



Canberra Nuclear Services Division, 1330 E. Golf Rd., Schaumburg, IL 60196 Tel. (708) 310-8650 FAX: (708) 310-8655

December 18, 1990

Mr. Mark Roberts
U.S. Nuclear Regulatory Commission
Region I
475 Allendale Road
King of Prussia, PA 19406

Dear Mr. Roberts,

Pursuant to our telephone conversation last Friday, I am forwarding to you information related to our surveying methodology employed at the Westinghouse Bloomfield, New Jersey site, during remediation activities. Enclosed is a survey protocol, prepared for our survey personnel at the onset of decontamination activities. This protocol describes release criteria, survey methods and measurement guidelines. I have also enclosed samples of our instrument calibration certificates and QC logs. Our Quality Assurance Manual requires on-site response checks each day the instrument is in use. You will note that the protocol refers to RMC, since it was written prior to our official incorporation into Canberra Industries as the Nuclear Services Division.

As we discussed, the procedure followed during work at the site is to have the decontamination contractor, SEG, monitor as they work, and then have Canberra/NSD do confirmatory measurements. In this way, we get double coverage in all areas. For most cases, continuous surveying has been employed, since we are not comfortable with grid systems for close out surveys. I would estimate that we have surveyed more than 50%, and as much as 100% of all surface areas in the various locations which have been remediated.

I hope this provides you the information you require. If we can be of further assistance, please call this office.

Sincerely,

A handwritten signature in black ink, appearing to read 'Leroy Booth', written over a horizontal line.

Leroy F. Booth, C.H.P.
Manager, Nuclear Services Division

LFB:pd

Enclosures

cc: B. Bowman/WEC
W. Bickerstaff/WEC

OFFICIAL RECORD COPY ML 10



CERTIFICATE OF CALIBRATION

Radiation Management Consultants certifies that the instrument listed below was calibrated and inspected before shipment and has met the manufacturer's published specifications. RMC certifies that our calibration measurements are traceable to the National Bureau of Standards. Applicable corrections are made to correct to 22°C and 760 mmHg.

RMC SERVICE NO. 015630

INSTRUMENT IDENTIFICATION Johnson GSM-10/PPA-2/ASP-2A 2699
(Manufacturer) (Model) (Serial Number)

CALIBRATION SOURCE ID. A-0009-6 130 Ci 137 Cs R59-10 10mCi 137 Cs
MP-1 Pulser SN 533

S94 Plutonium Alpha Standards

SN: P-6564, P-6791, P-6671, and P-6638 230Th 16600 dpm SN. 11798

RANGE	CALIBRATION POINT	INSTRUMENT READING	
		Before Adjustment	After Calibration
<u>X1</u>	<u>100 cpm</u>	<u>100 cpm</u>	<u>100 cpm</u>
	<u>400</u>	<u>395</u>	<u>395</u>
<u>X10</u>	<u>1000</u>	<u>950</u>	<u>1000</u>
	<u>4000</u>	<u>3700</u>	<u>3900</u>
<u>X100</u>	<u>10000</u>	<u>9500</u>	<u>10000</u>
	<u>40000</u>	<u>36800</u>	<u>39000</u>
<u>PPA-2 probe</u>		<u> </u>	<u> </u>
<u>X10</u>	<u>1 mR/hr 137Cs</u>		<u>3300 (net) cpm</u>
<u>X100</u>	<u>10 mR/hr 137Cs</u>		<u>28000</u>
<u>X10</u>	<u>16600 dpm 230Th qT=1cm</u>		<u>700</u>
<u>ASP-2A probe</u>			
<u>X10</u>	<u>1470 cpm</u>		<u>700</u>
<u>X100</u>	<u>14000</u>		<u>6500</u>
<u>X100</u>	<u>72580</u>		<u>29800</u>

COMMENTS

PPA-2 S/N 1081 ASP-2A S/N 1083

PPA-2 response to 137Cs 3000 cpm/mR/hr

PPA-2 response to 230Th 93300 cpm/uCi @ 8.4% 2π eff.

ASP-2A average response to 239Pu 45% 2π eff.

Calibration

Performed by Walter R. Tonderson Date October 26, 1990

I certify that the above information is correct.

Authorized Agent

Title

Michael W. Korb
Calibration Lab. Mgr

Date Oct. 26, 1990

(RMC is not responsible for damage incurred during shipment or use of this instrument)

DESIGNER AND MANUFACTURER

OF

Scientific and Industrial
Instruments

LUDLUM MEASUREMENTS, INC.

915 • 235-5494 - 235-4947 TELEX No. 466832 UD

POST OFFICE BOX 810 FAX NO. (915) 235-4672

501 OAK STREET

SWEETWATER, TEXAS, U. S. A. 79556

CONVERSION CHART

CUSTOMER: Canberra Rmc Date 6-26-89
 Order No. 89-2104 Model No. 12 S/N 65287
 Source Cs 132 Detector Model 44-9 S/N K058603
 Size 150 mci H. V.: 900 v

Reference Point	Dial	Range/Scale
200 mR/hr	210	X1000
150 "	180	"
100 "	150	"
50 "	90	"
25 "	59	"
15 "	320	X100
6 "	140	"
2 "	440	X10
1 "	220	"



CERTIFICATE OF CALIBRATION

LUDLUM MEASUREMENTS, INC.

POST OFFICE BOX 810 FAX NO. (915) 235-4872
501 OAK STREET TELEX No. 48832 UD
SWEETWATER, TEXAS, U. S. A. PH. 915-235-5484

CUSTOMER Canberra / Rmc ORDER NO. 89-2104
Mfg. Ludlum Model 12 Serial No. 65287
Mfg. " Det. Model 44-9 Serial No. PK058603
Cal. Date 6-26-89 Cal. Due Date 6-26-90 Cal. Interval 1yr METERFACE 202-354
Check mark (☒) applies to applicable Instr. and/or detector IAW mfg. spec. s. ☐ New Instrument
☐ Det. (Alpha) Bkgnd _____ cpm ☐ Det. Oper. V 900 V at 56 MV
T 75 °F RH 60 % Alt 2018 Cm Hg ☒ F/S Resp. ck ☐ Zero Reset ck. ☐ Audio ck. ☐ Meter Zeroed
☒ Bat. ck. (Min. Volt) 2.2 VDC ☐ Bat. Volt _____ VDC Instrument Volt Set 900 V
☐ Threshold Dial _____ Input Sens. 56 mV. ☐ Input Sens Linearity
☒ HV Readout (2 points) Ref./Inst. 470 / 500 V Ref./Inst. 1970 / 2000 V
☐ Alarm Setting ck. ☐ Window Operation ☐ Background subtract ☒ Mechanical ck.
Repair Instrument Received: ☐ Within Toler. + -10% ☐ 10-20% ☐ Out Toler. ☐ Requiring Repair

COMMENTS:

Gamma Calibration: GM detectors positioned perpendicular to source except for M. 44-9 in which the back of probe faces source.

RANGE MULTIPLIER	REFERENCE CAL. POINT	INSTRUMENT METER READING	INSTRUMENT REC'D "AS FOUND READING"
X <u>1000</u>	<u>400 Kcpm</u>	<u>400</u>	
X <u>"</u>	<u>100 "</u>	<u>100</u>	
X <u>100</u>	<u>40 "</u>	<u>400</u>	
X <u>"</u>	<u>10 "</u>	<u>100</u>	
X <u>10</u>	<u>4 "</u>	<u>400</u>	
X <u>"</u>	<u>1 "</u>	<u>100</u>	
X <u>1</u>	<u>400 Cpm</u>	<u>400</u>	
X <u>"</u>	<u>100 "</u>	<u>100</u>	
X _____			
X _____			
X _____			

all Range(s) Calibrated Electronically

	Reference Cal. Point	Instrument Meter Reading	"As Found Reading"
Digital Readout	/ / / / /	/ / / / /	/ / / / /
Log Scale	/ / / / /	/ / / / /	/ / / / /

Ludlum Measurements, Inc. certifies that the above instrument has been calibrated by standards traceable to the National Bureau of Standards, or to the calibration facilities of other International Standards Organization members, or have been derived from accepted values of natural physical constants, or have been derived by the ratio type of calibration techniques. The calibration system conforms to the requirements of MIL-STD-45662A and ANSI N323-1978.

☒ Cs137 Gamma s/n 1162 ☐ Neutron Am-241 Be s/n T-304 State of Texas Calibration License No. LO-1983☐ Alpha s/n _____ ☐ Beta s/n _____ ☐ Other _____☒ M-500 s/n 13663 ☐ Oscilloscope s/n _____ ☒ Multimeter s/n A34153Calibrated By: Thomas J. Kessen Date 6-26-89Reviewed By: Larry Bell Date 6-27-89

DESIGNER AND MANUFACTURER
OF
*Scientific and Industrial
Instruments*



LUDLUM MEASUREMENTS, INC.

915 • 235-5494 - 235-4947 TELEX No. 466832 UD
POST OFFICE BOX 810 FAX NO. (915) 235-4471
501 OAK STREET
SWEETWATER, TEXAS, U. S. A. 79556

Bench Test Data For Detector 43-5 S/N PL 058440
Customer Camberra / BMC Order No. 89-2104
Counter 12 S/N 65287 Distance-Source to Detector surface
Count Time Cpm Counter Input Sensitivity 36 mV
Isotope Pu 239 S/N 4337 Size 13,702 cpm Other _____

43-4/43-44 HV ADJ FOR ALTITUDE

ALT.	HIGH VOLTAGE
Sea Level	2050 V
1000 foot	2025 V
2000 foot	2000 V
3000 foot	1975 V
4000 foot	1950 V
5000 foot	1925 V
6000 foot	1900 V
7000 foot	1875 V

ALPHA SCINTILLATION DETECTOR

HV Plateau	Background	Source Count
850	0	3800
900	0	4000
950	2	4000
1000	10	4200

OPERATING VOLTAGE SET AT 900 V

AIR PROPORTIONAL	43-5	43-65	BACKGROUND	METER READING	RANGE/SCALE
//////	Toe	L/S *	0	400	X10
	Center	Center	0	400	X10
//////	Heel	Other **	0	400	X10

☒ Uniformity (+ 10%) Ave. Efficiency 29 %

• Least Sensitive Position (Heel Of Probe)

• • Opposite Least Sensitive Position (Top Of Probe)

Date 6-24-89 Signature Thomas J. Pessen

**RMC**

CERTIFICATE OF CALIBRATION

Radiation Management Consultants certifies that the instrument listed below was calibrated and inspected before shipment and has met the manufacturer's published specifications. RMC certifies that our calibration measurements are traceable to the National Bureau of Standards. Applicable corrections are made to correct to 22° C and 760 mmHg.

RMC SERVICE NO. 15270

INSTRUMENT IDENTIFICATION

Ludlum

(Manufacturer)

12/44-9 65287/68603

(Model)

(Serial Number)

CALIBRATION SOURCE ID. 90 S/YSN9103MP-1 Pulser SN 533

RANGE	CALIBRATION POINT	INSTRUMENT READING	
		Before Adjustment	After Calibration
<u>X1</u>	<u>100 CPM</u>	<u>100 CPM</u>	<u>100 CPM</u>
	<u>400</u>	<u>395</u>	<u>395</u>
<u>X10</u>	<u>1000</u>	<u>1000</u>	<u>1000</u>
	<u>4000</u>	<u>4000</u>	<u>4000</u>
<u>X100</u>	<u>10000</u>	<u>10000</u>	<u>10000</u>
	<u>40000</u>	<u>41000</u>	<u>41000</u>
<u>X1000</u>	<u>100000</u>	<u>100000</u>	<u>100000</u>
	<u>400000</u>	<u>400000</u>	<u>400000</u>
<u>X100</u>	<u>0.0108 uCi 90S-Y 40124</u>	<u>6000 CPM - 3670 TR eff. 565000 CPM/dl</u>	

COMMENTS

Calibration

Performed by Walter R. HendersonDate July 7, 1990

I certify that the above information is correct.

Authorized Agent

C. S. M. & Co.

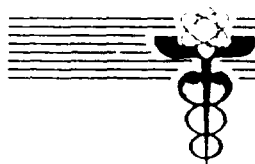
Title

RSO

Date

7-9-90

(RMC is not responsible for damage incurred during shipment or use of this instrument)

**RMC**

CERTIFICATE OF CALIBRATION

Radiation Management Consultants certifies that the instrument listed below was calibrated and inspected before shipment and has met the manufacturer's published specifications. RMC certifies that our calibration measurements are traceable to the National Bureau of Standards. Applicable corrections are made to correct to 22°C and 760 mmHg.

RMC SERVICE NO. _____

14693

INSTRUMENT IDENTIFICATION _____

LUDLUM

(Manufacturer)

12/44-9

(Model)

65287/053603

(Serial Number)

CALIBRATION SOURCE ID 90 Sr/Y SN9108 230 Pu SN P-6688MP-1 Pulser SN 533

INSTRUMENT READING

RANGE	CALIBRATION POINT	Before Adjustment	After Calibration
X 1	<u>100 cpm</u>	<u>100 cpm</u>	<u>100 cpm</u>
	<u>400</u>	<u>400</u>	<u>400</u>
X 10	<u>1000</u>	<u>1000</u>	<u>1000</u>
	<u>4000</u>	<u>4000</u>	<u>4000</u>
X 100	<u>10000</u>	<u>10000</u>	<u>10000</u>
	<u>40000</u>	<u>40000</u>	<u>40000</u>
X 1000	<u>100000</u>	<u>105000</u>	<u>100000</u>
	<u>400000</u>	<u>405000</u>	<u>400000</u>
		<u>//////////</u>	<u>//////////</u>
<u>44-9 Probe</u>	<u>0.0084 Ci ⁹⁰Sr/Y AT 1 cm</u>	<u>6000 cpm APPROX 36% 2N EFF, 555000 cpm/mCi</u>	
<u>43-5 Probe</u>	<u>0.0000 Ci ²³⁰Th AT 1 cm</u>	<u>800 cpm APPROX 11% 2N EFF 133000 cpm/mCi</u>	
<u>S.N. 053440</u>			

COMMENTS

Calibration

Performed by Harold W. BarberDate Dec. 29, 1989

I certify that the above information is correct.

Authorized Agent _____

Title _____

Date _____

(RMC is not responsible for damage incurred during shipment or use of this instrument)

**RMC**

CERTIFICATE OF CALIBRATION

Radiation Management Consultants certifies that the instrument listed below was calibrated and inspected before shipment and has met the manufacturer's published specifications. RMC certifies that our calibration measurements are traceable to the National Bureau of Standards. Applicable corrections are made to correct to 22°C and 760 mmHg.

RMC SERVICE NO

4693

INSTRUMENT IDENTIFICATION

LUDLUM

12/749

65251/553603

CALIBRATION SOURCE ID

90 Sr/Y SN9108

230 Pa SN 1-6682

MP-1 Pulser SN 533

INSTRUMENT READING

RANGE	CALIBRATION POINT	Before Adjustment	After Calibration
X 1	1000	1000	1000
X 10	10000	10000	10000
X 100	100000	100000	100000
X 1000	1000000	1000000	1000000
449 PROBE	0.0108 μ C, ⁹⁰ Sr/Y AT 1 cm	6000 CPM APPROX 36% 21% EFF, 553000 CPM/ μ C	
23-S PROBE	0.006 μ C, ²³⁰ Pa AT 1 cm	800 CPM APPROX 11% 21% EFF, 133000 CPM/ μ C	
SN 058440			

COMMENTS

Calibration

Performed by

Wood J. Marley

Date

Dec 29, 1987

I certify that the above information is correct

Authorized Agent

C. E. J. J. J.

Title

RSC

Date

1-8-90

(RMC is not responsible for damage incurred during shipment or use of this instrument)

Portfolio Instrument Q.C. Check
(All units in "CAM")
(All readings at contact)

sources in use
A Source: PV-239-01
B Source: Sr-090-01

Manufacturer: Johnson
Model: S/N: 2699
GSM 10

Manufacturer: Ludlum
Model: 12 S/N: 65287

Probe Label/S.N.	Date/Time	hkg.	α gross/net	β gross/net	hkg.	α gross/net	β gross/net
44-9/058603	3-20/0630				40	1800	2500
43-5/058440	3-20/0630				0	1700	
PPA-2/KIT1	3-20/0630	30	1600	1750			
ASP-2A/1083	3-20/0630	0	2600				
44-9/058603	3-21/0640				40	1800	2600
43-5/058440	3-21/0640				0	1600	
PPA-2/KIT1	3-21/0640	30	1700	1800			
ASP-2A/1083	3-21/0640	0	2600				
44-9/058603	3-22/0715				40	1800	2600
43-5/058440	3-22/0715				0	1600	
PPA-2/KIT1	3-22/0715	30	1600	1800			
ASP-2A/1083	3-22/0715	0	2600				
44-9/058603	3-23/0630				40	1900	2600
43-5/058440	3-23/0630				0	1600	
PPA-2/KIT1	3-23/0630	30	1600	1800			
ASP-2A/1083	3-23/0630	0	2600				
44-9/058603	3-26/0730				40	1800	2600
43-5/058440	3-26/0730				0	1650	
PPA-2/KIT1	3-26/0730	30	1600	1900			
ASP-2A/1083	3-26/0730	0	2650				
44-9/058603	3-27/0620				40	1800	2600
43-5/058440	3-27/0620				0	1600	
PPA-2/KIT1	3-27/0620	30	1600	1800			
ASP-2A/1083	3-27/0620	0	2600				
44-9/058603	3-28/0650				40	1800	2600
43-5/058440	3-28/0650				0	1600	
PPA-2/KIT1	3-28/0650	30	1600	1800			
ASP-2A/1083	3-28/0650	0	2700				
44-9/058603	3-29/0635				40	1800	2600
43-5/058440	3-29/0635				0	1600	
PPA-2/KIT1	3-29/0635	30	1600	1800			
ASP-2A/1083	3-29/0635	0	2700				

Portable Instrument Q.C. Check
(All units in "CAM")
(All readings at contact)

sources in use
α Source: PU-239-01
β Source: SP-090-01

Manufacturer: Johnson
Model: S/N: 2699
GSM10

Manufacturer: Ludlum
Model: 12 S/N: 65287

hc id/S.N.	Date/time	hkg.	α gross/net	β gross/net	hkg.	α gross/net	β gross/net
44-9/058603	4-3/0745				40	1900	2600
43-5/058440	4-3/0745				0	1600	
PPA-2/KIT	4-3/0745	30	1600	1800			
ASP-2A/1083	4-3/0745	0	2600				
44-9/058603	4-4/0700				40	1900	2600
43-5/058440	4-4/0700				0	1600	
PPA-2/KIT	4-4/0705	30	1600	1800			
ASP-2A/1083	4-4/0705	0	2700				
44-9/058603	4-5/0630				40	1900	2500
43-5/058440	4-5/0630				0	1600	
PPA-2/KIT	4-5/0635	30	1600	1700			
ASP-2A/1083	4-5/0635		2600				
44-9/058603	4-6/0705				40	1900	2500
43-5/058440	4-6/0705				0	1500	
PPA-2/KIT	4-6/0710	30	1600	1800			
ASP-2A/1083	4-6/0710	0	2600				
44-9/058603	4-9/1000				30	1800	2500
43-5/058440	4-9/1000				0	1600	
PPA-2/KIT	4-9/1005	30	1600	1700			
ASP-2A/1083	4-9/1005	0	2700				
44-9/058603	4-10/0730				50	1800	2600
43-5/058440	4-10/0730				0	1600	
PPA-2/KIT	4-10/0735	40	1600	1800			
ASP-2A/1083	4-10/0735	0	2700				
44-9/058603	4-11/0715				40	1900	2600
43-5/058440	4-11/0715				0	1600	
PPA-2/KIT	4-11/0720	40	1500	1700			
ASP-2A/1083	4-11/0720	0	2600				
44-9/058603	4-12/0725				40	1900	2600
43-5/058440	4-12/0725				0	1600	
PPA-2/KIT	4-12/0725	40	1600	1700			
ASP-2A/1083	4-12/0725	0	2600				



Radiation Management Consultants certifies that the instrument listed below was calibrated and inspected before shipment and has met the manufacturer's published specifications. RMC certifies that our calibration measurements are traceable to the National Bureau of Standards. Applicable corrections are made to correct to 22°C and 760 mmHg.

14290

0283A

(Serial Number)

S.N. D-16782

COMMENTS

47mm GLASS FIBER FILTER IN PLACE FOR ALL READINGS

Performed by

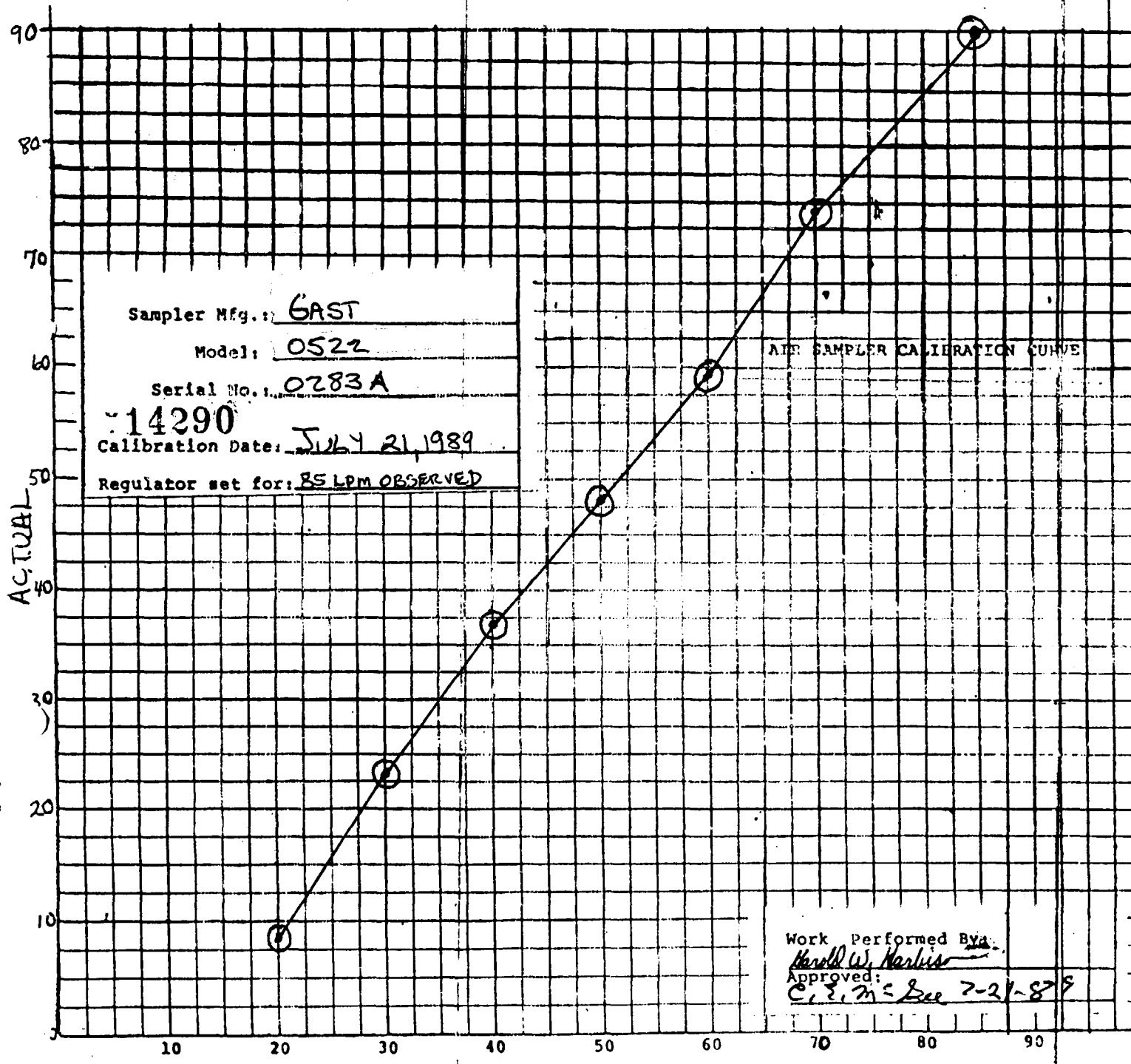
Date _____

Authorized Agent

Title

Date _____

(RMC is not responsible for damage incurred during shipment or use of this instrument)



Sampler Mfg.: GAST

Model: 0522

Serial No.: 0283 A

14290

Calibration Date: JULY 21, 1989

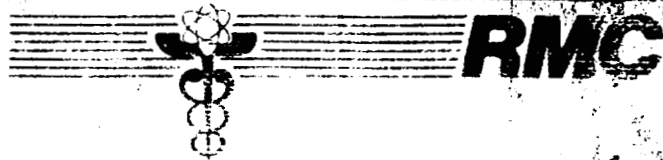
Regulator set for: 85 LPM OBSERVED

AIR SAMPLER CALIBRATION CURVE

Work Performed By: Harold W. Harless

Approved:

C. E. M. See 7-21-89



CERTIFICATE OF CALIBRATION

Radiation Management Consultants certifies that the instrument listed below was calibrated and inspected before shipment and has met the manufacturer's published specifications. RMC certifies that our calibration measurements are traceable to the National Bureau of Standards. Applicable corrections are made to correct to 22°C and 760 mmHg.

RMC SERVICE NO. **14005**
INSTRUMENT IDENTIFICATION: **EBE-1111** (Model) **F-120/HR-570** (Serial Number) **90-12/1989**
CALIBRATION SOURCE ID: **A-0009-6 130 C 137 C** **137 C**

RANGE	CALIBRATION POINT	INSTRUMENT READING	
		Before Adjustment	After Calibration
X-0.1	0.1 mR/hr	0.14 mR/hr	0.11 mR/hr
	0.4	0.45	0.40
X-1	2	2.0	2.0
	4	4.1	4.1
X-10	10	10.5	10
	40	42	40
Model Reference			
2011T5040		8000 CPM: APPROX 9.6 R/hr	
		3600 CPM	
10		31000	
2		6000	

COMMENTS

0.02 mR/hr for 15 min. FROM FINAL READING

Calibration Performed by **W. W. Martin** Date **March 29, 1989**

I certify that the above information is correct.
Authorized Agent **C. E. Jones**
Title **Radiation Safety Officer** Date **3-29-89**

is not responsible for damage incurred during shipment or use of this instrument)



RMC

CERTIFICATE OF CALIBRATION

Radiation Management Consultants certifies that the instrument listed below was calibrated and inspected before shipment and has met the manufacturer's published specifications. RMC certifies that our calibration measurements are traceable to the National Bureau of Standards. Applicable corrections are made to correct to 22°C and 760 mmHg.

RMC SERVICE NO. 14441

INSTRUMENT IDENTIFICATION Johnson Associates GSM-10/TA-2 2699/
(Manufacturer) (Model) (Serial Number)

CALIBRATION SOURCE ID. MP-1 Pulser SN 533 R59-10 10mCi 137 Cs

S94 Plutonium Alpha Standards 230 Th SN 11797

SN: P-6534, P-6791, P-6671, and P-6633

RANGE	CALIBRATION POINT	INSTRUMENT READING	
		Before Adjustment	After Calibration
X1	100 CPM	110 CPM	103 CPM
	400	410	390
X10	1000	1050	1020
	4000	3950	3800
X100	10000	11000	10200
	40000	39200	37500
PROBES & SERIAL # PPA-2 SN, 1081 } 0.004 uCi 230 Th AT 1cm } 6000 CPM: APPROX 94.5% EFF 93000 CPM GSP-2A } 0.1 mR/hr 137 Cs } 120,000 NET CPM S.N. 1082 } 0.2 mR/hr 137 Cs } 170,000 NET CPM } 1,000,000 CPM/HR/HR 137 Cs ASP-2A } 1470 2π CPM 239 Pu } 600 CPM S.N. 1083 } 1400 } 7000 } 72580 } 30000 } 44% AVERAGE 2π EFF			

COMMENTS

Note: Recheck of 230 Th response on 10-26-90 indicates factor of 10 difference on new calibration (probable range switch error)

Calibration Performed by Heidi W. Weber Date Sept 27, 1989

I certify that the above information is correct.

Authorized Agent C. J. M. = Doc

Title R50 Date 9-27-89

(RMC is not responsible for damage incurred during shipment or use of this instrument)

412 642 3318

DEC 07 '90 14:50 (W) E. ENVIRON AFFAIRS

P.2 8



**Westinghouse
Electric Corporation**

Westinghouse Building
Gateway Center
Pittsburgh Pennsylvania 15222

December 7, 1990

Mr. Mark Roberts
NRC, Region I
475 Allendale Road
King of Prussia, PA 19406

Dear Mr. Roberts:

Attached is an agenda of discussion items for our conference call next week. As we discussed earlier, the best day is Friday, December 14. If this is still agreeable with you, I will initiate the call around 10:00 a.m.

Sincerely,

C. W. Bickerstaff, Manager
Industrial Hygiene and
Materials Transportation
Environmental Affairs

**AGENDA OF DISCUSSION ITEMS WITH
RESPECT TO THE DECONTAMINATION PROJECT
AT BLOOMFIELD, NJ**

The management of Westinghouse is concerned with the time and cost of the decontamination work at Bloomfield, and wants assurances that additional clean up work will not be required at a future date. As a part of these assurances, they have requested that we review our procedures and methods with the NRC. The purpose of this review is to confirm that clean up criteria are being applied correctly and that decontamination activities are being completed in a manner acceptable to the Commission.

As submitted in the WEC decommissioning plan, the criteria being applied are consistent with Table 1 from Reg. Guide 1.86. With respect to this criteria, we wish to discuss and clarify the following:

- 1) The Table allows "maximum and "average" contamination levels. We assume the correct method of compliance is to simply take the arithmetic average of all readings within an area (1 square meter), provided no readings exceed the maximum criteria.
- 2) We have applied surface contamination criteria to contaminated concrete. This contamination may be absorbed into the concrete surface, to a minimal depth (i.e. 1 cm), causing a volume to be contaminated. However, we intend to continue to apply surface criteria to this situation.
- 3) In most cases where we have removed contaminated soils, the excavations have been left open to allow inspection and verification. In isolated areas where

412 642 3318

DEC 07 '90 14:51 (W) ENVIRON AFFAIRS

P.4/8

DEC 07 '90 12:13 CANBERRA NSD INFO 108 310-8655

P.3/3

contaminated soils have been removed, the excavations have been back filled to preserve safety or structural integrity. Records demonstrating successful decontamination have been maintained.

- 4) Several pieces of equipment and other materials have been removed from contaminated areas, cleaned and currently meet the criteria for acceptable surface contamination levels. Are there any additional restrictions on unrestricted release? It is our interpretation that materials which meet the Reg Guide 1.86 criteria may be released with no further restrictions.
- 5) Although many drains and underground pipes have been excavated and disposed of, at least one pipe presents a significant problem with respect to economics and safety. This is addressed in the attached hazard evaluation and is the approach we would take with similar situations in Bld 9. Does this assessment satisfy the requirements of the Commission?
- 6) During the recent pre-inspection visit, ORAU indicated they might be able to perform the release survey of areas south of Arlington Avenue in early December. Because of impending holiday breaks and inclement weather it would be preferable to complete the survey at this time. What is the current survey schedule?

REQUEST FOR RELEASE OF AN UNDERGROUND PIPE

During remediation of Room 106, a drain was found to be contaminated. The drain and associated piping were removed by excavation within Room 106, and followed into Room 105 and 104. A total of approximately 30 feet of pipe was removed to the wall of Room 104. During excavation, it was found that the pipe traversed downward to a depth of 8 feet in Room 104. Since further removal would have meant likely partial destruction of floors and load-bearing walls, excavation was halted. Smoke testing of the pipe was unsuccessful in identifying the exit point and indicated possible blockage of the pipe. Facility drawings and knowledge of the piping system indicate that the pipe probably exits Building 7 and empties into the sewerage system under Arlington Avenue. This drain has not been used for several years.

Since excavation of the entire pipe would be prohibitively expensive and might compromise the structural integrity of the building, it is proposed to cap the exposed end of the pipe, back fill the existing excavation, and leave the pipe in place. This proposal is based on the following hazard evaluation.

The subject pipe is a 6 inch diameter, cast iron pipe, probably with soldered joints. The pipe is known to be eight feet below ground surface and does not exit at any identifiable location within the site.

The pipe is known to be contaminated at the exit point in Room 104 with low levels of natural thorium. The gross external exposure rate at contact is 30 uR/hr (background is about 10 uR/hr). Exposure rates at 3 feet are indistinguishable from background. The pipe cannot be detected at floor level with the most sensitive survey instruments.

The interior of the pipe was surveyed for total and removable contamination. A 2 inch diameter thin window GM tube was placed in close proximity to the interior pipe surface and a maximum reading of 2000 cpm was obtained. Assuming the GM tube viewed a 20 sq cm area of the pipe and had a beta efficiency of 20%, the total

activity is

$$\begin{aligned}\text{Activity} &= 2000 \text{ cpm @ } 20\% \text{ eff} \\ &= 10,000 \text{ dpm}/20 \text{ cm}^2 \\ &= 500 \text{ dpm}/\text{cm}^2 \\ &= 2.25 \text{ E-4 uCi}/\text{cm}^2\end{aligned}$$

The inner area of the pipe is

$$\begin{aligned}&= 47.87 \text{ cm (circumference)} \times 30 \text{ cm/ft} \\ &= 1.46 \text{ E3 cm}^2 \text{ per foot} \\ \text{Activity in pipe} &= (1.46 \text{ E3 cm}^2/\text{ft})(2.25 \text{ E-4 uCi}/\text{cm}^2) \\ &= 0.328 \text{ uCi per foot of pipe}\end{aligned}$$

If the pipe runs to Arlington Avenue, the estimated length is 150 feet. Therefore, the total activity in the pipe is estimated to be

$$\begin{aligned}&= 0.33 \text{ uCi/ft} \times 150 \text{ ft} \\ &= 50 \text{ uCi natural thorium}\end{aligned}$$

Surface wipes indicate that approximately 50% of the activity is removable.

1) External Hazard

Assume the pipe is left in place. External dose rates to personnel continuously present at a surface 8 feet above the pipe will be within natural background levels.

Assume the pipe is excavated. If a worker were to handle the pipe for one hour, the contact dose to his hands would be approximately 0.03 mrad (30 urad). Assuming the exposure rate at 3 feet is 3 uR/hr (inverse square from contact), workers in the vicinity of the pipe for 8 hours might be exposed to a 24 urad dose.

We conclude the external hazard from this pipe is negligible.

2) Inhalation Hazard

Assume the pipe is excavated, broken, and all removable contamination released to the environment. Assume the total removable activity for each 3-foot section is released to a 1

$$\begin{aligned}\text{Activity} &= 0.33 \text{ uCi/ft} \times 3 \text{ ft} \times 0.5 \\ &= 500 \text{ pCi/sq. meter}\end{aligned}$$

If a reasonable resuspension factor of 10^{-6} m^{-1} is used, the airborne concentration is

$$\begin{aligned}&= 500 \text{ pCi/m}^2 \times 10^{-6} \text{ m}^{-1} \\ &= 5 \text{ E-4 pCi/m}^3 \\ &= 5 \text{ E-13 uCi/cm}^3\end{aligned}$$

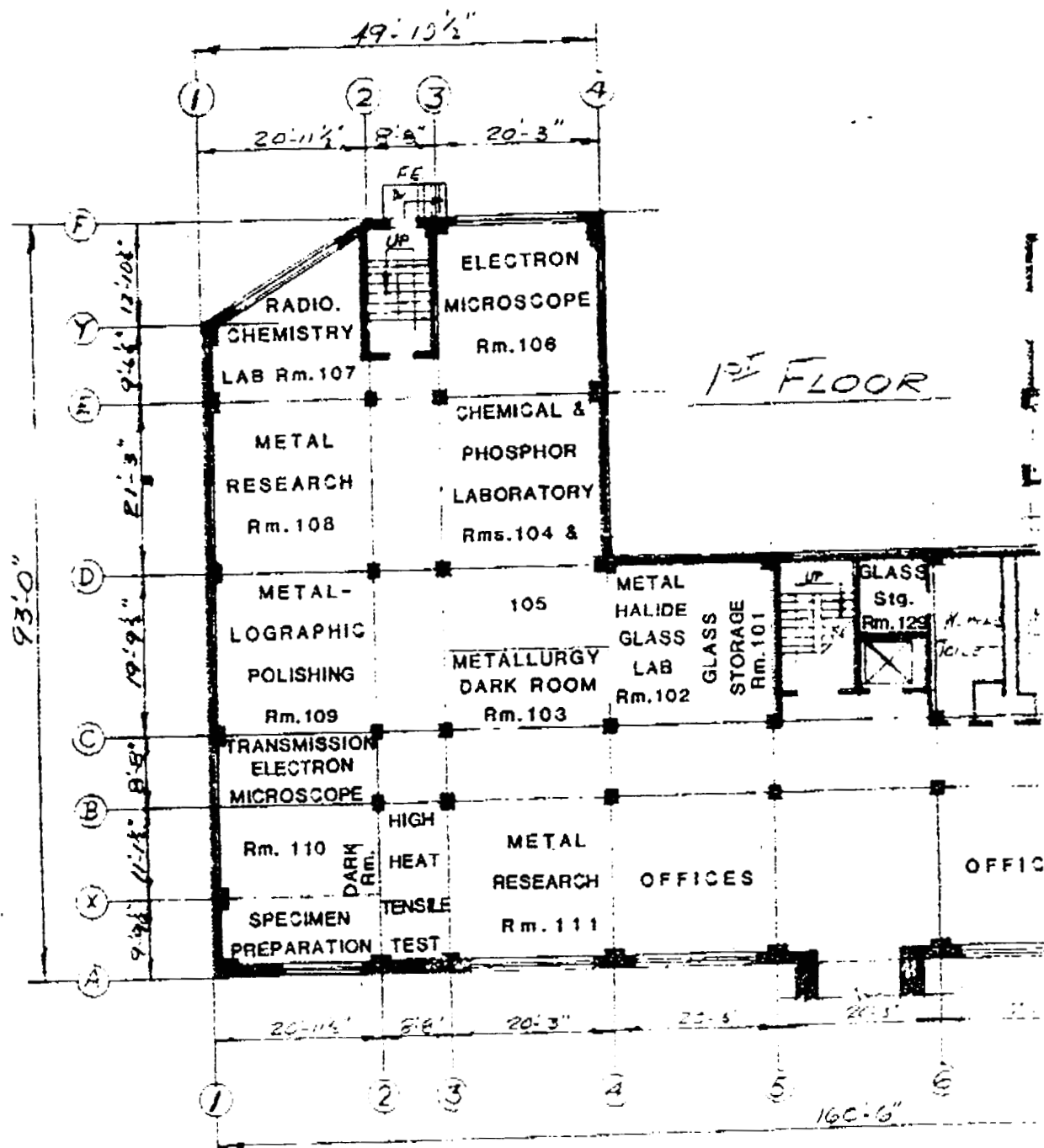
The MPC for natural thorium, unrestricted, is 2 E-12 uCi/cm^3 .

Using conservative assumptions, the worst case airborne concentration would be less than MPC for unrestricted areas.

3) Ingestion Hazard

Assume the removable activity within the pipe, 25 uCi, is released to the environment, either by leaking from the pipe, or by excavating the pipe, as above. The most likely form of the thorium, from knowledge of site materials, is as an insoluble oxide. Thus, uptake into food pathway vegetation or migration to ground water is very unlikely. However, if material migrated to ground water, a volume of 3000 gallons would dilute the entire activity to less than 2 E-6 uCi/ml , the MPC in water for unrestricted use.

We conclude this activity does not present a significant ingestion hazard.



412 642 3318

DEC 07 '90 14:49 (W) ENVIRON AFFAIRS

P.1/8



Westinghouse
Electric Corporation

Environmental Affairs

Westinghouse Building
Gateway Center
Pittsburgh Pennsylvania 15222

FACSIMILE COVER SHEET

Date: 12-7-90

To: Mark Roberts

Location: NRC, Region I

Number of Pages (including cover page): 8

From: Wayne Bickenstaff

Room: 1612 Phone: WIN 272-412-642-3880

The following pages are being sent from Westinghouse Corporate Headquarters in Pittsburgh, Pennsylvania. If any problems occur during the transmission, please call WIN 272-3922 or 412-642-3922.

Facsimile Machine Number:

WIN 272-3318 or 412-642-3318

REMARKS:

- File Phone Number: _____

12345677890

OCT 26-90 FRI 13:17 SEG

P. 01



SCIENTIFIC ECOLOGY GROUP, INC.

Facsimile Cover Sheet

Bloomfield Project

Westinghouse Electric Corporation
1 Westinghouse Plaza
Box 127
Bloomfield, N.J. 07003

Facsimile Machine Number
(201) 748-7715
Telephone Number
(201) 748-7350

Date: 10-26-90
To: MARK ROBERTS / NRC
Facsimile
Phone Number: _____
Number of Pages
(Including Cover Page): 2
From: LEE YOUNG
Phone: _____

Message: Copy of Additional Site
Assess, Pending Release Confirmation,
Forwarded to DRAU

12345677890

OCT. 26-90 FRI 13:17 SEC

P. 02

	Scope Change	Bldg.		Iso
1.	2-5	2	Duct, Downstream from Area 4, 2nd Floor	Th
2.	2-6	2	Blower, Outside Area 4, 2nd Floor	Th
3.	3-2	3	Garage Area, 1st Floor	Ra
4.	4-2	4	Dock Area, 1st Floor	U
5.	6-1	7	Pipe Chase, Roof to Basement	U
6.	6-2	7	Freight Elevator	U
7.	6-3	7	Buffalo Blower, Roof	U
8.	6-4	7	Pipe Chase, Bldg. 7, Under Area 43	U
9.	7-2	7	Res. 104, 105, Bldg. 7	Th
10.	7-4	7	Rm. 313, Bldg. 7	Th
11.	7-5	7	Rm. 213, Bldg. 7	Th
12.	7-6	7	Res. 516, 517	Th
13.	7-7	7	Res. 109, 110	Th
14.	7-8	7	Res. 312, 317	Th, U
15.	7-9	7	Rm. 119 Bldg. 7	Th
16.	7-10	7	3rd Floor, Hallway at Elev.	U
17.	7-11	7	Rm 111, Bldg. 7	Th
18.	7-12	7	Basement to 5th Floor	Th
19.	7-13	7	Rm. 110, Bldg. 7	Th
20.	7-14	7	Res. 101, 102, 103, 117, 122, 123A 123, 125, 126, 127, 128	Th
21.	8-1	7	Pipe Chase, Roof to Rm 105	Th
22.	8-2	7	Duct from Rm 106 to Roof	Th
23.	8-3	7	Pipe Invest. Downstream from Area 42	Th
24.	9-4	8	2nd Floor, Res. 1-12	Th, U
25.	13-1		Behind Bldg. 6, At RR Tracks, Soil	Th
26.	14-3	7	Exterior, S. Side	U
27.	15-2	9	Exterior SW, Sump, Man-holes	Th
28.	15-3	8	Exterior, W. Man-hole	U
29.	16-1	Incin.	Incinerator Decon.	U, Ra
30.	16-2	Incin.	Environmental Clean-up	U, Ra
31.	16-3	Sump	East of Bldg. 1	Th
32.	16-4	Sump	Between Bldg. 4&5	Th
33.	20-1	8	7 Areas, 1st 4th Floors	
		1.	Basement Floor Areas	Th
		2.	1st Floor @ Transformer	Th
		3.	1st Floor, overhead Drain Pipes	Th
		4.	1st Floor, SE Acid Room	Th
		5.	2nd Floor Spot	U
		6.	3rd Floor Spot	Th
		7.	4th Floor Areas	Th



BLOOMFIELD PLANT STATS.

10-18-

YR. BLDG NO.	TOTAL OFFICE SPACE - SQ. FT.	TOTAL MFG. SPACE - SQ. FT.	TOTAL WHSE. SPACE - SQ. FT.	TOTAL BLDG SPACE - SQ. FT.	MISC. STATS
1919/1906 1	58 306	16 533	13 182	88 021	12 BLDGS INCLUDING Power Hou
1907 2	18 000	136 799	1 600	156 399	
1920 3	11 000	129 636	48 212	188 848	1,025,481 SQ. FT. OF FLOOR SPACE
1915/17/20 4	68 736	64 936	4 600	138 272	
1915/1916 5	7 600	45 958	30 358	83 916	14.78 ACRES OF BLFD. REAL ESTATE
1912 6	—	29 299	—	29 299	
1925/1927 7	82 825	—	—	82 825	APPROX. 800 TONS OF AIR CONDITIONING
1929 8	11 600	135 095	4 400	151 095	
1923 9	—	16 830	—	16 830	16000 KVA. OF POWER @ 26,000V
1923 10	—	2 000	9 840	11 840	
1930 10A	—	400	3 545	3 945	- BLDG. #10 WAS DEMOLISHED - 2898 MAX. STEAM BOILER H.P.
1906/1927 11 Power House	—	—	—	9 403	
MISC.	—	—	—	64 788	3500 C.F.M. COMPRESSED HIGH PRESSURE AIR
TOTALS	258 067	577 486	115 737	1,025 481 SQ. FT.	

(5) FUEL OIL TANKS

(4) STORAGE TANKS - 20,000 GALS.

(1) OUT OF SERVICE #2 (FILLED WITH WATER)

(1) SERVICE TANK - 10,000 GALS.

11 ELEVATORS

1690 EMPLOYEES

132 IN PLANT PARKING SPACE

322 MAIN LOT EMPLOYEE
PARKING SPACES

109 LOWER LOT EMPLOYEE
PARKING SPACE

20 VISITOR PARKING SPACE