums) and they were taken to Section E (see diagram). Then two concourses of bricks were taken from Section B (see diagram) and the fork lift took out four 55 gallon drums. They were also moved to Section E. Section E is a "short shield" area.

The drums were cleaned up and the tops cemented. The drums were then taken out of the short shield area, weighed and radiation readings were taken (surface + two meters). The drums were then moved into the new cell area as per the procedure in the 10/05/83 correspondence from Jim Welsh to D. J. Glenn. There was no airborne monitoring. The qualified respirator user [redacted] used to operate. Section A is empty of barrels but some miscellaneous PVC pipe still. Section B is empty of barrels except for a plastic bucket reading 5 R/hr which was moved on Monday 10/17/83 from Section D.

On Monday 10/17/83, INI removed the twelve barrels of waste from the old cell area. Three to four layers of bricks were removed to get the barrels out. Section C had a lot tool box in the area (assumed to be contaminated, and left in area) Section D the lead bucket (lead # 2 on diagram) was reading about 10 R/hr. There was also a plastic bucket with filter medium which read about 5 R/hr. Section C is empty of barrels except for miscellaneous junk (tool box, wire, gloves, etc). Section D is empty of barrels, except for the lead B152 bucket which has 10 R/hr of unknown material.

Friday 10-21-82

Update of waste shipment

on Monday Oct. 17, 1982 (12 drums)

Move 18 barrels from old contaminated area → now stored in new cell area

Move started on friday (6 drums) 10/14/82

[redacted]

Dose of personnel from move on Monday 10/17/82

[redacted]

Dose on the friday 10/14/82

Generated some air borne behind curtain [redacted]

Used respirators before entering and in the + on top of the cell.

Curtain was open → airborne activity got into plant area

There was a concentration (3.42×10^{-10} μc/ml) in the plant. This was determined at the end of the day on Monday

Finding open A section

B152

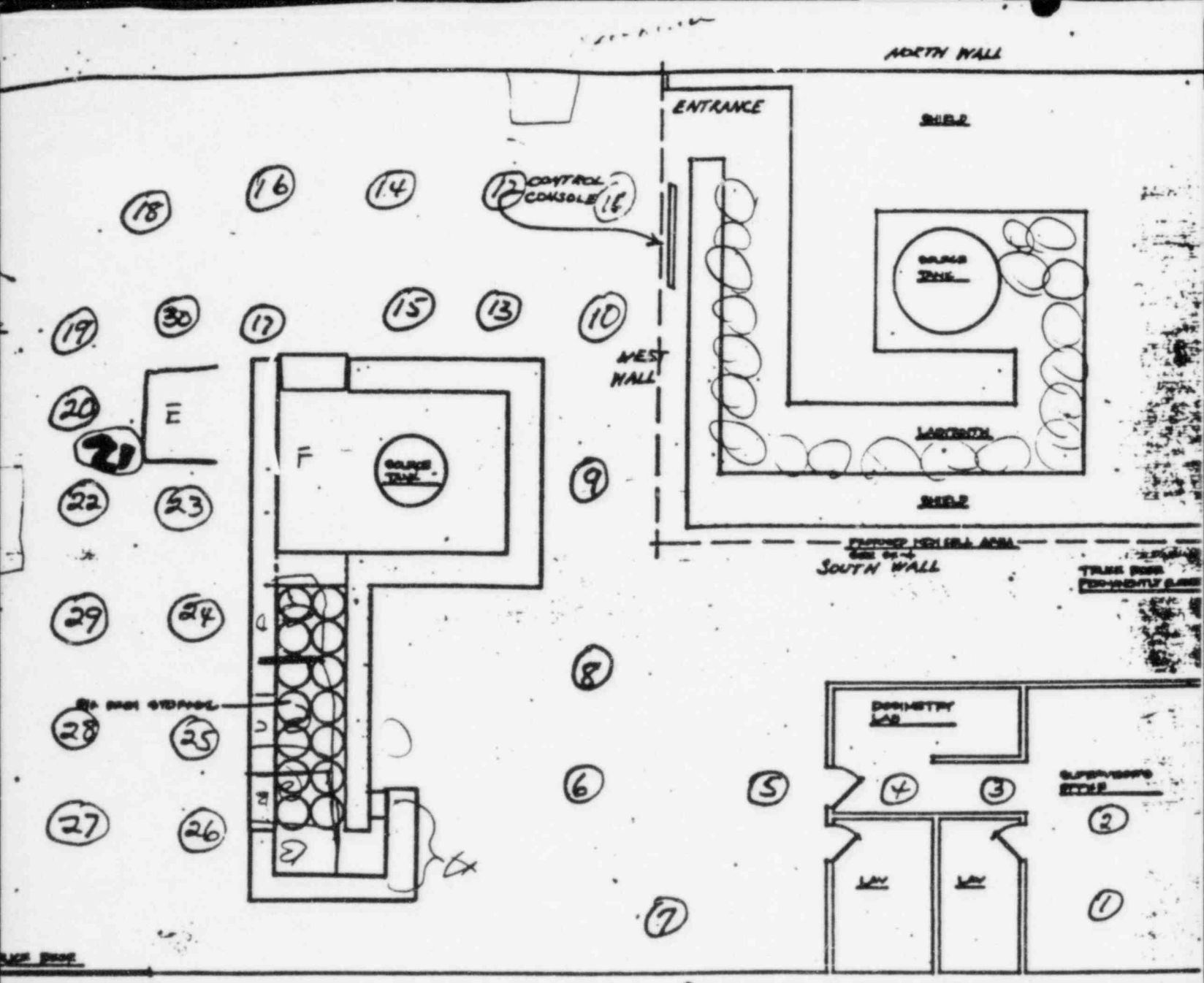
~~B4~~

B152

Barrels

	#	WT	55	80	TOP	BOT	SIDE	Ci	^ 800	v 200	^ 1000	SPA	
	1	952	✓		600	(1.1R)	1R	0.133	✓				
✓	(2)	883	✓		700	300	750	0.133	✓				
C✓	(3)	1250 / 1150	✓		400	(400)	250	0.053		-250-500	✓		
OK	(4)	765	✓		100	450	500	0.053		✓			
✓	(5)	1400 / 1600		✓	400	150	700	0.180	Vol.		✓		
✓	(6)	850			300	400	550	0.109	✓				
CNSI	7.	1200	✓		550	(1.2R)	900	(12.15)			✓	0.334 mCi/gm	
OK✓	(8.)	950	✓		325	110	500	0.106	✓				
CNSI	9.	1200	✓		900	(1.1R)	950	(13.4)			✓		
CNSI ✓	(10.)	900	✓		50	150	125	(2.23)	✓				
CNSI ✓	(11)	938	✓		30	125	95	(1.34)	✓	LSA			
CNSI	12	650	✓		500	(1.25R)	550	8.9		✓			
CNSI	13	818	✓		550	(1.25R)	425	8.9	✓				
CNSI	14.	576	✓		900	(1.125)	500	6.69		✓			
CNSI	15.	797	✓		375	900	400	(4.46)		✓			
CNSI	16.	756	✓		525	(1.4R)	700	9.37		✓			
OK	(17.)	365	✓		225	450	850	0.133		✓			
NO	18.	1400		✓	800	600	(1.2R)	0.186			✓		INI
OK	(19)	120			3	8	<10	0.010					
OK	(20)	43			10	30	100	0.010					B152
OK B152	(21)	381			10	4	35	0.010					

The serials circled are going to shipping on 10/27/83 LSA.
The remaining barrels will go to Dr. B120 CAST (do not know when they are going, INI has on distance [illegible])



DATE 10/18/83 EFF 20.1% by JOE LARRY.

DATE	SAMPLE #	time	COUNTS TOTAL	DKg	NET TOTAL	Cpm	EFF	Dpm	REMARKS
	B152								B152

may be leaking 141 doesn't know

#5

Source consists of ... believed overweight

[.020" thickness of 1/2 diameter tube Source tubes ...]

1/2 in Turing tube rack

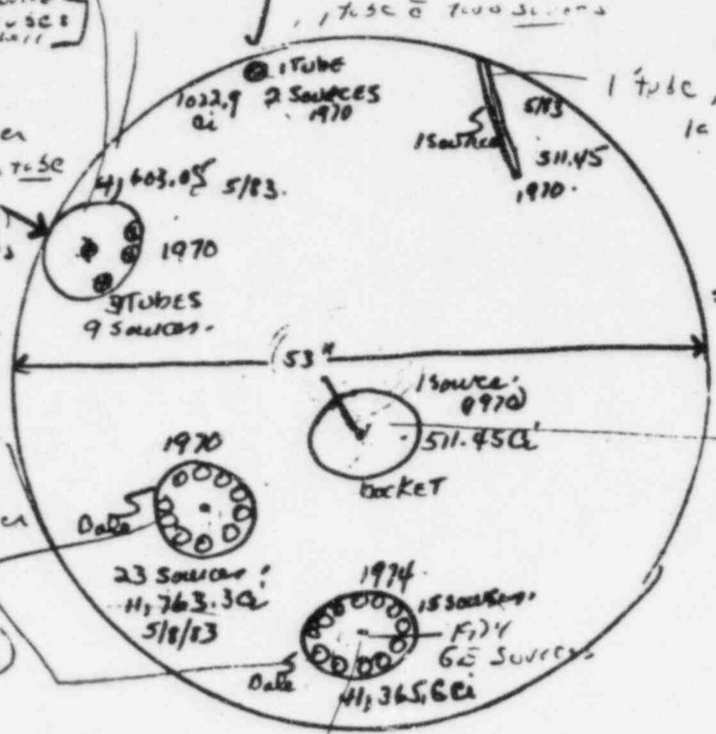
Source rack
- 3 1/2 inches in diameter
- 3 source pencils in each tube

tube is ~5 feet (60 ...)
pencils are 18 inches long
Source tube are bent and pencil cannot be removed at present time. In 1974 the entire source rack was dropped several times

Source Sets
8 - 10 inches diameter

(23 x 511.45 = 11,763.3 ci) present calculation

1 tube with two sources



1 Source in Cork

1 tube, 1 source laying against wall

23 @ 2650 = 60,950

3 1/2 / 23 / 9

= one Source located (511.45) in S.F. Cork = 37 TOTAL

broken source still leaking believed to be 1970 vintage source

Fifty 60 Sources

15 - 50 sources Total 41,365 Ci

In a screw thread encapsulation (NOT SEALED) original 1974 135,090.

1970 Sources in Pool.
36. @ 5/83 original 2650.

36 @ 511.45 Ci = 18,412.2 Ci.

1974 Sources original 9,006 Ci
15 @ 5/83 of 2757.63

15 @ 2757 = 41364.56.

The bottom of the pool has silt. possibly 3 inches silt is getting [illegible] as source leak. The wall of the tank are flaking and rusting. The walls are contaminated.

TOTAL in pool 18,412.2 1970.
41,364.56.

59,776.76. TOTAL

2519

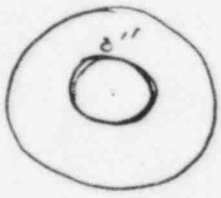
Section F there is an old pump assembly which is contaminated. empty barrel and miscellaneous materials.

the Pool itself: (see diagram)

B152

B152

= 6(CEW)



MW @ counters x 0.0462 = Ci Cs137

- Chem gave a factor to use for the drums check
The were not sure if all the drums had ~~[illegible]~~ pb
in

B152

B152

IXI Drums.

CAVITY 10" x 24"

Volume = $\pi r^2 h$ = 1884 in³

ft³ = 1884 / 1728 = [illegible] ft³

ft³ to cm³ = [illegible] = 3[illegible] cm³

ρ resin (w) = 0.35 gm/cm³

Weight = [illegible] = [illegible] kgm

\# 1) 133 / 10,907 = 0.0122 [illegible]/gm

\# 2) 133 [illegible] = 0.0122 [illegible]

\# 3) [illegible] / 10,907 = 0.005

\# 4) 58 / 10,907 = 0.005 " "

\# 5) [illegible] / 10,907 = 0.00[illegible] "

\# 6) 106 / 10,907 = 0.0096 " "

\# 8) = 0.0096 " "

17) 133 / 10,907 = 0.0122 " "

18) 186 / 10,907 = 0.0177 " "

B152

CNSI

1 lbs. = 454 gm.

WT. FILTER 30 lbs.

30 X 454. = 13,620 gm

#7) 17.95 / 13,620 = 0.131 mCi / gm.

#9) 13.4 / 13,620 = 0.98 mCi / gm OK.

+ #10) 2.23 / 13,620 = 0.164 mCi / gm. OK. to go LSA.

#11) 0.34 / 13,620 = 0.098 mCi / gm OK to go LSA

#12) 8.9 / 13,620 = 0.653 mCi / gm.

#13) 8.9 / 13,620 = 0.653 mCi / gm

#14) 6.69 / 13,620 = 0.49 mCi / gm

#15) 4.46 / 13,620 = 0.327 mCi / gm.

#16) 9.37 / 13,620 = 0.69 mCi / gm.

Ci = 0.4462 x Mr. Schneider (Chem Nuclear)

B152

B152

Category III >75 ft³ ACT > 1 curie

Price out
11-55 = 82.5 ft³
1-83 = 11.5 ft³
94.0 ft³ @ 13.28 ft³ = $1248.32

Rad surcharge
501 - [R] 4/55 1/83 = 41 ft³ @ 3.00 ... 539.[illegible]
251-500 2/55 = 15 x 10.00 ... 150.[illegible]
101-250 2/55 = 15 x 8.00 ... 120.00
51-100 2/55 = 7.5 x 5.00 ... 37.50
0-50 2/55 = No charge ... -0-
2847.[illegible]

Pallet Vol = 58 ft³ x 13.28 ... [illegible]

weight ...
- 1000 to 5000 (2) 250. ea ... $500.[illegible]

Curie Surcharge 1-5 Ci ... 500.00

[illegible]

A) Perpetuity fund Escrow 2.25/ft³. ... 211.50

B) S.C L.L RAW Disposal Tx 4.00/ft³ ... 376.00

C) 2.4% Barnwell Co. [illegible] Tx ... [illegible]

B152 B152 3[illegible]

IWI

$Dr_{mr} = \frac{6\,CEN}{r^2} = \frac{6\,N\,25}{(6.3)^2}$ (20)

25 - 39.7 ... 7.73 ...

52.9 × 2 = 106 mr, $\frac{106}{20} = 5.3$

25 mr $\frac{25 - 39.69}{15}$ ... [illegible] ... /25

10 mr $\frac{10 - 39.69}{15} = \frac{39.69}{15} = 26.46 \times 2 = \frac{52.92}{10} = 5.3$

∴ Formulas for Ao in drums with 6" concrete with air mr reading at 2 meters.

5.3 × mr/hr at 2 meters = Ao per drum

(2½) 10.6 × mr/hr at 2 meters = Ao

B 152

To go. Truck

#2 #19
#3 #20
#4 #21
#5
#6
#8
#10
#11
#17

XIX

Top - 3mm.
bot = 8mm
WT - 120 lbs.
Surface All < 10mm.

L.S.A.

XX WT 43 lbs.

Top 10 mm
bot 30 mm.
Sides = 100 - 30 - 20 - 25

LSA.

XXI 387 lbs.
Top - 10 mm.
Bott. - 4 mm.
Sides - 20 - 35 - 15 - 85
Center - Bkg.

[B152]

B152

USA

XV

WT 797

Top 375

bot 900

2 meters 7 - 5.5 - 10 · Type B

Surface 190 - 50 - 100 - 400 · N.O.S.

Ci 0.4462 × 10 = 4.46 ·

SPA $\frac{4.46}{13,620}$ = 0.327 mCi/gm ·

XVI WT 756

Top 825

bot (1.4R)

2 meters 20 - 25 - 15

Surf. 625 - 700 - 275 NOS

Ci 0.4462 × 21 = 9.37 ·

SPA $\frac{9.37}{13,620}$ = 0.69 mCi/gm ·

XVII WT 365 ·

Top 225

bot 450 ·

OK

Surf 800 - 850 - 750 - 800 ·

2 meters 15 - 15 - 25 - 20 ·

SPA = $\frac{133}{10,907}$ = 0.0122 mCi/gm

∴ A0 = 5.3 × 25 = 133 mCi · LSA

XVIII WT 1,600 ·

Top 800 ·

bot. 600

Surf 950 - (1.2R) - 1.0R - 600 · [B152]

B152 2 meters 26/35/35/25

Ci 53 × 35 = 186 mCi ·

(55)

XI WT 938.

Top 30.

bot 125

OK. Surface 65 95 60 50.

Meters 1 - 2 - 3.

Curie 0.4462 x 3. = 1.34 Ci

SpA 1.34 / 13,620 = 0.098 mCi/gm LSA.

XII (55)

wt 650.

Top 520.

bot 1.25R.

Surface. 550 200 350 200.

Meters 20 - 10.

Curie 0.4462 x 20. = 8.9 Ci.

SpA 8.9 / 13,620 = 0.653 mCi/gm. NOS.

XIII WT 818.

Top. 550.

bot 1.25R.

Surface 200 - 400 - 200 - 485 NOS.

Meters 20 - 20 - 15

Curie 0.4462 x 20 = 8.9 Ci

SPA 8.9 / 13,620 = 0.653 mCi/gm

XIV WT 576. [B152]

Top. ~~600~~ 1R

bot 1.25R. NOS.

B152 Surface 450 - 500 - 200 - 200.

Meters 21-9.

Oct 13/14/62.

Descheduled A.

STACKED Moving drums. To NEW CELL

Drum # I (55) CEMENT Top. - CLEANED.

WT - 952 Lbs.

SURFACE - Top 600 - Bottom (1.1 R.) - SIDES 600 - 700 - 1

1 METER = 180 - 180 - 50 - 50. 1,400 RPM.

2 meter. = 25 - 25 2,000 DPM.

SPA = 133/10,907 gm = 0.0122 mCi/gm PAINT both sides

Ai mCi = 5.3 x 25 = 133 mCi

med white pine P. L.S.A.

Drum II (55)

WT - 883. CEMENT Top - CLEANED.

SURFACE - 500 - 500 - 750 - 650

Bottom - 300.

OK Top - 700.

2 meters - 20 - 25

SPA. = 133/10 907 = 0.0122 mCi/gm

Ao. = 5.3 x 25 = 133 mCi

L.S.A.

10/11 Descheduled B.

Drum III (55)

A_o = 5.3 x 10 = 53 mCi

OK WT. 1150

SURFACE 200 - 250 - 200 - 400. [B152]

BOTTOM - 400 L.S.A.

B152 Top - 400.

+ 10 - 6 1 meter 20 - 20

55-gal Lt.

Drum IV (55)

WT 765 lbs.

OK

Surface 200 - 250 - 500.

Bottom - 450. Top 100.

2 meters 7 - 10 . . .

S.A. $^{53}/_{10,907}$ = 0.005 mci/gm . .

A0 mci 5.3 x 10 = 53 mci . . L.S.A.

V (93 gal) Fibbs.

WT. 1600 lbs. ±.

OK

Top - 400.

bottom - 150.

Surface 200 - 300 - 400 - 700.

2 meters 6 ⑮ 20.

S.A. - $^{106}/_{10,907}$ = 0.0097 mci/gm

A0 mci = 5.3 x 20. = 106 mci LSA

VI (55)

OK

Top. 300

bottom 400

WT - 850

Surface - 400 - 550 - 550.

2 meters 10 & 20.

SPA - $^{106}/_{10,907}$ = 0.0097 mci/gm . . .

A0. = 5.3 x 20 = 106

LSA.

B152 [B152]

VII (55)

WT > 1200

Top 550

DoT 1.2R

Surf 150 150 600 900

2meter 6 10 40

Curie 0.4462 x 40 = 17.85 Ci

SPA 17.85/13,620 = 1.31 mCi/gm

NOS.

✓ VIII WT 950. (55)

Top. 1R -> 825

DoT 110.

OK Surf. 300 - 200 - 500. LSA

2meter 5 20 15

A_0 = 5.3 x 25 = 106.

SPA 106/10,907 = 0.0097 mCi/gm

IX wt > 1200 (55)

Top 900.

DoT 1.1R.

Surf 200 600 950 350.

2meter 2 - 80 - 20 NOS

Curie 0.4462 x 30 = 13.4 Ci.

SPA 13.4/13,620 = 0.98 mCi/gm

X wt 900 (55)

Top 50

✓ DoT 150.

OK. SURFACE. 125 125. 100 80. [B152]

2meters 2 5.

B152 Curie 0.446 x 5 = 2.23 Ci. LSA.

SPA 2.23/13,620 = 0.164 mCi/gm

Background (cont'd.)

7) The drums at present are stored in our old cell labyrinth area which we have deemed contaminated.

8) These drums will have to be removed from the old cell, prepared, deconed, surveyed and then transferred to a clean area.

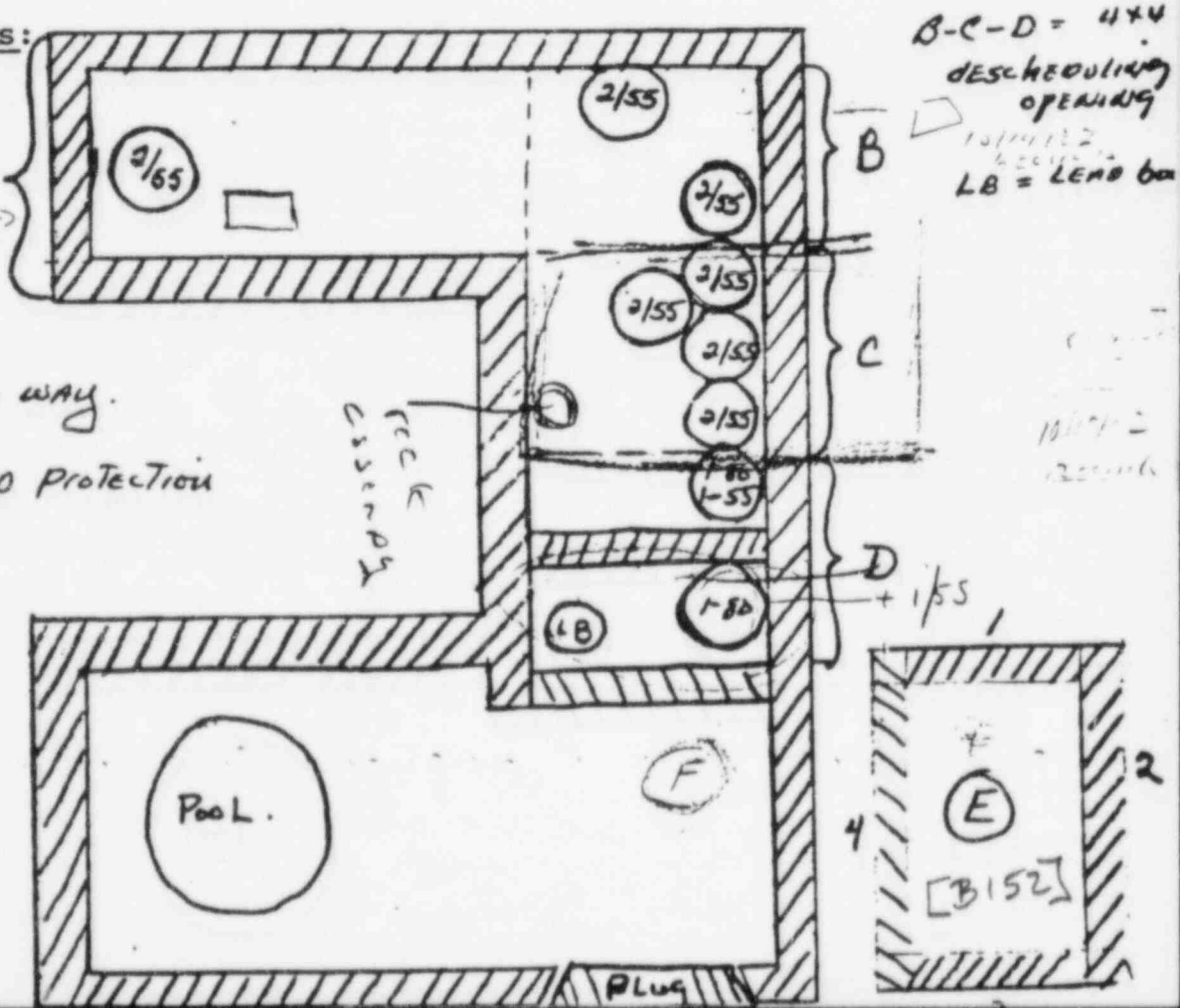
9) The new cell will act as the clean shielded area for holding until shipment.

A. Phase I - Objective:

To remove the drums from their present location (contaminated old cell) for the purpose of preparation, decon, survey, and transfer to a clean shielded holding area (new cell labyrinth) to await shipping.

B. Plan by Steps:

1) Layout -



HYDRO NUCLEAR SERVICES

WHOLE BODY COUNTING
RADIO-NUCLIDE ANALYSIS PROGRAM

10 CFR 2.790 INFORMATI

25-OCT-83 12:15:49

1 ST

[redacted]

TLD BADGE: NA PLANT BADGE #: NU TECH

UPTAKE DATE: 25-OCT-83 00:00:00
COUNT DATE: 25-OCT-83 12:03:33

ELAPSED LIVE TIME: 600. ELAPSED REAL TIME: 601.

THYROID: 20.20 FRONT-TO-BACK: 1.60
SEAT HEIGHT: 12.20 OPERATOR'S INITIALS: [redacted]

WHOLE BODY SCREEN REPORT (REV 04)

THYROID
ENERGY WINDOW 99.95 TO 998.83

PK	IT	ENERGY	AREA	BKGND	FWHM	CHANNEL	LEFT	PW	CTS/SEC	%ERR	FIT
** NO PEAKS **											

LUNGS
ENERGY WINDOW 124.27 TO 2042.96

PK	IT	ENERGY	AREA	BKGND	FWHM	CHANNEL	LEFT	PW	CTS/SEC	%ERR	FIT
1	4	1172.75	1007.	985.	63.94	403.15	394	38	1.68E 00	5.4	6.82E 00
2	4	1331.59	867.	563.	58.41	423.02	394	38	1.45E 00	5.1	

NUCLIDE	KEY ENERGY	ACTIVITY UCI /UNIT	1 SIGMA ERROR	MPC-HOUR	%DOB	H-50 MREM
CO-60	1173.20	2.641E-02	1.431E-03	19.56	2.26*	0.00

TOTALS:
ACTIVITY= 2.641E-02 MPC-HOUR= 19.56 %DOB= 2.26 H-50= 0.00

LOWER TORSO
ENERGY WINDOW 95.53 TO 2014.73

PK	IT	ENERGY	AREA	BKGND	FWHM	CHANNEL	LEFT	PW	CTS/SEC	%ERR	FIT
1	1	584.64	92.	2020.	40.67	584.89	578	15	1.53E-01	69.9	4.41E 00
2	1	1178.52	1432.	963.	56.13	657.61	647	20	2.39E 00	4.0	1.23E 00
3	1	1331.83	1643.	819.	77.20	676.38	667	36	2.74E 00	3.3	1.01E 01

'LIDE	KEY ENERGY	ACTIVITY UCI /UNIT	1 SIGMA ERROR	MPC-HOUR	%DOB	H-50 MREM
60	1173.20	2.233E-02	9.036E-04	3.31	10.15*	0.00

S:
ITY= 2.233E-02 MPC-HOUR= 3.31 %DOB= 10.15 H-50= 0.00

BANS:
B153 CTIVITY= 4.874E-02 AVG MPC-HOUR= 7.62 TOTAL H-50= B153
B8
D BY:

HYDRO NUCLEAR SERVICES

WHOLE BODY COUNTING
RADIO-NUCLIDE ANALYSIS PROGRAM

25-OCT-83 12:33:01

[redacted]

2nd

TLD BADGE: NA PLANT BADGE #: NU TECH 10 CFR 2.790 INFORMATION

UPTAKE DATE: 25-OCT-83 00:00:00
COUNT DATE: 25-OCT-83 12:20:56

ELAPSED LIVE TIME: 600. ELAPSED REAL TIME: 601.

THYROID: 20.20 FRONT-TO-BACK: 1.60
SEAT HEIGHT: 12.20 OPERATOR'S INITIALS: [redacted]

WHOLE BODY SCREEN REPORT (REV 04)

THYROID

ENERGY WINDOW 99.95 TO 998.83

PK	IT	ENERGY	AREA	BKGND	FWHM	CHANNEL	LEFT	PW	CTS/SEC	%ERR	FIT
** NO PEAKS **											

LUNGS

ENERGY WINDOW 124.27 TO 2042.96

PK	IT	ENERGY	AREA	BKGND	FWHM	CHANNEL	LEFT	PW	CTS/SEC	%ERR	FIT
1	3	1170.03	1110.	862.	65.73	402.81	394	42	1.85E 00	4.8	6.69E 00
2	3	1327.09	637.	603.	53.13	422.46	394	42	1.06E 00	6.7	

NUCLIDE	KEY ENERGY	ACTIVITY UCI /UNIT	1 SIGMA ERROR	MPC-HOUR	%DOB	H-50 MREM
CO-60	1173.20	2.908E-02	1.395E-03	21.55	2.49%	0.00

TOTALS:
ACTIVITY= 2.908E-02 MPC-HOUR= 21.55 %DOB= 2.49 H-50= 0.00

LOWER TORSO

ENERGY WINDOW 95.53 TO 2014.73

PK	IT	ENERGY	AREA	BKGND	FWHM	CHANNEL	LEFT	PW	CTS/SEC	%ERR	FIT
1	1	600.58	161.	1300.	39.35	586.84	582	14	2.69E-01	32.6	1.20E 00
2	5	1176.60	548.	370.	52.23	657.37	650	35	9.13E-01	7.5	3.62E 00
3	5	1332.45	403.	423.	51.74	676.46	650	35	6.71E-01	8.8	
4	1	1467.81	245.	648.	50.56	693.03	685	33	4.09E-01	16.0	1.38E 01

NUCLIDE	KEY ENERGY	ACTIVITY UCI /UNIT	1 SIGMA ERROR	MPC-HOUR	%DOB	H-50 MREM
CO-60	1173.20	8.534E-03	6.401E-04	1.26	3.88%	0.00

TOTALS:
ACTIVITY= 8.534E-03 MPC-HOUR= 1.26 %DOB= 3.88 H-50= 0.00

B153

TOTAL ACTIVITY= 3.761E-02 AVG MPC-HOUR= 7.60 TOTAL H-50= 0.00

B153

REVIEWED BY:

NUCLEAR SERVICES

WHOLE BODY COUNTING
RADIO-NUCLIDE ANALYSIS PROGRAM

04-NOV-83 12:17:09

#1

[redacted]

10 CFR 2.790 INFORMATION

TLD BADGE: NA PLANT BADGE #: INT. NU.

UPTAKE DATE: 04-NOV-83 00:00:00
COUNT DATE: 04-NOV-83 12:05:11

ELAPSED LIVE TIME: 600. ELAPSED REAL TIME: 601.

THYROID: 21.80 FRONT-TO-BACK: 1.30
SEAT HEIGHT: 13.50 OPERATOR'S INITIALS: [redacted]

WHOLE BODY SCREEN REPORT (REV 04)

THYROID
ENERGY WINDOW 99.95 TO 998.83

PK	IT	ENERGY	AREA	BKGND	FWHM	CHANNEL	LEFT	PW	CTS/SEC	%ERR	FIT
** NO PEAKS **											

LUNGS
ENERGY WINDOW 124.27 TO 2042.96

PK	IT	ENERGY	AREA	BKGND	FWHM	CHANNEL	LEFT	PW	CTS/SEC	%ERR	FIT
1	0	1166.23	41.	506.	35.33	402.33	394	16	6.75E-02	80.3	
2	0	1463.06	331.	279.	53.72	439.46	427	24	5.52E-01	9.0	

NUCLIDE	KEY ENERGY	ACTIVITY UCI /UNIT	1 SIGMA ERROR	MPC-HOUR	%DOB	H-50 MREM
CO-60	1173.20	1.059E-03	8.499E-04	0.78	0.09	0.00

TOTALS:
ACTIVITY= 1.059E-03 MPC-HOUR= 0.78 %DOB= 0.09 H-50= 0.00

LOWER TORSO
ENERGY WINDOW 95.53 TO 2014.73

PK	IT	ENERGY	AREA	BKGND	FWHM	CHANNEL	LEFT	PW	CTS/SEC	%ERR	FIT
1	1	721.13	2740.	1694.	399.99	601.60	582	22	4.57E 00	2.9	1.14E 01
2	4	1182.98	429.	501.	59.07	658.15	642	45	7.15E-01	8.8	3.08E 00
3	4	1342.89	305.	340.	50.67	677.73	642	45	5.08E-01	10.3	
4	1	1472.08	350.	634.	76.77	693.55	687	35	5.83E-01	11.5	1.25E 01

NUCLIDE	KEY ENERGY	ACTIVITY UCI /UNIT	1 SIGMA ERROR	MPC-HOUR	%DOB	H-50 MREM
CO-60	1173.20	6.702E-03	5.907E-04	0.99	3.05%	0.00
ZR-95	724.18	8.479E-02	2.422E-03	3.79	29.24%	0.00

TOTALS:
ACTIVITY= 9.149E-02 MPC-HOUR= 4.78 %DOB= 32.28 H-50= 0.00

ALL ORGANS:
TOTAL ACTIVITY= 9.255E-02 AVG MPC-HOUR= 1.86 TOTAL H-50= 0.00

REVIEWED BY:

B154

B154

HYDRO NUCLEAR SERVICES

WHOLE BODY COUNTING
RADIO-NUCLIDE ANALYSIS PROGRAM

04-NOV-83 12:54:28

#2

[redacted]

TLD BADGE: NA PLANT BADGE #: INT. NU.

UPTAKE DATE: 04-NOV-83 00:00:00
COUNT DATE: 04-NOV-83 12:47:23

10 CFR 2.790 INFORMATION

ELAPSED LIVE TIME: 300. ELAPSED REAL TIME: 300.

THYROID: 21.80 FRONT-TO-BACK: 1.30
SEAT HEIGHT: 13.50 OPERATOR'S INITIALS: [redacted]

WHOLE BODY SCREEN REPORT (REV 04)

THYROID
ENERGY WINDOW 99.95 TO 998.83

PK	IT	ENERGY	AREA	BKGND	FWHM	CHANNEL	LEFT	PW	CTS/SEC	%ERR	FIT
** NO PEAKS **											

LUNGS
ENERGY WINDOW 124.27 TO 2042.96

PK	IT	ENERGY	AREA	BKGND	FWHM	CHANNEL	LEFT	PW	CTS/SEC	%ERR	FIT
** NO PEAKS **											

LOWER TORSO
ENERGY WINDOW 95.53 TO 2014.73

PK	IT	ENERGY	AREA	BKGND	FWHM	CHANNEL	LEFT	PW	CTS/SEC	%ERR	FIT
1	1	1181.45	100.	620.	42.45	657.97	647	31	3.34E-01	36.5	4.22E 0

NUCLIDE	KEV ENERGY	ACTIVITY UCI /UNIT	1 SIGMA ERROR	MPC-HOUR	%DOB	H-50 MREM
CO-60	1173.20	3.130E-03	1.143E-03	0.46	1.12+	0.00

TOTALS:
ACTIVITY= 3.130E-03 MPC-HOUR= 0.46 %DOB= 1.42 H-50= 0.00

ALL ORGANS:
TOTAL ACTIVITY= 3.130E-03 AVG MPC-HOUR= 0.15 TOTAL H-50= 0.00

REVIEWED BY:

SIGNATURE DATE

ELAPSED PROGRAM EXECUTION TIME = 24 SECONDS.

Clothe removed.

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HYDRO NUCLEAR SERVICES

WHOLE BODY COUNTING
RADIO-NUCLIDE ANALYSIS PROGRAM

04-NOV-83 12:45:50

[redacted]

10 CFR 2.790 INFORMATION

TLD BADGE: NA PLANT BADGE #: INT. NU.

UPTAKE DATE: 04-NOV-83 00:00:00
COUNT DATE: 04-NOV-83 12:33:53

ELAPSED LIVE TIME: 600. ELAPSED REAL TIME: 601.

THYROID: 20.50 FRONT-TO-BACK: 1.50
SEAT HEIGHT: 10\80 OPERATOR'S INITIALS: [redacted]

WHOLE BODY SCREEN REPORT (REV 04)

THYROID
ENERGY WINDOW 99.95 TO 998.83

PK	IT	ENERGY	AREA	BKGND	FWHM	CHANNEL	LEFT	FW	CTS/SEC	%ERR	FIT
** NO PEAKS **											

LUNGS
ENERGY WINDO+ 124.27 TO 2042.96

PK	IT	ENERGY	AREA	BKGND	FWHM	CHANNEL	LEFT	FW	CTS/SEC	%ERR	FIT
** NO PEAKS **											

LOWER TORSO
ENERGY WINDOW 95.53 TO 2014.73

PK	IT	ENERGY	AREA	BKGND	FWHM	CHANNEL	LEFT	FW	CTS/SEC	%ERR	FIT
1	1	661.67	667.	2833.	121.39	594.32	583	28	1.11E 00	11.9	3.45E 00
2	1	1186.65	766.	865.	64.02	658.60	649	20	1.28E 00	6.5	2.21E 00
3	1	1394.37	1180.	669.	140.15	684.04	669	35	1.97E 00	4.3	1.69E 01

NUCLIDE	KEY ENERGY	ACTIVITY UCI /UNIT	1 SIGMA ERROR	MPC-HOUR	%DOB	H-50 MREM
CO-60	1173.20	1.198E-02	7.812E-04	1.77	5.44*	0.00
CS-137	661.64	1.022E-02	1.218E-03	1.36	1.86*	0.00

TOTALS:
ACTIVITY= 2.220E-02 MPC-HOUR= 3.14 %DOB= 7.30 H-50= 0.00

ALL ORGANS:
TOTAL ACTIVITY= 2.220E-02 AVG MPC-HOUR= 1.05 TOTAL H-50= 0.00

REVIEWED BY:

SIGNATURE DATE

ELAPSED PROGRAM EXECUTON TIME = 30 SECONDS.

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HYDRO NUCLEAR SERVICES

WHOLE BODY COUNTING
RADIO-NUCLIDE ANALYSIS PROGRAM

04-NOV-83 12:31:48

[redacted]

TLD BADGE: NA PLANT BADGE #: INT. NU.

UPTAKE DATE: 04-NOV-83 00:00:00
COUNT DATE: 04-NOV-83 12:19:42

ELAPSED LIVE TIME: 600. ELAPSED REAL TIME: 601.

THYROID: 20.20 FRONT-TO-BACK: 2.00
SEAT HEIGHT: 11.20 OPERATOR'S INITIALS: [redacted]

WHOLE BODY SCREEN REPORT (REV 04)

THYROID
ENERGY WINDOW 99.95 TO 998.83

PK	IT	ENERGY	AREA	BKGND	FWHM	CHANNEL	LEFT	FW	CTS/SEC	%ERR	FIT
** NO PEAKS **											

LUNGS
ENERGY WINDOW 124.27 TO 2042.96

PK	IT	ENERGY	AREA	BKGND	FWHM	CHANNEL	LEFT	FW	CTS/SEC	%ERR	FIT
1	5	1439.86	200.	97.	35.09	436.56	401	47	3.33E-01	9.9	6.26E 00
2	5	1486.77	187.	82.	38.93	442.43	404	47	3.11E-01	10.0	

NUCLIDE	KEY ENERGY	ACTIVITY UCI /UNIT	1 SIGMA ERROR	MPC-HOUR	%DOB	H-50 MREM
** NONE **						

LOWER TORSO
ENERGY WINDOW 95.53 TO 2014.73

PK	IT	ENERGY	AREA	BKGND	FWHM	CHANNEL	LEFT	FW	CTS/SEC	%ERR	FIT
1	1	665.04	191.	1290.	40.55	594.73	590	15	3.19E-01	27.5	1.03E 00
2	1	1168.07	469.	700.	63.85	658.78	643	25	7.82E-01	9.2	1.69E 00
3	4	1344.92	334.	200.	45.75	677.98	668	37	5.57E-01	8.1	1.18E 00
4	4	1466.03	381.	198.	65.41	692.81	668	37	6.35E-01	7.3	

NUCLIDE	KEY ENERGY	ACTIVITY UCI /UNIT	1 SIGMA ERROR	MPC-HOUR	%DOB	H-50 MREM
CO-60	1173.20	7.340E-03	6.763E-04	1.09	3.34*	0.00
CS-137	661.64	2.933E-03	8.070E-04	0.39	0.53	0.00

TOTALS:
ACTIVITY= 1.027E-02 MPC-HOUR= 1.48 %DOB= 3.87 H-50= 0.00

ALL ORGANS:
TOTAL ACTIVITY= 1.027E-02 AVG MPC-HOUR= 0.49 TOTAL H-50= 0.00

REVIEWED BY:

SIGNATURE DATE

ELAPSED PROGRAM EXECUTION TIME = 42 SECONDS.

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RSA CORPORATION

U.S. HIGHWAY 46 AND SCHLEY STREET DOVER, NEW JERSEY 07801 201-381-0583

EMERGENCY PROCEDURE

RADIATION OVEREXPOSURE

In the event any individual is directly exposed to radiation from the source in the UP position it is deemed necessary to have immediate Medical attention.

1) Remain CALM. Do NOT Panic. Proceed to telephone.

2) Contact Mr. Stein or Mr. O'Sullivan on the intercom. If off-shift hours or week-end call Mr. O'Sullivan at [redacted]

3) If unable to reach either party, proceed as follows.'

   a) Secure cell door.
   b) Prepare a brief note describing:

      i) What happened
      ii) What safety system malfunctioned, if any.
      iii) Estimate of time in seconds you were in the cell proper.

   c) Place note over irradiator key switch.
   d) Place film badge on Mr. O'Sullivan's desk.

4) Dial 366-1600 Dover General Hospital, Ask for Ambulance response and give location.

5) Ambulance response time is 3-4 minutes. During this time use survey meter to check surface of body and clothing for contamination.

6) At Hospital Emergency Receiving identify yourself and explain that this is a Radiation Overexposure case and report whether or not contamination is involved.

7) Have Hospital continue trying to contact Mr. O'Sullivan or Mr. Stein.

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RSA CORPORATION

U.S. HIGHWAY 46 AND SCHLEY STREET DOVER, NEW JERSEY 07801 201-361-0583

EMERGENCY PROCEDURE

RADIATION OVEREXPOSURE

In the event any individual is directly exposed to radiation from the source in the UP position it is deemed necessary to have immediate Medical attention.

1) Remain CALM. Do **NOT** Panic. Proceed to telephone.

2) Contact Mr. Stein or Mr. O'Sullivan on the intercom. If off-shift hours or week-end call Mr. O'Sullivan at [redacted] or Mr. Stein or Mr. Thomas at home.

3) If unable to reach either party, proceed as follows:

   a) Secure cell door.
   b) Prepare a brief note describing:

      i) What happened
      ii) What safety system malfunctioned, if any.
      iii) Estimate of time in seconds you were in the cell proper.

   c) Place note over irradiator key switch.
   c) Place film badge on Mr. O'Sullivan's desk.

4) Dial 366-1600 Dover General Hospital, Ask for Ambulance response and give location.

5) Ambulance response time is 3-4 minutes. During this time use survey meter to check surface of body and clothing for contamination.

6) At Hospital Emergency Receiving identify yourself and explain that this is a Radiation Overexposure case and report <u>whether</u> or <u>not</u> contamination is involved.

7) Have Hospital continue trying to contact Mr. O'Sullivan or Mr. Stein.

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION I
631 PARK AVENUE
KING OF PRUSSIA, PENNSYLVANIA 19406

4 OCT 1983

Docket No. 030-07026 License No. 29-13848-01
CAL 83-15

International Nutronics, Incorporated
ATTN: Mr. Bruce Thomas
Plant Manager
US Highway 46 and Schley Street
Dover, New Jersey 07801

Gentlemen:

This refers to our telephone conversation on October 4, 1983, regarding the results of the inspection of your facility on September 30 and October 1, 1983.

With regard to this matter, we understand that you have taken or will take the following actions:

1. Discontinue any use of your facility for the conduct of irradiations.

2. Submit a decontamination plan for your facility to this office. This plan will contain a complete characterization of your facility, with a description of the location and levels of all sources of radiation and contamination, and a timetable for decontamination activities, and transfer of contaminated waste. Prior to implementation of any decontamination activities or preparation of radioactive material for shipment, detailed operating and radiation control procedures will be provided to NRC Region I. No decontamination efforts will be initiated until the NRC has confirmed receipt of the procedures and has had at least two working days to review the submitted procedures.

3. Perform a survey of all interior areas of your facilities to evaluate potential exposure to sources of radiation and radioactive materials, including airborne radioactive materials. However, prior to entry into any High Radiation Area (HRA) or any Airborne Radioactivity Area (ARA), a detailed plan for entry, including radiation protection procedures to be followed, will be provided to NRC Region I. No entry into any HRA or ARA will be made until the NRC has confirmed receipt of the procedures and has at least two working days to review the submitted procedures.

4. Evaluate the status of contamination external to your facility including facilities, equipment, soil, and water, and submit the results to this office by October 19, 1983. These evaluations will include drilling of test wells to sample groundwater in the vicinity of your facility. Analytical methods will be sensitive enough to detect one picocurie or less of activity per gram of soil or milliliter of water.

5. Schedule whole-body counts (in vivo bioassay) of all employees, past and current, who have worked at your facility since October of 1982. Inform NRC Region I of your schedule for completing this action. Provide a summary of the results of this program to NRC Region I in accordance with the reporting requirements of 10 CFR 20.405, but in any case within seven days after completion of the program.

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6. Except in an emergency, no changes in the water purification system on either pool, including addition of any auxiliary equipment, will be made without prior notification and approval by NRC Region I.

7. No further decontamination efforts or other acts which might produce airborne activity will be carried out within your irradiator facility until an adequate exhaust filtration system has been installed and been reviewed by NRC Region I.

8. Notify NRC Region I of all proposed radioactive material shipments at least 48 hours prior to the proposed shipment date.

9. Discontinue all activities which might produce liquid discharges from the facility which may contain radioactive material.

10. Neither abandon nor release any facility until the NRC has confirmed a successful decontamination of the facilities and terminated the license.

If our understanding of your planned actions, as described above, is not in accordance with the actions being implemented, please contact this office by telephone and in writing within 24 hours of your receipt of this letter.

Sincerely,

James M. Doyne for

Thomas T. Martin, Director
Division of Engineering and Technical Programs

cc:
Public Document Room (PDR)
Nuclear Safety Information Center (NSIC)
State of New Jersey

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Nucleon
Lectern
Associates INC.

CONSULTANTS IN RADIATION PROTECTION TRAINING AND MANAGEMENT PROGRAMS

September 22, 1984

Director of Office of Administration
U.S. Nuclear Regulatory Commission
Washington, D.C. 20055
Attn: Freedom of Information Request
(FOYIA)

FREEDOM OF INFORMATION
ACT REQUEST
FOIA-84-763
Rec'd 10-1-84

Dear Sir:

I have been retained as a Health Physics Consultant by the law firm of Moore, Clifford, Wolfe, Larson and Trutner of Oakland, California representing the Lexington Insurance Company concerning International Nutronics Inc. located in Dover, New Jersey.

I would like to request under the Freedom of Information Act (FOYIA) the following material.

(1) All documents pertaining to the initial application for license as well as all the amendments pertaining to this license. (I understand the initial application was made in 1970 by Radiation Services Associates until the present September, 1984. (License #29-13848-01).

(2) All documents pertaining to the initial application for license as well as all the amendments pertaining to this license by International Nutronics, Inc. from the transfer and sale of said facility until the present.

(3) All documents such as inspection reports by the U.S. Nuclear Regulatory Commission as well as its predecessor the U.S. Atomic Energy Commission from the initial issuance of the license in 1970 until the present.

(4) All documents such as enforcement actions, citations and any correspondence dealing with this license from its inception until the present time.

(5) All documents such as reports and any correspondence that have been generated by the licensee RSA and/or INI from its inception until the present time.

(6) All documents, reports and/or correspondence dealing with whole body bioassay counting techniques dealing with this licensed facility.

(7) In summary, I am requesting the complete file on this licensed facility from its initial licensing phase to the present time with any other appropriate Federal regulatory action, correspondence, reports, citations as well as regulatory actions related to this facility.

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3414 First Avenue • P.O. Box 430 • Suite 7 • Olney, Maryland 20832 • 301-774-3301

(8) In addition, I am also requesting documentation of any abnormal incident, accident situations that may have occured at this facility from the inception of its operation (U.S. N.R.C. or licensure reports etc.) until the present.

I would also like to request a policy statement developed by the Nuclear Materials Safguards Section (NMSS) which was issued as a directive and provided guidance to New York State with respect to radiation levels for unrestricted release of nuclear facilities.

I understand that under present FOYIA requirements as specified in 10CFR, Part 9, Section 9.8 that an appropriate fee will be charged for photocopying the material requested. Please proceed with this request and bill me for the material as required.

I would appreciate this material as soon as possible and would appreciate a confirmation of this request.

Thank you for your utmost cooperation and attention in this matter.

Sincerely,

Michael S. Terpilak

Michael S. Terpilak
President, and Director
of Technical Services
Certified Health Physicist