TRITIUM RELEASE - CIRCA 1974

ECR 317311-105

December 13, 1974

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Environmental Control

Distribution

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IRF (Record)

KWIC Index

Contamination
Surveillance
Tritium
Ventilation

TRITIUM RELEASE - CIRCA 1974

M. R. Boss, F. D. Hobbs

During the period August 30 to September 4, 1974, approximately 1.3 Ci of tritium was released via air effluents from Building 776/777. Subsequent sampling confirms that tritium concentrations returned to normal levels after September 4.

Three possible causes of this incident were considered. One; the release may have been the result of buildup and subsequent release of residual tritium from the July 1973 tritium incident. Two; it may have been caused by a recent receipt of tritium-contaminated materials. Three; a combination of circumstances, involving both residual buildup and additional source material.

Regardless of the cause of this release, there was no significant elevation in ambient air or water tritium concentrations. There was only a single rainwater sample collected during this time period in which a detectable increase in tritium concentration above background was detected. Independent analysis by the Colorado Department of Health confirms these findings. Also, specific tritium urinanalysis on operating personnel who may have been exposed indicates no measurable increases.

SUMMARY AND CONCLUSIONS

The specific cause of the tritium release could not be absolutely determined. One possible source was a sealed shipping container in which samples were received from Battelle Northwest Laboratories (BNWL). However, tritium contamination residing in glovebox lines, exhaust and supply plenums from the previous major tritium incident in 1973 cannot be totally discounted as the cause or at least being contributory. One significant fact relating to the recent tritium incident remains that no operating personnel received an exposure as indicated by urinanalysis. Also,

persons in the vicinity of the Rocky Flats Plant were not exposed to tritium levels above normal background. The fact that the incident did occur indicates the possibility of future incidents, possibly of greater magnitude, and the need for improved, diligent monitoring to preclude receipt of unknown contamination from other USAEC sites.

DISCUSSION

Immediately upon indication of elevated tritium concentrations in effluent air from Building 776/777, an investigation of the causes was initiated. The possibility of the receipt and processing of a tritium-contaminated shipment or buildup of residual contamination from the July 1973 tritium incident were both considered.

It was learned that elevated room air concentrations of tritium were detected in the special assembly area of Building 776/777, although these elevated concentrations could not be related specifically to the time period of the effluent air releases. It was further learned that two separate sealed shipping containers were opened in the special assembly downdraft room on August 29. These containers had been received from BNWL on July 17, 1974. One contained parts, while the other contained samples from the parts. Following verification of weights, the samples were immediately repackaged for shipment to Lawrence Livermore Laboratories on September 4, 1974. The parts were subsequently placed in the production stream for recycle.

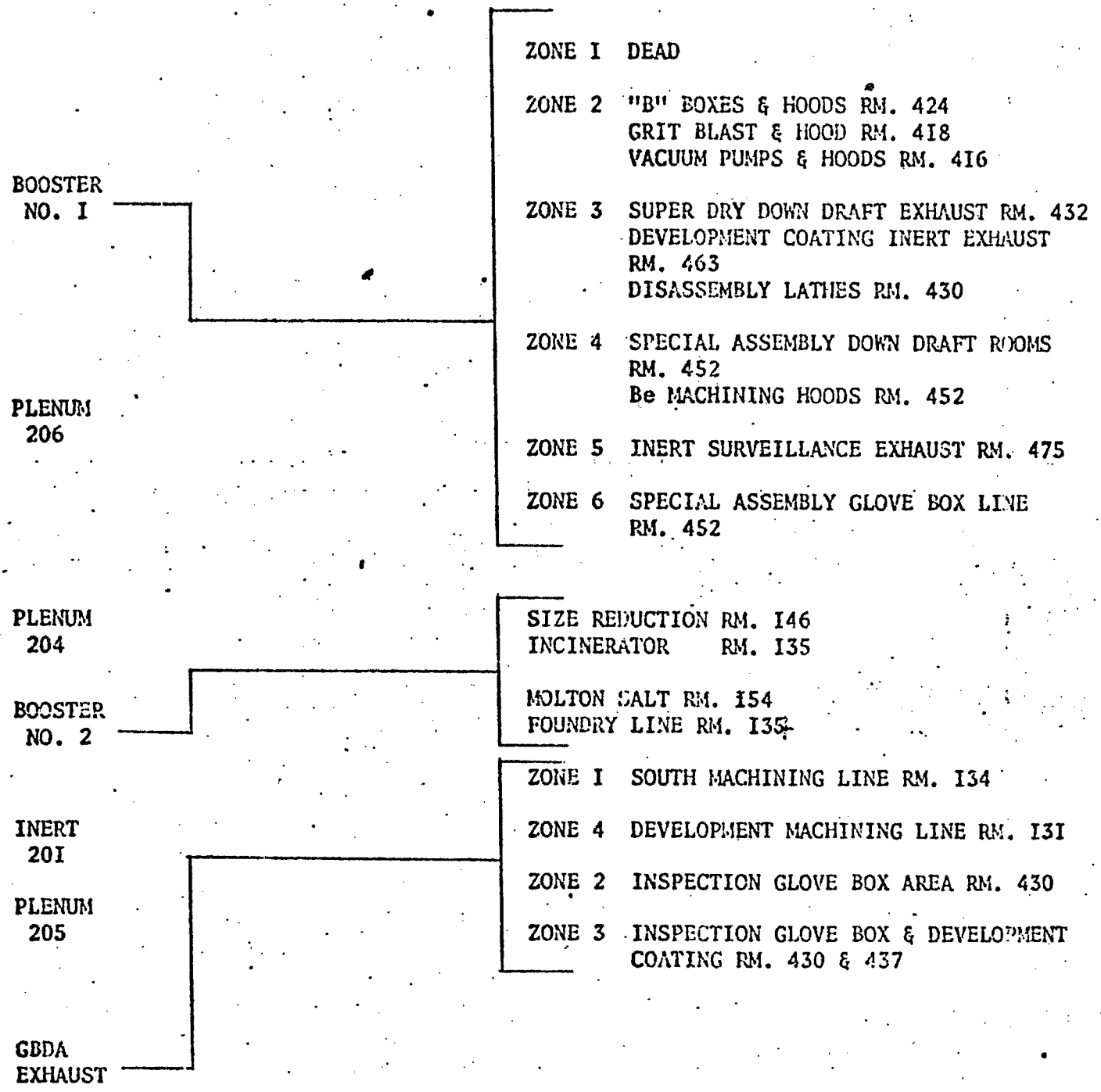
Tritium analysis of the shipping vessel containing the samples showed 1.33×10^8 pCi tritium/smear, while the vessel containing the parts showed 1.16×10^4 pCi tritium/smear. The fact that the container with small samples of the part had the highest contamination level indicates the pressure vessels, and not the material contained in the vessels, were contaminated.

Elevated room air samples were collected in an area immediately adjacent to the downdraft room in which the shipping containers were opened. However, the validity of the elevated room air samples could not be absolutely confirmed due to a suspected cross-contaminated sampling apparatus.

The other portion of the investigation centered around the possibility of residual contamination from the July 1973 incident, and proved to be complex due to the extensive modification of Building 776/777 exhaust systems in recent months. These modifications eliminated the existing glovebox dry air systems and booster-type systems one and two. These systems were replaced by four distinct exhaust ventilation systems. During the course of these modifications, a myriad of construction and operational upset conditions were experienced. These upset conditions generally include excessive positive/negative glovebox pressures, excessive leakage between exhaust systems as the result of cross-connections, temporary ducting connections between systems to obtain air balance or cooling within a system and excessive building humidity. A chronology of the ventilation operations thought to be pertinent is included as Appendix I.

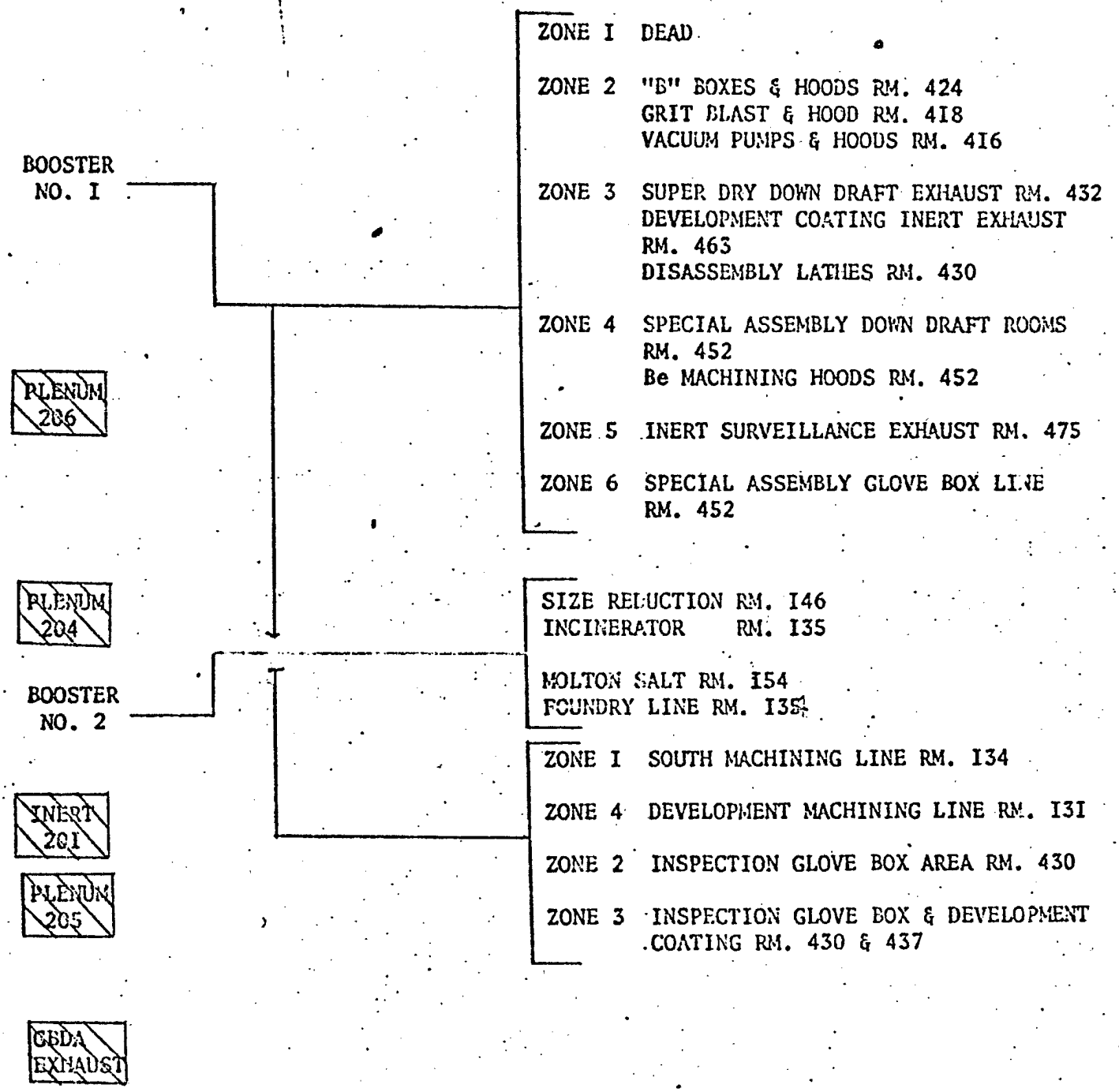
Construction modification to the effluent ventilation system is shown in the accompanying diagrams. Two new exhaust plenums were constructed in 1974. As shown, System 205 was placed in service in February 1974 and exhausted the dry air glovebox system in Building 776. At this time, exhausted air from the special assembly room was diverted, via temporary ductwork, to System 205 and this condition persisted until early August when Plenum 206 was completed. This temporary connection between 205 and 206 explains the tritium contamination found in both systems.

ORIGINAL CONFIGURATION



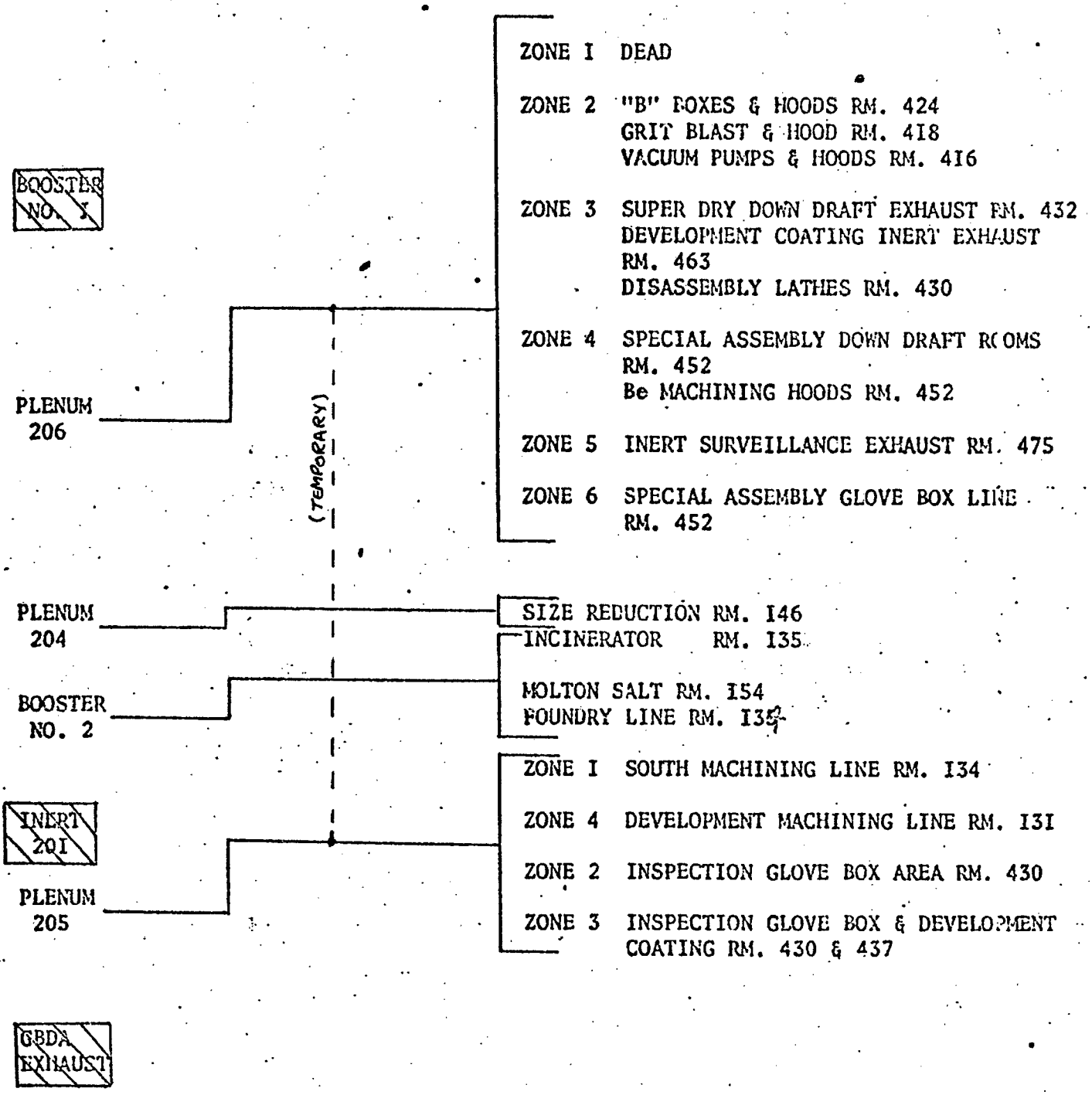
REF. DRAWINGS NO. 1394I-1
1394I-2
1394I-3

GBDA EXHAUST TO BOOSTER NO. I MAY 14,1973



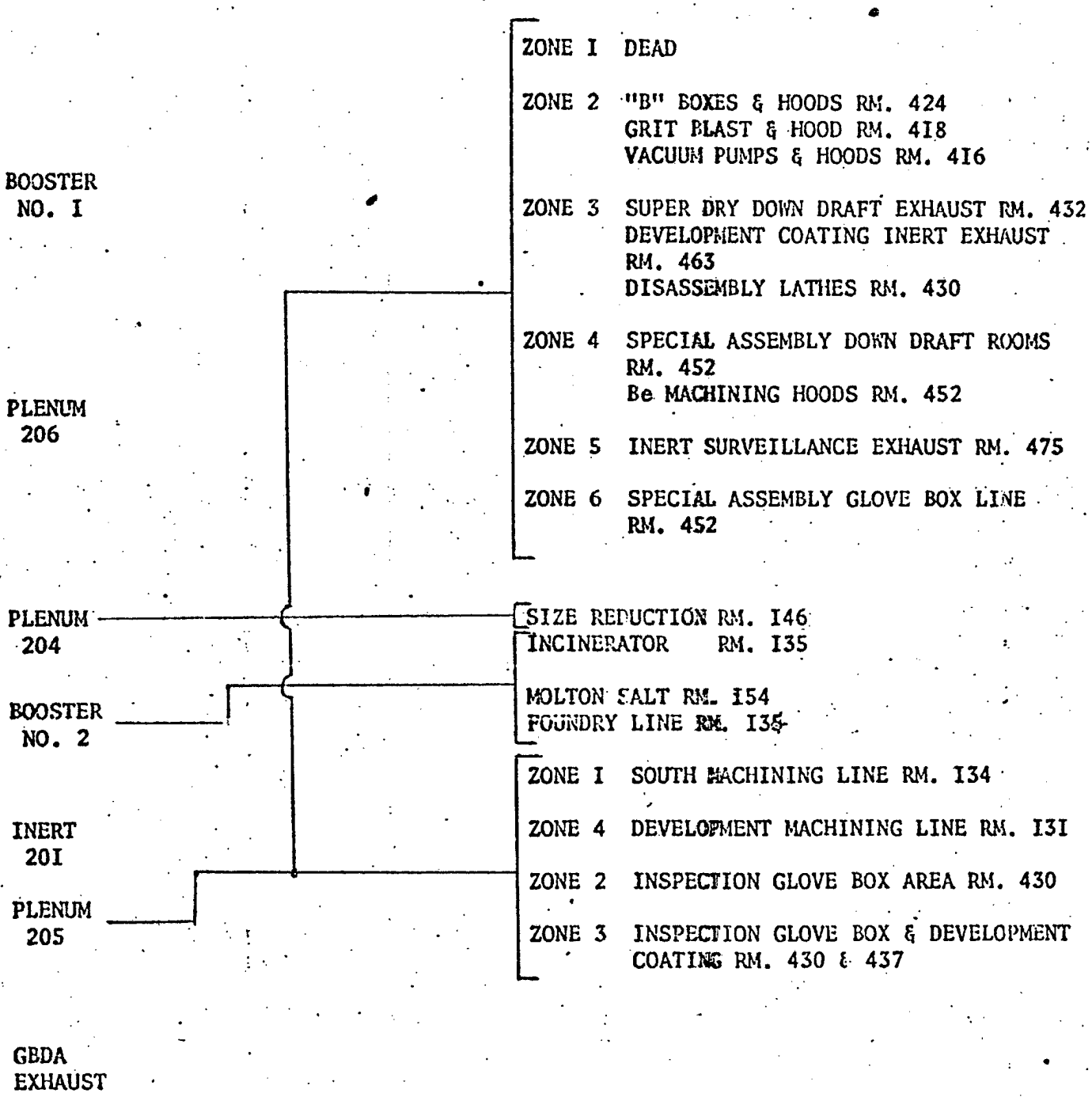
REF. DRAWINGS NO. I394I-I
I394I-2
I394I-3

CLD BOOSTER NO. 1 LOAD TO PLENUM 206 AUG. 7,1974

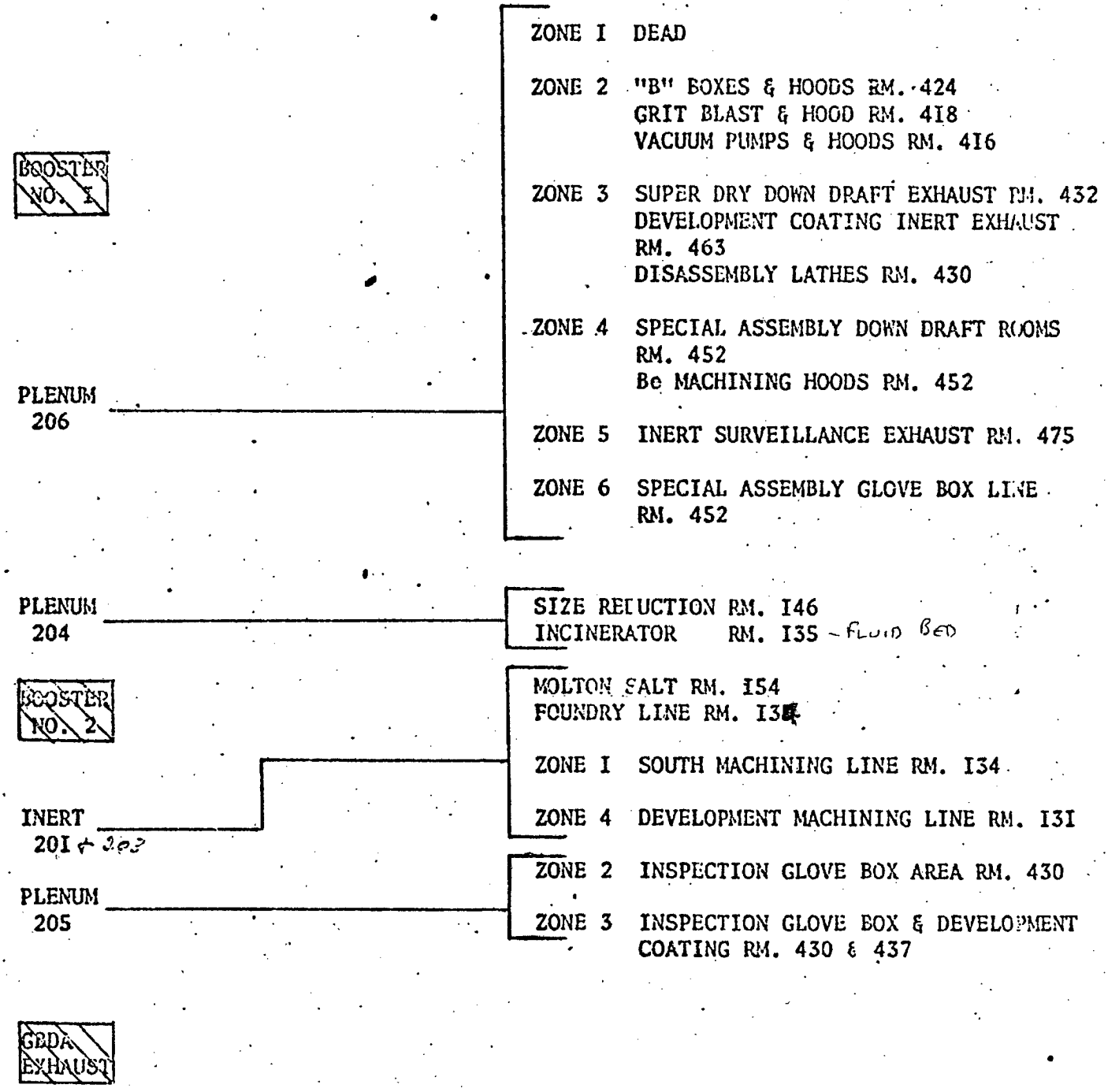


REF. DRAWINGS NO. I394I-I
I394I-2
I394I-3

GBDA TO PLENUM 205 FEB. 11, 1974



REF. DRAWINGS NO. I394I-I
I394I-2
I394I-3



REF. DRAWINGS NO. I394I-I
I394I-2
I394I-3

During the period August 23-25 and August 30-September 2 excessive humidity caused the dry air systems (205,206) to contain considerably more moisture than is normally present in these effluents. A steam supply outage caused dryer shutdown on August 24 and the dryer capacity was deliberately reduced on August 27 to conserve energy. Unseasonable rains, occurring at this time, also aggravated the abnormally higher humidity.

Tritium contamination residing in glovebox lines, exhaust and supply plenums could not be discounted as being contributory to the increased contamination observed in other lines and effluent exhaust. The releases were undoubtedly the result of any one or more of the conditions cited. Additionally, analysis of various drying agents reveal the presence of contamination and illustrate that room air supplies are contaminated to some extent.

RECOMMENDATIONS

As the result of past experiences, recommendations for improving the overall tritium handling program can be made. Some appear fundamental or even trivial, but more importantly, all are feasible and easily implemented.

1. Expedite the surveillance required to characterize the tritium contamination levels known to exist in areas of Buildings 776/777, 707, 771, and 774. In the absence of complete information regarding the residual activity, it becomes increasingly more difficult to specifically determine the extent and location of additional tritium contamination entering the Rocky Flats Plant from incoming shipments.

2. With the exception of retirement pits, recycle plutonium buttons, and oralloy components, all other incoming shipments of SS material must be evaluated for tritium contamination.

3. The tritium detection program should be expanded to include individual pressure vessels and other shipping containers. This program, in its present form, heavily relies on administrative controls to prevent the shipment of tritium-contaminated SS material to the Rocky Flats Plant. Historically, it is known that SS materials have been shipped to Rocky Flats in containers contaminated with tritium.

4. Expedite the construction of the tritium surveillance area planned for Room 431, Building 777.

5. Expand the overall surveillance program to include non-SS materials shipped to Rocky Flats from other USAEC contractors.

6. Standardize the collection, flow rates and apparatus in those samples used for tritium analysis.

7. Cross-contaminated sampling apparatus, resulting in the loss of data, points to the extreme care that must be exercised to obtain valid sample results.

8. All containers used in shipping SS materials should be physically identified by number. These container numbers should likewise appear on the authorization for shipment (Form RF-43940, see Appendix V). This additional information would be invaluable in documenting the history and usage of these containers.

9. The increased emphasis on routine tritium monitoring in the production buildings makes the acquisition of liquid scintillation counters desirable in the supporting laboratories.

10. Since Rocky Flats has agreed to accept materials slightly contaminated with tritium, the routine tritium urinanalysis program should be continued with periodic data evaluation.

11. Install continuous tritium monitoring instrumentation in those operations having a release potential. (Specifically, the special assembly areas of Building 777.)

12. Develop procedures and provide facilities for decontaminating shipping containers and other equipment. There appears to be a significant cost savings involved in doing this.

13. The reduction of dryer capacity in building air supply systems to save energy is of dubious value. This practice should be eliminated until the benefits become more obvious.

BUILDING 776 AND 777 VENTILATION OPERATIONS

APPENDIX I

BUILDINGS 776 AND 777 VENTILATION OPERATIONS

8/02/74	Checked out the control room "master" speed controls for supply and exhaust fans.
	Required speed changes on most major fans.
8/03/74	Completed steam outage at "C" pit. Welded fittings into the high pressure condensate line to permit the discharge of condensate from the 300 psi line into the 776 to 771 condensate line. (Not yet in service).
	Installed check valves in the preheat coil condensate lines from systems 4, 6 and 2.
	Overhauled the west reducing station.
	This shutdown allowed all the 776/777 ventilation systems to go to almost atmospheric humidity. The inerted systems were the only ventilation systems not affected.
8/06/74	Booster #1 was curtailed for construction work.
	The final stage of plenum 206 was tested and the plenum is alright for service.
	The Booster #1 curtailment was to install a fitting on the second floor booster ductwork to provide a method of using a portable exhauster to assist in the forthcoming shutdown.
8/07/74	The Booster #1 load which was temporarily handled by the GBDA exhaust plenum 205 was switched into the new booster type exhaust plenum 206. Construction cut one day off their scheduled downtime.
	Air is being pulled through the zone #2 ductwork and the supply plenum to cool the oversized 205 exhaust fan and prevent excessive negative on the GBDA boxes.

8/07/74	At this time the 205 plenum was connected to loads handled by the original GBDA exhaust plenum and the 206 plenum was connected to loads handled by the original Booster #1 plenum.
8/09/74	A meeting was held to schedule the shutdown for the inert tie-in and the GBDA start up.
8/12/74	The GBDA controls were prepared for start up.
8/14/74	Went into shut down conditions for inerting.
8/16/74 through 8/18/74	Construction worked overtime and completed the shutdown work.
	The GBDA system was put into service followed by the Inert system.
	Excessive leakage between the Inert system and the GBDA system caused trouble. A cross connection was located Saturday, August 17, 1974.
	The GBDA system could not be operated in fully automatic condition because the leakage through the vortex vanes more than equals the amount of supply that can be forced into the system.
	The temporary supply duct from GBDA zone #3 to the super dry intake was put into service and the super dry room was worked down to a minus 36^0F dewpoint for the Killdeer project.
8/23/74	Decontaminated the top of plenum 205 and the GBDA zone #3 safety disk. The supply line is hot and when the safety disk lifts there is a contamination potential. The safety disks will be removed.

8/23/74 The outside air intake of supply system #5 was found to be hot. (Decontaminated Monday, August 26, 1974).

The Inert system area #2 supply line was shut down so construction could make some corrections to the system.

8/24/74 Steam shutdown to install check valves in the condensate lines of the remaining supply system preheat coils.

This shutdown allowed all ventilation systems except the Inert systems to go to atmospheric humidity.

8/26/74 The Killdeer project is completed.

The S-5 system was started up.

8/27/74 Started cutting back on dehumidification and power consumption in Buildings 776 and 777.

Completed the filter plenum fire detection tests. Several small faults were noted and repair requests were issued.

Completed the bimonthly safety checks.

DOP tested the S-5 supply HEPA filter bank.

Filter Technicians started the decontamination of the Booster #2 filter plenum.

The cut back on dehumidification was excessive and the following day Supply Systems #1, #4, #7 and #8 Kathabars were returned to service to partially dry out the building.

8/31/74 Cleaned exhaust fans. This required shutting down the individual main exhaust fans and increasing the flow carried by the other three.

9/02/74	Had a data logger on control room negative. The building negative was alright.
9/03/74	Kathabar representative was here to check out S-5 Kathabar. S-5 was operated at high fan speed with Kathabar in operation.
	#1 exhaust fan in high speed.
9/04/74	S-5 back on slow speed, Kathabar off. #1 exhaust fan back to medium speed.
	4:00 p.m. - Attempted to put #3 main exhuast fan on. Could not start it.
	5:55 p.m. - #4 main exhaust shut down on overheat. Put #1 and #2 exhaust fans on high speed.
	9:04 p.m. - #4 exhaust on the line in medium speed, #1 and #2 exhaust fans in medium speed.
	11:04 p.m. - Data logger failed. It was out of service until September 11, 1974.
9/05/74	Exhaust fan #3 back in service. Problem had been caused by a mislabeled control circuit breaker.
9/06/74	Shut down #5 and #8 Kathabars. The #4 main exhaust fan was down for cleaning.
	Health Physics checked plenums 205 and 206 for tritium.
	S-9 shut down for painters.
9/07/74	S-4 Kathabar off. Not needed.
9/09/74	DOP tested the S-3 supply system HEPA filter bank.

9/09/74

Health Physics entered plenums 205 and 206 to get samples for investigation.

#4 exhaust fan was put into operation. All exhaust fans have now had the belt guards revised to meet OSHA.

All supply systems now operable.

9/11/74

The special assembly glovebox dryer system was removed from service to gather silica jel samples. Back in service on the p.m. shift.

Samples were collected from the GBDA and S-1, S-3/7, S-4 and S-8 Kathabar systems.

Experienced an upset on the Inert system. Apparently it was caused by air lock leakage.

The data logger was repaired and returned to service. It was necessary to replace the analog digital converter board.

ENVIRONMENTAL SAMPLE RESULTS

APPENDIX II

TRITIUM CONCENTRATIONS IN EFFLUENT WATER (pCi/l)

Date	Pond A-1	Pond B-4	Pond C-1	Walnut Creek at Indiana
8/22/74	-	4200	1200	3000
8/27/74	-	1400	3503	6000
8/28/74	-	634	625	2332
8/29/74	-	788	504	2401
8/30/74	-	1180	4125	1575
9/01/74	1512	1164	*	3136
9/02/74	2165	579	803	1834
9/03/74	1193	1296 (2042)	537	2228
9/04/74	5520	*	3568	552
9/05/74	*	*	1606	*
9/06/74	2374	*	*	1730
9/07/74	*	*	*	*
9/08/74	*	*	*	*
9/09/74	*	*	*	*
9/10/74	1382	6374	*	2092
9/11/74	1063	962	513	2427
9/12/74	1986	1952	623	6186
9/13/74	1479	692	*	1362

( ) Replicate Sample

* <MDA

TRITIUM CONCENTRATIONS IN AMBIENT AIR (pCi/m^3)

On Site

Date		Vol (m^3)	pCi $^3H/m^3$
8/09-8/23/74	S-80 (Pond A-1)	20	1.4
8/16-8/23/74	S-22 (Gate 12)	10	1.1
8/23-8/29/74	S-80	8.9	5.1
8/23-8/29/74	S-22	8.9	<2.3
8/29-9/05/74	S-80	8.9	<MDA
8/20-9/05/74	S-22	8.9	<MDA

Off Site

8/16-8/23/74	S-27	10	<1.4
8/23-8/29/74	S-27	8.9	<5.0

M. R. Boss
9/20/74

TRITIUM RAINOUT (pCi/l)

Date	T-4	T-5	T-8	T-10	T-50	T-51
8/09/74 (0.18")	1886	1267	515	*	1246	3043
9/02/74 (0.40")	1390	749	1037	*	46322	1219
9/12/74 (0.15")	*	*	*	*	*	523

Locations

T-4	North of Building 771 at fence
T-5	East of Building 771 at fence
T-8	East of fence
T-10	East of Building 444
T-50	Northeast of Building 995 at fence
T-51	East of Building 776/777

* <MDA

M. R. Boss
9/20/74

TRITIUM URINANALYSIS

APPENDIX III

URINE ANALYSIS

Tritium analysis are randomly performed on 10% of our normal Pu/Am urine samples. From these data, a baseline will be established to indicate trends, if they exist. Specific tritium analysis will continue to be made on employees working in areas showing increased concentrations. Tritium urinalysis results displaying total body exposures exceeding 1 mrem/week will be accounted to the employees radiation exposure record and appropriate actions taken when indicated.

Tritium urinalysis results, pertinent to the latest occurrence are tabulated below, together with preliminary background data:

Identifications	Area	pCi H^3/ℓ
998	777	15740 ± 6100
869	777	25610 ± 6100
510	777	32320 ± 6170
012	777	21600 ± 5800
548	777	22370 ± 5800
680	777	15730 ± 5640
801	707	13700 ± 5370
180	779	24000
449	779	14000
112	707	17000
-	Non Occupational - Denver	470
004	123	630 ± 580

ITEMS REMOVED FROM SPECIAL ASSEMBLY LINE

APPENDIX IV

ITEMS REMOVED FROM SPECIAL ASSEMBLY LINE

DATE	ITEM	DISPOSITION	pCi/SMEAR
8/2	30923-5987	Molten Salt 776	8000
	DDH-118	Module J Bldg 707	1700
	DDH-120	Module J Bldg 707	1000
	DDH-122	Module J Bldg 707	6000
	DDH-129	Module J Bldg 707	8000
8/5	U-602-3231	Scrap	900
	U-602-3219	Scrap	300
	53037-6500	Scrap	600
	53049-10170	Scrap	5000
8/6	U-622-6039	Offsite Shipment	2000
	U-622-6030	Offsite Shipment	8000
8/13	U-203-6693	Recycle	3000
8/14	U-206-7215	Molten Salt 776	7000
	DDH-108	Module J Bldg 707	7702
	30923-1823	Molten Salt 776	6619
	U-202-8126	Scrap	4000
	11404-18903	Scrap	547
	11803-19801	Scrap	1119
	11402-18903	Scrap	2310
	Can Sampling Fixture	Prod. Surv. 779	1216
8/20	Coupons, 27 ea.	Pu Met. 779	7000
8/14	U-206-7215	Scrap, Recycle	7000
8/20	30501-4214	Scrap	3000
	30501-3503	Scrap	4000
	TAB-1-C-31202	Vault 707	9963
8/23	U-204-6699	Scrap, Recycle	5000
8/14	U-203-6693	Scrap, Recycle	3000
8/20	Coupons, 4 ea.	Pu Met. 771	1260

MRB: 9/24/74

AUTHORIZATION TO SHIP SS MATERIALS

APPENDIX V

REC JUN 27 '74

CLASSIFICATION

UNCLASSIFIED

DOW CHEMICAL COMPANY U.S.A.
ROCKY FLATS DIVISION
GOLDEN, COLORADO

(Refer No. 203)

AUTHORIZATION TO SHIP SS MATERIALS

DATE June 24, 1974 NO. 204

SHIPPER

STATION Battelle, Pacific Northwest Laboratory RIS HYA
ADDRESS P.O. Box 999
Richland, WA 99352
REQUESTED SHIPPING DATE About July 15, 1974
SIGNATURE OF AUTHORIZED REPRESENTATIVE

GENERAL MATERIAL DESCRIPTION

SS MATERIAL (CHEMICAL ELEMENT) Plutonium GROSS QUANTITY 12 grams
PHYSICAL DESCRIPTION Pu metal - unalloyed
CHEMICAL DESCRIPTION α-Pu
PRINCIPAL IMPURITIES Normal for this grade of Pu
MATERIAL ORIGINATION (PLEASE CHECK) ☐ RF; ☐ SR; ☐ ARHCO; ☒ BNWL; ☐ LASL; ☐ LLL; ☐ OTHER

MATERIAL HISTORY

HAS THE MATERIAL BEEN EXPOSED TO ANY OTHER RADIONUCLIDES, SUCH AS FISSION PRODUCTS, OTHER ACTINIDES, TRITIUM, ETC.? (YES OR NO) No
IF YES, DESCRIBE IN DETAIL THE CONDITIONS IN WHICH THE MATERIAL WAS EXPOSED ON A SEPARATE SHEET.

HAS THE MATERIAL COME IN CONTACT WITH ANY HAZARDOUS MATERIAL OR UNDERGONE UNUSUAL PROCESSING OR TESTS? (YES OR NO) No
IF YES, DESCRIBE IN DETAIL THE HAZARDOUS MATERIAL PROCESSING OR TESTS ON A SEPARATE SHEET.

WHAT IS THE FORM OF THE MATERIAL?

SIGNATURE OF SHIPPER'S TECHNICAL REPRESENTATIVE 1 - not available for signature

METHOD OF PACKAGING

OUTSIDE CONTAINER TYPE AEC-AL-USA 5332 BF APPROX. NO. One
INSIDE CONTAINER TYPE RF Pump down can APPROX. NO. One
OTHER CONTAINER INFORMATION evacuated & refilled with high purity gas.
HAZARDS INCLUDING SPECIAL PRECAUTIONS None
"Note" This item is a sample from and will be shipped in the same container with the item described in request No. 203.

DOW RECEIVING APPROVAL

REVIEWED FOR PROCESS COMPATIBILITY
AUTHORIZED TECHNICAL REPRESENTATIVE 7/2/74 DATE

APPROVED FOR SHIPMENT ON 7/15/74 BY
AUTHORIZED SS REPRESENTATIVE 7/2/74 DATE

CLASSIFICATION

UNCLASSIFIED

RF-43940 (10-73)
DESTROY PREVIOUS ISSUE

MBA Acct. No: 361-31, 367-71
(771 Lab)

Date: 6/20/74

Received via (559 Lab) to

Responsible Individual

Intended Use: Chemical, Emission & Fiber Spec analysis.

Anticipated Waste Disposal: Return to

Routine:

Special: SANL 251-106

LLL Engr.

Dow Engr.

Dow 918190

CLASSIFICATION

UNCLASSIFIED

REC JUN 21 '74

DOW CHEMICAL COMPANY U.S.A.
ROCKY FLATS DIVISION
GOLDEN, COLORADO

(Refer, Rec 204)

AUTHORIZATION TO SHIP SS MATERIALS

DATE June 19, 1974 No. 203

SHIPPER

STATION Battelle, Pacific Northwest Laboratory RIS HYA

ADDRESS P.O. Box 999
Richland, Washington 99352

REQUESTED SHIPPING DATE Ready to ship; awaiting approval

SIGNATURE OF AUTHORIZED REPRESENTATIVE

GENERAL MATERIAL DESCRIPTION

SS MATERIAL (CHEMICAL ELEMENT) Plutonium GROSS QUANTITY 301 grams

PHYSICAL DESCRIPTION Pu metal - unalloyed

CHEMICAL DESCRIPTION α Pu

PRINCIPAL IMPURITIES Normal for weapons grade Pu

MATERIAL ORIGINATION (PLEASE CHECK) ☐ RF; ☐ SR; ☐ ARHCO; ☒ BNWL; ☐ LASL; ☐ LLL; ☐ OTHER

MATERIAL HISTORY

HAS THE MATERIAL BEEN EXPOSED TO ANY OTHER RADIONUCLIDES, SUCH AS FISSION PRODUCTS, OTHER ACTINIDES, TRITIUM, ETC.? (YES OR NO) NO

IF YES, DESCRIBE IN DETAIL THE CONDITIONS IN WHICH THE MATERIAL WAS EXPOSED ON A SEPARATE SHEET.

HAS THE MATERIAL COME IN CONTACT WITH ANY HAZARDOUS MATERIAL OR UNDERGONE UNUSUAL PROCESSING OR TESTS? (YES OR NO) NO

IF YES, DESCRIBE IN DETAIL THE HAZARDOUS MATERIAL PROCESSING OR TESTS ON A SEPARATE SHEET.

WHAT IS THE FORM OF THE MATERIAL? Metal piece (part)

SIGNATURE OF SHIPPER'S TECHNICAL REPRESENTATIVE - not available for signature

METHOD OF PACKAGING

OUTSIDE CONTAINER TYPE AEC-AL-USA 5332 BF APPROX. NO. one

INSIDE CONTAINER TYPE RF Pump down can APPROX. NO. one

OTHER CONTAINER INFORMATION Evacuated and refilled with high purity gas.

HAZARDS INCLUDING SPECIAL PRECAUTIONS Open pump down can on down draft table

DOW RECEIVING APPROVAL

REVIEWED FOR PROCESS COMPATIBILITY 6/24/74
AUTHORIZED TECHNICAL REPRESENTATIVE DATE

APPROVED FOR SHIPMENT ON 6/24/74 BY 6/26/74
AUTHORIZED SS REPRESENTATIVE DATE 6/24/74

CLASSIFICATION

UNCLASSIFIED

RF-43940 (10-73)
DESTROY PREVIOUS ISSUE

Date: 6/24/74 MBA Acct. No. 1144-40 (Hold), 1177-81 (Assembly)

Receiver: (Hold in Warehouse)

Responsible Individual

Intended Use: Special Assembly

Anticipated Waste Disposal:

Routine: None

Special: LLL, SANL 253-010 — BNW

LLL, ENGR.

Don-ENGR.

918190

SNL 257-116

TRITIUM SAMPLING RESULTS IN AUGUST

APPENDIX VI

TRITIUM SAMPLING RESULTS IN AUGUST

Concentrations in pCi/m^3 (Multiply by 10^{-12} to obtain uCi/ml)

	779A	561	777-205	777-206	777 Spec Assy - Rm Air	774-B
8-02 to 8-05	1,972	74	657		2,268 ; 2,512	20,700
8-05 to 8-07	4,460	89	739		1,179 ; 628	23,000
8-07 to 8-09	4,049	< Det	2,488		1,789 ; 1,256	20,700
8-09 to 8-12	2,455	< Det	1,363		1,300 ; 1,413	18,400
8-12 to 8-14	5,335	< Det	1,158		Lost	25,300
8-14 to 8-16	4.181	74	Lost		Bkg ; 3,611	23,000
8-16 to 8-19	2,086	135	Lost		; 2,439	23,000
8-19 to 8-21	6,602	Lost	< Det		3,140	25,300
8-21 to 8-23	Lost	< Det	Lost		3,297 ; Lost	30,000
8-23 to 8-26	3,260	< Det	< Det		2,927 ; 8,841	27,600
8-26 to 8-28	4,034	5,911	739		3,100 ; 4,874	25,300
8-28 to 8-30	3,183	30	1,182		3,986 ;	25,300
8-30 to 9-03	1,449	15	148,000	86	37.7×10^6 (8-30)	~23,000
9-03 to 9-04	7,010	< Det	2.51×10^6	2,020	1.1×10^6 8,477 (9-03) (9-04)	~24,000
9-04 to 9-06	7286	< Det	3,862	2,326	4,081 (9-05)	
Integrated value for period 9-04 to 9-06			1,305	3,424		

ROOM AIR SAMPLES - SPECIAL ASSEMBLY

APPENDIX VII

ROOM AIR SAMPLER - ROOM 452
SPECIAL ASSEMBLY - BUILDING 777

Sample Date	Volume/m^3	pCi/Sample	pCi/m^3
5-31	5.94	56,000	9427.6
6-04	5.94	72,000	12121.2
6-03	5.94	121,000	20370.3
6-06	5.94	35,000	5892.2
6-05	5.94	98,000	16498.3
6-13	5.94	32,000	5387.2
6-12	6.15	28,000	4552.8
6-11	6.15	76,000	12357.7
6-10	6.37	89,000	13971.7
6-07	6.15	67,000	10894.3
6-20	5.52	24,000	4347.8
6-19	6.15	28,000	4552.8
6-18	6.57	2,900	441.0
6-17	4.67	27,000	5781.5
6-14	6.15	42,000	6829.2
6-25	5.09	23,000	4518.6
6-24	6.37	Lost	--
6-21	6.15	Lost	--
7-01	6.37	22,000	3453.6
6-28	2.76	12,000	4347.8
6-27	6.15	33,000	5365.8
6-26	6.15	28,000	4552.8
7-05	5.94	23,000	3872.0
7-03	5.94	18,000	3030.3
7-02	6.37	25,000	3925.0
7-09	6.15	16,000	2601.6
7-10	6.15	28,000	4552.8
7-16	5.09	107,000	21021.6
7-15	6.15	36,000	5854.0
7-18	6.15	31,000	5040.6
7-17	5.94	25,000	4208.7
7-23	5.94	6,000	1010.1
7-19	6.37	31,000	4866.5
7-22	6.37	31,000	4866.5

Sample Date	Volume/m^3	pCi/Sample	pCi/m^3
7-26	6.37	16,000	2511.7
7-25	4.25	9,000	2117.6
7-24	6.15	19,000	3089.4
7-31	5.97	11,000	1842.5
7-29	6.37	11,000	1726.8
7-30	4.94	17,000	3441.0
8-01	5.73	13,000	2268.7
8-06	5.09	6,000	1178.8
8-02	6.37	16,000	2511.7
8-07	6.37	4,000	627.9
8-09	6.37	8,000	1256.0
8-08	6.15	11,000	1790.0
8-09	6.37	8,000	1235.9
8-13	6.37	9,000	1413.0
8-12	6.15	8,000	1300.8
8-15	6.37	<MDA	
8-16	6.37	23,000	3611.0
8-19	6.15	15,000	2439.0
8-20	6.37	20,000	3139.7
8-21	6.37	21,000	3296.7
8-22	6.15	Lost	--
8-23	6.15	18,000	2926.8
8-26	5.09	45,000	8840.0
8-27	6.15	19,000	3089.4
8-28	5.95	29,000	4873.9
8-29	5.52	22,000	3985.5
8-30	6.37	240×10^6	37676609.0
9-03	6.37	7×10^6	1098901.1
9-04	6.37	54,000	8477.2
9-05	5.09	26,000	5108.0
9-06	-	Lost	--
9-09	5.94	18,000	3030.3
9-10	6.37	20,000	3139.7
9-11	5.52	16,000	2898.5
9-13	6.15	29,000	4715.4
9-16	5.52	13,000	2355.1
9-17	20.3	33,000	1625.6

SPECIAL ASSEMBLY - DRYBOX SMEARS

APPENDIX VIII

SMEARS IN DRYBOXES IN SPECIAL ASSEMBLY

DATE	BLDG/ROOM	BOX NO.	pCi/SMEAR (MAX.)
8-29-74	777/452	206-548	2,515,000
	777/452	206-541	Possibly lost
		206-513	Possibly lost
		206-512	Possibly lost
		253-030	Possibly lost
		024-029 Pass thru	Possibly lost
		253-029	Possibly lost
		253-028	Possibly lost
		253-027	887,000
		206-531	14,400,000
8-30-74	777/452	253-024	11,000,000
		253-023	1,380,000
		253-022	2,500,000
		206-525	1,770,000
		206-524	501,000
		206-522	10,900,000
9-03-74	777/452	206-541	39,600,000
		206-538	7,890,000
		206-537	7,930,000
		206-536	154,000
		253-032	231,000
		206-527	644,000
		206-528	1,420,000

DATE	BLDG/ROOM	BOX NO.	pCi/SMEAR (MAX.)
9-04-74	777/452	206-511	2,870,000
		206-510	1,060,000
		206-507	6,590,000
		206-505	4,240,000
		206-504	1,640,000
		206-529	488,000
		206-531	404,000
		Conveyor belt	10,200,000
		206-532	339,000
		206-530	122,000
9-05-74	777/452	206-541	91,400
		206-548	300,000
9-10-74	777/452	206-541	2,260,000
		206-531	5,590,000

TRITIUM SMEAR SURVEY

APPENDIX IX

TRITIUM SMEAR SURVEYS

BUILDINGS 776-777

DATE	BLDG/ROOM	BOX OR SYSTEM		Pi/SMEAR (MAX.)
9-05-74	776-154	206-499 Molten salt inside box		5,560
9-06-74	776-205	205 Plenum - cold side		< 100
	776-206	206 Plenum - cold side		< 100
	777-452	206-532	top of box	< 100
		206-536		< 100
		206-538		< 100
		255-043		< 100
		206-541		< 100
		206-543		< 100
		253-022		163
		253-026		< 100
		253-027		< 100
		206-524		< 100
		206-517		< 100
		206-522		< 100
		206-523		< 100
		206-524		< 100
		206-525		< 100
		203-663		< 100
		206-527		< 100
		206-528		< 100
		206-530		< 100
	777-430	206-427	inside box	24,400
		206-408		379,000
		206-448		123,000

DATE	BLDG/ROOM	BOX OR SYSTEM		Pi/SMEAR (MAX.)
9-06-74	777-430	206-452	inside box	4,800
		206-454		6,300
		206-456		19,800
		206-457		88,700
		E.B. Welder		353,000
		206-464		13,400
		206-442		105,000
		206-369		12,900
		206-438		3,880
		206-370		20,800
		206-362		42,800
9-06-74	776 Roof	Penthouse		< 100
	777-437	A-1		110,000
		A-2		4,800
		A-3		9,400
	777-463	A-5		1,200
		Conveyor line		7,900
		A-7		7,700
9-09-74	776-205	205 Plenum (hot side)		211,000
	776-206	206 Plenum (hot side)		1,230,000
	777-430	Unit 36403/21410		520
		Carrier 516		85,600
		Unit 36403/21403		1,200
		Carrier 545		13,200
	777-452	Hydride Beaker		249,000
	777-430	Unit 36403/21410		1,320
		Unit 36403/2140		480

DATE	BLDG/ROOM	BOX OR SYSTEM	Pi/SMEAR (MAX.)
9-10-74	777-452	Oil on floor 206-536	< 100
	777-430	206-400 - inside box	16,200
		206-399	47,500
		206-409	149,000
		206-398	92,300
		206-426	7,640
		206-408	46,600
		206-397	35,200
		206-396	10,300
		206-427	62,800
		206-405	74,800
		206-404	221,000
		206-395	27,700
		206-429	6,960
		206-448	15,100
		206-430	11,000
		206-447	7,680
		Box 454	5,840
		Line 454-452	3,960
		Box 452	4,960
		Line 452-451	32,700
		Box 451	69,100
		Line 454-456	7,720
		Box 456	920
		Line 456-457	6,040
		Box 457	32,500
		Box 458	8,720
		Box 459	144,000
		Box 059	231,000
		Line 457-589	338,000
		Box 589	123,000

DATE	BLDG/ROOM	BOX OR SYSTEM	Pi/SMEAR (MAX.)
9-10-74	777-430	Line 589-462	10,600
		Box 462	17,500
		Box 466	10,200
		Line 462-452	6,440
		Line 356-357	160,000
		Line 357-316	318,000
		Box 316	13,000
		Line 316 E	413,000
		Line 316 W	182,000
		Line Box 360	28,410
		Box 360	45,600
		Line 360-361	160,000
		Box 361	120,000
		Line 361-362	226,000
		Box 362	111,000
		Line 362-328	163,000
		Line 364	725,000
		Line 440	138,000
		Line 328	73,900
		Line 325 E	74,700
		Line 325	24,900
		Conveyor to 443	255,000
		Box 166	18,000
		Box 515	15,200
		Box 163	221,000
		Box 161	6,480
		Box 505	2,200
	776 - Size Reduction	Filters	9,760
		Floor	< 500
	776-201	Floor	1,100

DATE	BLDG/ROOM	BOX OR SYSTEM	Pi/SMEAR (MAX.)
9-11-74	777-430	Box 447	31,300
		Box 431	13,800
		Box 432	4,240
		Box 445	18,200
		Box 443	2,680
		Box 444	472,000
		Box 434	84,800
		Box 443	120,000
		Box 435	167,000
		Box 442	145,000
		Box 436	96,400
		Box 437	117,000
		Box 438	46,300
		Box 439	32,000
		Box 366	7,840
		Box 365	12,300
	777-437	N. Conveyor	46,300
	777-463	Box A-4	20,300
	777-437	Box A-6	5,640
	↓	252-082	9,040
	777-452	Silica Jel dwyer ~ 250-300 dlb (mrv)	< 100 = 13.6 mCi H^3
	776-Booster II	Filters	480
		Floor	< 100

DATE	BLDG/ROOM	BOX OR SYSTEM	Pi/SMEAR (MAX.)
9-11-74	777-430	Box 373	82,400
		Line 373-372	30,900
		Box 372	141,000
		Line 372-371	21,800
		Box 371	8,130
		371 Weights	800
		371 Scale	157,000
		371 Carriers	4,120
		371 Balance	2,680
		Line 371-370	64,700
		Box 370	57,100
		Line 370-367	29,900
		Box 368	16,800
		Box 367	25,400
		Box 369	23,000
		Line	16,200
	777-452	Floor at J-24	460
		Floor at K-24	470
		Floor at L-24	640
		Floor at M-24	780
		Floor at K-25	560
		Floor at J-25	950
	777-430	Line 314	59,500
		Box 329	560
		Box 330	1,240
		Box 331	2,080
		Box 332	2,360

DATE	BLDG/ROOM	BOX OR SYSTEM	Pi/SMEAR (MAX.)
9-11-74	777-430	Box 334	2,880
		Line 307-314	4,960
		Line 308	8,200
		Box 318	2,360
		Box 314	28,800
		Box 324	67,700
		Box 312	10,900
		Box 323	7,360
		Box 311	74,900
		Box 321	23,300
		Line 321-320	23,900
		Box 320	3,280
		Box 309	7,720
		Box 206-447	226,000
	776-250	Plenum Floor	< 100
		Plenum Fan	< 100
	776-252	Plenum Floor	465
		Plenum Filter	1,636
	776-S-8	Plenum Filter	< 100
		Plenum deep beds	< 100
	776-S-7	Plenum Filter	< 100
		Plenum Floor	< 100
	776-S-4	Plenum Filter	< 100
	776-251	Plenum Floor	3,625
		Plenum Filter	3,603

DATE	BLDG/ROOM	BOX OR SYSTEM	Pi/SMEAR (MAX.)
9-11-74	776-440	Floor	1,000
	776-432	Floor K-20	500
		Floor H-19	1,460
		Floor H-20	710
		Floor K-19	520
	776-201	#1 System Kathene	160,000 = 0.2 mCi
		#4 System Kathene	400,000 = 0.8
		#3/7 System Kathene	450,000 = 1.4
		#8 System Kathene	140,000 = 0.2
		GBDA System Kathene	400,000 = 0.7
			3.3 mCi