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ChemRisk/Shonka Research Associates, Inc., Document Request Form

(This section to be completed by subcontractor requesting document)

Jack Buddenbaum / K-25 Site Records
Requestor / Document Center (is requested to provide the following document)

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Signature

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K/EM-134

Sanitized Version of Folder Containing

INFORMATION ON AIR POLLUTION EFFLUENT STUDY (1956-58)

Compiled by
S. G. Thornton
Environmental Management Division
OAK RIDGE K-25 SITE
for the Health Studies Agreement

May 1995

Oak Ridge K-25 Site
Oak Ridge, Tennessee 37831-7201
managed by MARTIN MARIETTA ENERGY SYSTEMS, INC.
for the U.S. DEPARTMENT OF ENERGY
under Contract DE-AC05-84OR21400

This document has been approved for release to the public by:

G M Hall for A S Quist 6/26/95
Technical Information Officer Date
Oak Ridge K-25 Site

DATE	FLUORINE (Pumped Samples)									HF (Pumped Samples)					NO2		HF (Pumped Samples)					CLF3		Pumped Samples ClF				Pumped Samples ClF3				Pumped Samples COF2				Pumped Samples ALF3			SO2 Pumped Samples		
	912-1	912-3		1902	1802	1490	1428	1930	Total					Total	1420						Total			1391	384-4	912-3	Total	912-4	912-1	912-3	Total	912-1	912-3	Total	912-1	912-3	Total	709	1501	Total
1-16-58																						0.1																			
1-24-58	48.26	6.23	0.3			1.6			56.39								10	27		2.2	39.2																	376	2.79	378.73
2-9-58	28.21	9.51		19.9	32.8		4	11.2	96.67	1.12				1.12	200		10	27		4	41.0																	370	4.49	374.68
2-17-58				18.9	32.8	0.1		11.2	133.1	1.57				1.57	280		10	27		4	41.0																		8.36	8.36
2-25-58	16.8	12.0		0.65	32.8	1.5	9	11.2	83.95	0.35	0.1			0.45	228		10	27			32.0	0.25		0.25																0.25	0.25
3-5-58	19.96	3.84		10.9	33.8	0.5	1		68.96	0.99	0.05			1.04	232		10	27			37.0	3.7		3.7															26.0	0.11	26.11
3-13-58	29.4	2.30	0.6	57.23	32.8	2.0	4		127.33	0.282	0.195			0.477	220		10	27			37.0																		18.6	4.92	23.52
3-21-58				4.4	32.8				37.2	0.378	0.02			0.398	200		10	27																					68.4	1.40	69.80
3-22-58	34.2	2.23							36.43																																
3-29-58	91.3	1.37	0.3	37.4	32.8				93.17	1.18				1.18	214		10	27			37.0	2.95		2.95		0.98	0.43	0.88		0.08										35.10
4-6-58																																								17.89
4-14-58	32.56	1.91		15.2					49.67	0.92				0.92	8							1.47	0.1	1.57			0.01	0.01	4/23	0.027							21.0	0.10	21.10
4-22-58	22.04	1.29		16.7		3			93.51						54							1.47		1.47	0.37		0.96	0.96	4/23	0.10							540	3.2	543.2
4-30-58			0.3		32.8				33.1						40		10	27			37.0	0.75		0.75													30.4	0.08	30.48
5-8-58	7.39			11.2	32.8	2			53.94	0.78	0.2			0.98	32		10	27			37.0		4	4.0		0.84		0.84	0.22		0.22	0.14		0.14				28.2	0.35	28.55
5-16-58	7.29				32.8	1			4.79						12		10	27			37.0																			
5-24-58	9.80				32.8				42.7								10	27			37.0	3.0		3.0		0.43		0.43	0.05		0.05							0.07	0.07
6-1-58																				4	41.0	0.75		0.75	1.31													0.07	0.07
6-9-58			0.3	51	32.8			11.2	44.5											4	4.0		3	7.0														0.07	0.07
6-17-58				38.0				11.2	49.2	0.24				0.24	14								2.2	5.2														0.16	0.16
6-25-58				50.4		4			54.4	0.52				0.52																								0.06	0.06
7-3-58			0.3	7.6	32.8	4.25			44.95	1.76				1.76				27			37.0	6.73		30.73														0.05	0.05
7-11-58																						1.5		1.5														0.06	0.06
7-19-58				14.0	32.8			11.2	58.0	1.67				1.67				27		4	31.0			31.0														0.06	0.06
7-27-58	11.69				32.8			11.2	44.0									27		4	31.0	1.46		32.46														0.06	0.06
8-4-58	11.97			9.47	32.8	2		5.6	59.84	1.99				1.99	12		10	27		2	39.0	1.46		1.46		0.89		0.89	0.11		0.11	0.52		0.52	0.03		0.03	0.07	0.07
8-12-58						4.0			4.0						18					2	39.0	1.46		1.46		1.61		1.61	0.22		0.22	0.46		0.46	0.13		0.13	0.06	0.06
8-20-58								5.6	5.6						216		10			2	12.0	2.92		2.92														0.07	0.07
8-28-58								5.6	5.6						912		10			2	12.0	1.46		1.46														0.07	0.07
9-6-58						0.5		5.6	6.1						200		10			2	12.0	4.73	2.50	3.23														0.06	0.06
9-18-58																						0.73		0.73														0.07	0.07
9-21-58	2.99			16.40				5.6	122.51	1.85	1			2.85	216		10			2	12.0	2.19		2.19		4.31		1.31	0.34		0.34	0.19		0.19				0.08	0.08
9-29-58			0.3	38.9		2.5		5.6	99.4	1.16				1.16	912		10			2	12.0																	0.09	1.09
10-7-58			0.3	17.8					18.1	1.88				1.88	10							0.75	1.5	2.25														0.09	0.09
10-15-58	2.96		0.3	16.24		8.0		5.6	19.2	0.81	1.0			1.81	224		10			2	12.0		1.50	0.50		0.53		0.53	0.13		0.13	0.16		0.16						

	FLUORINE									UF_6						NO_2	HF								ClF_3			U	Cl_2			ClO_3F			$ClOF_2$			ClF			SO_2		
DATE	312-1	312-3	1004L	1131	1301	1401	1413	1420	Total	1004L	1131	1401	1413	1420	Total	1420	1004L	1131	1231	1301	1401	1413	1420	Total	1004L	1401	Total	1131	312-1	312-3	Total	312-1	312-3	Total	312-1	312-3	Total	312-1	312-3	Total	703	1501	Total
10-23-58				9		4.0		5.6	18.6		0.61				0.61	210			10				2	12	1.46	0.1	1.56															0.09	0.09
10-31-58			0.3	185				5.6	190.9		0.72				0.72	200			10				2	12																		0.09	0.09
11-8-58			0.3	124					124.3		0.68				0.68										0.73		0.73															0.10	0.10
11-16-58				325		3.0			328.0		1.22				1.22	8										0.25	0.25															0.09	0.09
11-24-58			0.3	61.9		6.0		5.6	73.8		1.22				1.22	212			10				2	12																		0.10	0.10
12-2-58			0.3	127					127.3		1.85				1.85	8									0.74		0.74															0.12	0.12
12-10-58				110					110		1.38				1.38	10									1.46		1.46															5.83	5.83
12-18-58				105					105		1.01				1.01	8									0.73		0.73															5.83	5.83
12-26-58				49.0					49.0		0.78				0.78																											3.68	3.68
Total	279.92	69.77	3.3	238.95	557.6	48.95	18	140.0	1373.78		186.10	2.52			188.62	36.18			280	459	0.1		48.2	739.30	41.93	14.95	149.88	1.58	5.16	206.63	211.79	1.07	.773	1.843	1.47	4.56	6.03	0.16	2.29	4.77	1155.40	43.58	1574.98

WCX-885 (Jan'58) Y-12 DATA SHEET

	Fluorine				U-6				N-F				C/F			
Date	1004-8	1401	1413	Total	1004-8	1401	1413	Total	1004-8	1401	1413	Total	1004-8	1401	1413	Total
1-4-59	0.30			0.30									0.74			0.74
1-19-59			55.0	55.0			1.5	1.5			2.5	2.5	1.46	3.0		1.76
1-27-59			5.0	5.0									1.46			1.46
2-4-59		3.0		3.0												
2-12-59													1.46			1.46
2-20-59													2.92			2.92
2-28-57	0.3			0.3									0.73			0.73
3-8-59	3.0		4.0	7.0			1.0	1.0								
3-16-59	0.2	2.0		7.2									0.74			0.74
3-24-59		5.0		5.0												
4-1-59		5.0		5.0									2.92			2.92
4-9-59		7.0		7.0									1.46			1.46
4-17-59													1.46			1.46
4-25-59																
5-3-59		1.0		1.0										0.5		0.5
5-11-59		3.0		3.0									1.46			1.46
5-19-59		4.0		4.0												
5-27-59		3.0		3.0												
6-4-59		5.0		5.0									0.73			0.73
7-6-59	0.3			0.3									1.46			1.46
7-14-59																
7-30-59		8.0		8.0												
8-7-59		3.0		3.0									7.4			7.4
8-15-59	0.3			0.3									2.10			2.10
8-23-59	0.3	3.0		3.3									0.74			0.74
8-31-59	0.3	9.0		9.3												
9-8-59		8.0		8.0									0.74			0.74
9-16-59	0.6	4.0		4.6									7.30			7.30
9-24-59	0.3	7.0		7.3												
10-2-59	0.3	3.0		3.3									0.74			0.74
10-10-59																
10-18-59		4.0		4.0		0.1		0.1								
10-26-59			30.0	30.0			1.0	1.0					0.74			0.74
11-3-59	0.3	9.0		9.3									0.74			0.74
11-12-59	0.30	3.00	19.75	23.05			0.23	0.23					0.74			0.74
11-27-59													0.74			0.74
12-5-59	0.30			0.30									0.74			0.74
12-13-59	0.30			0.30									0.74			0.74
12-21-59		6.0		6.0												
TOTAL	7.40	110.00	113.75	231.15		0.1	3.73	3.83			2.5	2.5	42.46	3.5		43.26

1/9/1957

SURVEY OF ATMOSPHERIC EFFLUENT OF THE ORGDP - ~~February 1, 1957~~

Cal. as F_2 except where indicated

Building	Type Operation	Contaminant	Amount of Contaminant Emmitted/Month
K-31	Cold Trapping	F_2, HF, UF_6	102 lbs./~~month cal. as F_2~~ — 102 lbs/month
K-33	Cold Trapping	F_2, HF, UF_6	516 lbs./~~month cal. as F_2~~
K-402-8	Cold Trapping	F_2, HF, UF_6	5.4 lbs./~~month cal. as F_2~~
K-413	Cold Trapping & Side Withdrawals	F_2, HF, UF_6	5.4 lbs./~~month cal. as F_2~~
K-633	Test Loops	F_2	18 lbs./~~month cal. as F_2~~
K-631	Tails Withdrawal	UF_6	A release approx. once a year
K-1302	F_2 Cells Conditioned	HF, F_2	3620 lbs. HF/ month
K-1401	Converter Conditioning	F_2, ClF_3, UF_6	10 lbs. ClF_3/month, 30 lb F_2/month
K-1420	Nitric Acid Spray Booth	NO_2, NO, N_2O N_2O_4	1335 lbs./month cal. as HNO_3
K-1420	Furnace Stand Converter Conditioning	F_2	20 lbs./~~month as F_2~~
K-1420			
K-1420	Oxide Fluorination	F_2	159 lbs./~~month as F_2~~
K-1421 1031	Incineration	Fly Ash	Possible Traces of UO_2F_2 & UF_4
K-1420	Drum Dryer Calciner	NO_2, NO, N_2O N_2O_4	150 lbs./month as HNO_3
K-1410	Decontamination	UF_6	UF_6 releases possible on occasions
K-1131	Cold Trapping	UF_6	50 lbs. of UF_6/month
K-1131	Feed Manufacturing	F_2, HF	200 lbs. F_2/month, 1000 lbs. HF/month
K-1413	EDD Pilot Plant	UF_6, F_2	20 lbs. of UF_6/month, 960 lbs. F_2/month
K-1004 L	UF_6 Pilot Plant	UF_6	Release of 1/2 lb. approx. 3 times yearly
K-1004 L	"	F_2	4.5 lbs./month
K-1004 L	"	ClF_3	Trace quantities of ClF_3 releases 3 times/ mo.
K-302-5	Purge and Product	UF_6, F_2	1 lb./month
K-33	K-33 Cooling water	CrO_4	2880 lbs./~~month~~

Building	Type Operation	Contaminant	Amount of Contaminant Emmitted/month
K-701	Power House	SO_2, F Fly Ash	SO_2 released in lbs/month during 1956 are as follows; Jan. 5,016,200; Feb. 186,144; Mar. 57,806; Apr. 0.0; May 0.0; June 0.0; July 0.0; Aug. 0.0; Sept. 0.0; Oct.20,580; Nov. 2,771,160; Dec. 2,949,380.
K-1501	Steam Plant	SO_2, F Fly Ash	SO_2 released in lbs./ month during 1956 are as follows; Jan. 152,460; Feb.47,550; Mar. 34,181; Apr.5,964; May 979; June 702; July 0.0; Aug.0.0; Sept. 14,147; Oct.21,337 Nov. 54,156; Dec. 24,319

~~BUSINESS CONFIDENTIAL~~

INTER-COMPANY CORRESPONDENCE

UNION CARBIDE NUCLEAR COMPANY

A Divison of Union Carbide and Carbon Corporation

To: Mr. S. H. Smiley (2)

Plant: Oak Ridge Gaseous Diffusion

Date: June 15, 1956

Copies To: Mr. C. R. Schmitt

Subject: Preliminary Air Pollution Survey

The attached tabulation summarizes preliminary information obtained from a recent survey of Oak Ridge Gaseous Diffusion Plant buildings that vent gaseous or particulate contaminants to the atmosphere.

note: 1) Lab D – Kwasnoski – F_2 used for consumption studies – < 1 #/mo (F_2) to atmosphere

2) 13# HF from UF_6/day in cascade due to in leakage – Parsons

3) In-place conditioning 1 cell/week – 456 ft^3/cell – Parsons

4) HF in K-1131 – cold traps in hoist.

C. R. Schmitt
Engineering Development Department

/mbc

~~BUSINESS CONFIDENTIAL~~

This form for Inter-Company Correspondence only

WCX-163 (8-55)

Building	Type Operation	Contaminant	Amt. of Contaminant	Reference
K-402-8	Cold Trapping	F_2	100 scfm. F_2 at 10% F_2 once a year.	R. H. Dyer
		UF_6	Possible	
K-413	Cold Trapping and Side Withdrawals	F_2	100 scfm. F_2 at 10% F_2 once a year.	R. H. Dyer
		UF_6	Possible.	
K-633	Test Loops	F_2	100 scfm. at 10% F_2 once a month. (Diluted to about 5% thru stack.)	R. H. Dyer
K-631	Tails Withdrawal	UF_6	A release occurs approximately once per year	R. H. Dyer
K-1302	Conditioning of F_2 Cells	F_2	Normally condition ca. 16 F_2 cells per month which requires 1-1/2 hours/cell at 500 - 3500 amps. Equivalent to 4.5 lbs. F_2/cell for each 1.5 hrs. This amount of F_2 is discarded to stack; however, two blowers ~~15,000~~ cfm. each are used to dilute F_2 stack effluent.	~~W. C. Paris~~
K-1401	Converter Conditioning	F_2 ClF_3 UF_6 poss.	Three stacks are employed for gas discharge. Furnace stands 17 and 19 supply ClF_3 (10 lb./mo. av.) and 5 lb. F_2/mo. to small stack at K-1401 with jet dilution. Remaining furnace stands vent F_2 to K-1302 stack or second small stack at K-1401 depending on load. All gas very dilute after purging and jetting operations. Av. F_2 used for conditioning/mo. = 30 lbs.* Conditioning load variable.	R. G. Nicol and C. M. Preston

* Assume average loss of 1 lb. F_2 per converter; generally treat about 30 converters per month (highest load = 150 converters per month).

Building	Type Operation	Contaminant	Amount of Contaminant	Reference
K-1420	Nitric Acid Spray Booth	NO_2, NO, N_2O	Intermittent operation. Approx. seven 15-minute periods/day or 2 hrs./ shift, booth analyzes ca. 150 ppm. HNO_3 in 8,000 ft.^{3} in space (20 x 20' x 20') thrown to atmos.	A. L. Allen
K-1420	Furnace Stand Converter Conditioning	F_2	Estimated 20 lb. F_2 per converter, about 1 converter per month. F_2 vented thru K-1302 stack.	J. Dykstra
K-1420	~~Hg Recovery Room~~	~~Hg~~	~~Unable to estimate.~~	~~J. Dykstra~~
K-1420				J. Dykstra
K-1420	Oxide Fluorination	F_2	Mgg. 30 kgs. UF_6/day 80% F_2 utilization. Normally this F_2 is vented to 1302 stack, but not always; 17 cfm. Kinney pump used to discharge directly to ~~atmos.~~	J. Dykstra
K-1421	Incineration	Soot	Possibly some traces of UO_2F_2 and UF_4, mostly dust and soot from burning of oily rags, etc.	J. Dykstra
K-1420	Drum Dryer Calciner	NO_2, NO, N_2O	Estimated at 5 lb. HNO_3 max. per day to stack. (Use 120 gal. 3N HNO_3 to make 15 kg. UO_3/day	J. Dykstra
K-1410	Decontamination	~~F_2~~ UF_6 possibly	~~Intermittent operations, maximum of 1 lb. F_2/mo.~~ vented to atmosphere, UF_6 possibly on occasion.	R. E. Shelton
K-1100	Barrier Plant Operation	Nickel Carbonyl(?)	Average of 5 lbs. dust/ day discharged to atmos. (amount of dust ~~with~~ variable, however, occasionally amount may be considerably higher than average.	J. K. Kranzreb

MAC = 0.001 ppm

Building	Type Operation	Contaminant	Amount of Contaminant	Reference
K-1131	Cold Trapping	UF_6	Conc. approx. ~~200~~ 160 ppm. UF_6. Av. monthly losses range from 35 to 50 lb. UF_6/mo.	L. Nothern, W. D. McCluen (U. control)
K-1131	Feed manufacture	F_2, HF	Approx. 200 lb. F_2 and 1000 lb. HF discharged to stack/mo. The amount of HF may be higher than 1,000 lb./mo. on occasion depending on operation. HF vent tank losses from K-1132, 3, and 4 are included in this estimate.	L. Nothern
K-1413	EDD pilot plant		No fluoride contaminants are vented at present time. Occasionally F_2 may be vented thru stack depending on type of pilot plant operations.	P. J. Marlino R. M. French
K-1004-L	UF_6 pilot plant	UF_6	Occasional seal failure occurs approx. 2 or 3 times a year. These UF_6 losses estimated at 1/2 lb. for each failure.	Flanders and O'Brien.
K-1004-L	UF_6 pilot plant	F_2	Barrier changes approx. twice a month. Approx. 20 cu.ft. F_2 at 20% conc. is diluted to 3 - 4% F_2 and vented	Flanders and O'Brien
K-1004-L	UF_6 pilot plant	ClF_3	Trace quantities of ClF_3 are vented thru traps. ClF_3 is extremely dilute. Venting occurs approx. 3 times/mo.	Flanders and O'Brien
K-302-5	Purge and Product	UF_6, F_2	Trace quantites of UF_6 & F_2 lost. Both gases extremely dilute and est. at less than 1 lb./mo.	G. Forseman
K-33 Cooling Towers	K-33 Cooling Water	CrO_4	Loss of chromate in windage calculated at 43.5×10^6 mg. CrO_4/day on basis of 25 ppm. CrO_4 in recirculating water. 230×10^6 gal./day, ~~it~~ water recirculating rate, windage at.2% H_2O recirc. rate, 44 fans at 430,000 cfm./fan. Conc. of Cr in windage calculated	

Building	Type Operation	Contaminant	Amount of Contaminant	Reference
			to be 0.49 mg. CrO_3/10 cu. meters of air. According to Amer. Stds. Assn. the max. allowable conc. is 1 mg. CrO_3/10 cu. meters air.	C. R. Schmitt
K-701	Powerhouse		Since some coals contain high fluorides possibly some fluoride contaminant emitted to atm. with stack gases.	J. Gamble
K-1501	Steam Plant	Fly Ash	Flue gases analyze 10-12% CO_2, 2-3% O_2, and remainder N_2. Coal has not been analyzed for fluoride content. Some fly ash emitted during winter. Amount of fly ash cannot be estimated.	
K-1004-A, B, C, D	Lab. Area		Some HF, F_2, UF_6 probably vented here. Each lab. room would probably have to be contacted. Fluorides are being used by Kwasnoski and Dr. Bernhardts groups, possibly others.	

Building	Type Operation	Conta	311-1 Vol.%	312-1 Vol.%	312-3 Vol.%	Reference
K-311-1 K-312-1 K-312-3	Cascade Purge					R. L. Farrar H. L. Goochie
	Total Volume		15,000 to 16,000 scfd.	9,000 scfd.	4,000 scfd.	

K-33 Conditioning & Drying
maximum of 1/2% F_2 discharged to atm over a 2 hr period, total of 500 cfm F_2 discharged; rate 1 cell/week
per EF Master

1957 Jan, Feb, March

K-413 – 50% higher – 11 lbs/month

K-633 – Same – 18 lbs/month

K-631 – 50% higher – A release approx. once a year

K-1302 – Same as now – 3620 lbs. HF/month

K-1401 – 30% higher – 13 lbs. ClF_3/month, 40 lbs F_2/month

K-1420 – Nitric Acid Booth was operating in K-1303 at

25% of present operation. 333 lbs/month as HNO_3

K-1420 – Nickel Recovery – Not in Operation

K-1420 – Oxide Fluorination – Operating in K-1301 at

25% of present operation – 40 lbs/month Cal. as HNO_3

K-1421 – Incineration – Operating in K1410 Possible Release of UO_2F_2 & UF_4

K-1420 – Drum Calciner – Not in Operation at this time

K-1410 – Decontamination – UF_6 Releases possible on occasions

K-1131 – Cold Trapping – 62 lbs/month UF_6

K-1131 – Feed Manufacturing – Approx. 250 lbs. F_2 and 1250 lbs HF discharged to stack/month

K-1420 – Furnace Stand Converter Cond. – 20 lbs/month

History of the Cascade Side Purge

It was found in preliminary stage of this study that instruments monitoring the purge were not installed until Oct. 1955. There were data as to the total SCF of purge but not data on % Fe.

Jerry Dickson
Homer Hunter

Foreman
302-1

Oct. 1955 - install instrument in K 311-1

1954 Joe Dykster
Carson

Jan.	K 1301
Feb.	
March	
April	
May	
June	
July	
August	
Sept.	

Process Engineer

Bacon — ~~4304~~ 8740

633 - Same since 1954

413 - 50% Butler — Bob Dyer

402-8 - 50% Butler

631 - 50% Butler

Bacon →

Oct. 1953 - Chemical division daily operating reports.

Kephart - Same in 1954

Mitchell B. E. Calif Mr - Same as now

Nicol R. G - 1300 greatest part - 30% higher in 1954

Rocker W. E. Calif Mr.

~~[illegible]~~ Whitaker

89645'

Joe Ryster - Check with Geo. Stubbs in Process Engineering - Schaffer

A.L. Allan - 1300 Bldg. Check with Ryster

H.T.E Sheldon - 8233 Call him Monday for 1954 Exp.

APR 11 1957 APR 11 1957

K-1413 - Same as now - 20 lbs. of UF_6/month/960 lbs. F_2/month

K-1004-L; UF_6 Pilot Plant UF_6; same as now (½ lbs. 3 times/yr)

K-1004 L; UF_6 " " F_2; same as now (4.5 lbs/m)

K-1004 L; " " " ClF_3; same as now (Trace ClF_3 3 times/yr)

K-302.5 Same as now

K-33 - Cooling Water CrO_4 - Not using CrO_4

K-701 Power House - Copy original Jan. 1954 5,320,000 lbs; Feb. 2,940,000 lbs.; March 2,881,600 lbs; April 653,600 lbs; May 368,000 lbs; June 42,000 lbs; July 6,400 lbs; August 0.0 lbs.; Sept. 51,600 lbs; Oct. 1,110,400 lbs; Nov. 2,744,800 lbs; Dec. 4,105,200 lbs. These values will increase by 20% per year for 57, 58, 59

K-1501 Steam Plant. - Copy original Jan 1954 235,600 lbs; Feb. 59,200 lbs; March 191,200 lbs; April 84,000 lbs May 60,000 lbs; June 800 lbs.; July 0.0; August 0.0; Sept. 0.0; Oct. 0.0; Nov. 133,600 lbs; Dec. 332,400 lbs.

K-311-1 - F_2 - Not finished

K-1037 - Burns - 100 #/month

* Changes Which Have Occured Between Feb. 1957 & April 10, 1957

K-1131 & UF_6 — 50 Lbs. UF_6/Mo.
Cold Trapping

Feed Mfg. F_2, HF — 100 Lbs. F_2/Mo.; 70 Lbs HF/Mo.

Cleanup Reactor — 407 Lbs F_2/Mo.

K-311-1 - Started Feed Back To K-1131 2:55 PM
2/18/57

** History of Cascade Purge Shown on attached
graph

SURVEY OF ATMOSPHERIC EFFLUENTS OF THE ORGD PLANT - FEBRUARY 1957

Building	Type Operation	Contaminant	Amount of Contaminant Emmitted Per Month	References
K-31	Cold Trapping	F_2, HF, UF_6 Possible	102 lbs/month cal. as F_2, 20 scfm at 10% F_2 for 4 hr. period twice/mo.	Kephart
K-33	Cold Trapping	F_2, HF, UF_6 "	516 lbs/month cal. as F_2, released in a similar manner as K-31 (Diluted to 1% in stack)	Mitchell
K-402-8	Cold Trapping	F_2, HF, UF_6 "	5.4 lbs/month calculated as F_2, 100 scfm released for 1 hr., F_2 at 10% once per year	R. H. Dyer
K-413	Cold Trapping and Side Withdrawals	F_2, HF, UF_6 "	5.4 lbs/month cal. as F_2, 100 scfm released for 1 hr., F_2 at 10%, one release per year	R. H. Dyer
K-633	Test Loops	F_2	18 lbs/month cal. as F_2, 100 scfm at 10% F_2 for 1/4 hr. once per month (Diluted to 5% thru stack)	R. H. Dyer
K-631	Tails Withdrawal	UF_6	A release approximately once/year	R. H. Dyer J. Dykstra
K-1302	Conditioning of F_2 Cells	HF, F_2	3,600 lbs/month HF released, 2-5 lbs HF/hr. is vented to atm. during normal operation. Released thru an 85 ft. stack with two 50,000 cfm dilution blowers. Approximately 20 lbs/month F_2 vented thru K-1301	J. Dykstra
K-1401	Converter Conditioning	F_2, ClF_3, UF_6 Possible	10 lbs ClF_3/month & 30 lbs F_2/month; three stacks are employed for gas discharge. Furnace stands 17 & 19 supply ClF_3 10 lbs/month to small stack at K-1401 with fit dilution and 5 lbs F_2 thru same. Remaining furnace stands vent F_2 to K-1302 stack or second small stack at K-1401 depending on load.	R. G. Nicol and C. M. Preston
K-1420	Nitric Acid Spray Booth	NO_2, NO, N_2O, N_2O_4	Intermittent operation - Approx. seven 15 min. periods/day or two hrs/shift, booth analysis 150 ppm HNO_3 in 8000 $ft.^3$ space thrown to atmosphere. This amounts to 1335 lbs/month calculated as HNO_3	A. L. Allen
K-1420	Furnace Stand Converter Conditioning	F_2	20 lbs/month F_2 vented through K-1302 stack	A. L. Allen
K-1420				J. Dykstra
K-1420	Oxide Fluorination	F_2	159 lbs/month Mfg. 30 Kgs. UF_6/day, 80% utilization. Normally this F_2 is vented through K-1302 stack, but not always; 17 cfm Kinney pumps used to discharge to K-1302 stack	J. Dykstra
K-1421	Incineration	Fly Ash	Possibly some trace of UO_2, F_2, and UF_4 mostly dust and soot from burning of oil rags, etc.	J. Dykstra
K-1420	Drum Dryer Calciner	NO_2, NO, N_2O, N_2O_4	150 lbs/month estimated at 5 lbs HNO_3/day to stack (use 120 gal. 3N HNO_3 to make 15 kg. UO_3/day	J. Dykstra

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SURVEY OF ATMOSPHERIC EFFLUENTS OF THE ORGD PLANT - FEBRUARY 1957

BUILDING	TYPE OPERATION	CONTAMINANT	AMOUNT OF CONTAMINANT EMITTED PER MONTH	REFERENCES 1/54
				J. Dykstra 0
K-1302	Conditioning of F_2 Cells	HF, F_2	3,600 lbs/month HF released, 2-5 lbs HF/hr. is vented to atm. during normal operation. Released thru an 85 ft. stack with two 50,000 cfm dilution blowers. Approximately 20 lbs/month F_2 vented thru K-1301.	J. Dykstra Same
K-1420				J. Dykstra None
K-1420	Oxide Fluorination	F_2	159 lbs/month mfg. 30 Kgs. UF_6/day, 80% utilization. Normally this F_2 is vented through K-1302 stack, but not always; 17 cfm Kinney pumps used to discharge to K-1302 stack.	J. Dykstra K-1301 25%
K-1421	Incineration	Fly Ash	Possibly some trace of UO_2, F_2 and UF_x mostly dust and soot from burning of oil rags, etc.	J. Dykstra K-1410 Same
K-1420	Drum Dryer Calciner	NO_2, NO, N_2O_3, N_2O_4	150 lbs/month estimated at 5 lbs HNO_3/day to stack (use 120 gal 3N HNO_3 to make 15 kg. UO_3/day).	J. Dykstra Same
K-1410	Decontamination	UF_6	UF_6 release possible on occasions.	J. Dykstra Same K-1303 25%
K-1420	Nitric Acid Spray Booth	NO_2, NO, N_2O_3, N_2O_4	Intermittent operation - Approx. Seven 15 min. periods per day or two hrs/shift, booth analysis 150 ppm NO_2 in 800 ft^3 space thrown to The Atmosphere. This Amounts to 1335 Lbs/Month Calculated As HNO_3	

Building	Type Operation	Contaminant	Amount of Contaminant Emmitted Per Month	References
K-1410	Decontamination	UF_6	UF_6 release possible on occasions	J. Dykstra W. E. Rooks and J. K. Franzreb
K-1131	Cold Trapping	UF_6	Average loss of 35-50 lbs UF_6 per month. Released in concentrations of around 100 ppm.	L. Nothern
K-1131	Feed Manufacturing	F_2, HF	Approx. 200 lbs F_2 and 1000 lbs HF discharged to stack/month. The amount of HF may be higher than 1000 lbs/month on occasions depending on operation. HF vent tank losses from K-1132, 3, and 4 are included in the estimate.	L. Nothern
K-1413	EDD Pilot Plant	UF_6, F_2	20 Lbs UF_6/month this comes from a semi-continuous operation F_2 released per month is approx. 960 lbs/month a continuous operation.	H. E. Kaufman
K-1004-L	UF_6 Pilot Plant	UF_6	Occasional seal failure occurs approx. 2 or 3 times a year, these failures release approx. 1/2 lb. per failure	Flanders & O'Brien
K-1004-L	UF_6 Pilot Plant	F_2	Barrier changes approx. twice a month to approx. 20 cu. ft. F_2 at 20% concentration is dilutes to 3.4% F_2 vented. 4.5 lbs/month	Flanders & O'Brien
K-1004-L	UF_6 Pilot Plant	ClF_3	Trace quantities of ClF_3 are vented thru traps. Occurs 3 times a month 1 lb per month	G. Forseman
K-302-5	Purge and Product	UF_6, F_2		C. E. Schmidt
K-33	K-33 Cooling Water	CrO_4	Loss of approx. 2880 lbs/month. Loss of chromate in windage calculated at 43.5×10^6 neg. CrO_4/day on basis of 25 ppm CrO_4 in recirculating water. 230×10^6 gal./day water recirculating rate, windage 0.2% H_2O recirculating rate, 44 fans at 430,000 cfm/fans. Conc. of Cr in windage calculated to be 0.49 mg. CrO_3/10 cu. meters of air	
K-701	Power House	SO_2, F, Fly Ash	SO_2 cal. on the basis of 3.5% sulfur coal being emmitted per month Jan. 1956-5,016,200; Feb. 1956-186,144; March 1956-57806; Apr. 1956 0.0; May 1956-0.0; June 1956-0.0; July 1956-0.0; Aug. 1956-0.0; Sept.1956-0.0 Oct. 1956-20,580; Nov 1956-2,771,160; Dec. 1956 2,949,380.	J. Elrod
K-1501	Steam Plant	SO_2, F, Fly Ash	SO_2 cal. on the basis of 3.5% sulfur coal, lbs emmitted per month in 1956 is as follows: Jan. 152,160; Feb. 17,550; Mar. 34,181; Apr.5964; May-979; June-702; July 0.0; Aug. 0.0; Sept. 14,147; Oct. 21,337; Nov. 54,156; Dec. 25,319.	J. Gamble

Contaminant	K-311-1	Vol %	K-312-1	Vol %	K-312-3	Vol %
Total Volume	15,000	16,000	9,000 SCFD		4,000 SCFD	

The above percentages are given with the highest and lowest figure found in weekly analyses of the effluent. This data can be found in Report No. KLI-3901, taken in a period between March 2, 1956 and September 13, 1956.

Appendix

History of Cascade Side Purge

An average consumption rate for 1956 was obtained. (Ref. 29)

An average of the purge rate was then calculated. (Ref. 29)

TABLE A

SURVEY OF ATMOSPHERIC EFFLUENT OF THE ORGDP-April 10, 1957.

Building	Type Operation	Contaminant	Amount of Contaminant Emmitted/month Cal. as F_2 except where Indicated. 1957	1954
K-31	Cold Trapping	F_2, HF, UF_6	102 lbs.	102 lbs.
K-33	Cold Trapping	F_2, HF, UF_6	516 lbs.	516 lbs.
K-33	K-33 Cooling Water	CrO_4	2,880 lbs.	Not using CrO_4
K-302-5	Purge & Product	UF_6, F_2	1 lb.	1 lb.
K-311-1 *			Started Feed Back to K-1131 at 2:55 P.M. on 2-18-57. ** This eliminated any effluent emmission from this point.	**
K-402-8	Cold Trapping	F_2, HF, UF_6	5.4 lbs.	11 lbs.
K-413	Cold Trapping & Side Withdrawals	F_2, HF, UF_6	5.4 lbs.	11 lbs.
K-631	Tails Withdrawal	UF_6	A release approx. once/yr.	A release approx. once/yr.
K-633	Test Loops	F_2	18 lbs.	18 lbs.
K-701	Power House	SO_2, F Fly Ash	SO_2 released in lbs./mo. during 1956 are as follows: Jan. 5,016,200; Feb. 186,144; Mar. 57,806; Apr. 0.0; May 0.0 June 0.0; July 0.0; Aug. 0.0 Sept. 0.0; Oct. 20,580; Nov. 2,771,160; Dec. 2,949,380.	SO_2 released in lbs./mo. during 1954 are as follows: Jan. 5,320,000; Feb. 2,940,000; Mar. 2,881,600; Apr. 653,000; May 368,000; June 42,000; July 6,400; Aug. 0.0; Sept. 51,600; Oct. 1,110,400; Nov. 2,744,800; Dec. 4,105,200. These values will increase by 20% per yr. for 57, 58 & 59.
K-1004-L	UF_6 Pilot Plant	UF_6	Release of 1/2 lb. approx. 3 times yearly.	1/2 lbs. 3 times/yr.
-1004-L	UF_6 Pilot Plant	F2	4.5 lbs./month	4.5 lbs./month

SURVEY OF ATMOSPHERIC EFFLUENT OF THE ORGDP-April 10, 1957.

Building	Type Operation	Contaminant	Amount of Contaminant Emmitted/month Cal. as F_2 except where Indicated 1957	1954
K-1004-L	UF_6 Pilot Plant	ClF_3	Trace quantities of ClF_3 released 3 times/mo.	Trace ClF_3 3 times/mo.
K-1037		Boron	100 lbs./mo.	100 lbs./mo.
K-1131	Cold Trapping	UF_6	50 lbs. UF_6/mo.	62 lbs. UF_6/mo.
K-1131	Feed Manufacturing	F_2, HF	100 lbs. F_2/mo.; 70 lbs. HF/mo.	250 lbs. F_2 and 1,250 lbs. HF discharged to stack/mo.
K-1131	Clean-up Reactor		407 lbs. F_2/mo.	Not in operation.
K-1302	F_2 Cells Conditioned	HF, F_2	3,620 lbs. HF/mo.	3,620 lbs. HF/mo.
K-1401	Converter Conditioning	F_2, ClF_3, UF_6	10 lbs. ClF_3/mo, 30 lbs. F_2/mo.	13 lbs. ClF_3/mo., 40 lbs. F_2/mo.
K-1410	Decontamination	UF_6	UF_6 releases possible on occasions.	UF_6 releases possible on occasions.
K-1413	EDD Pilot Plant	UF_6, F_2	20 lbs. UF_6/mo., 960 lbs. F_2/mo.	20 lbs. UF_6/mo., 960 lbs. F_2/mo.
K-1420	Nitric Acid Spray Booth	NO_2, NO, N_2O, N_2O_4	534 lbs./mo. as HNO_3.	Nitric Acid Booth was operating in K-1303. 333 lbs./mo. as HNO_3.
K-1420	Furnace Stand Converter Conditioning.	F_2	20 lbs./mo.	20 lbs./mo.

SURVEY OF ATMOSPHERIC EFFLUENT OF THE ORGDP-April 10, 1957.

Building	Type Operation	Contaminant	Amount of Contaminant Emmitted/month Cal. as F_2 except where Indicated. 1957	1954
K-1420				Not in operation.
K-1420	Oxide Fluorination	F_2	159 lbs./mo.	Operating in K-1301 40 lbs./mo. Cal. as HNO_3.
K-1420	Drum Dryer Calciner	NO_2, NO, N_2O, N_2O_4	150 lbs./mo. as HNO_3	Not in operation.
K-1421	Incineration	Fly Ash	Possible Traces of UO_2F_2 and UF_4.	Operating in K-1410, possible traces of UO_2, F_2 & UF_4.
K-1501	Steam Plant	SO_2 F Fly Ash	SO_2 released in lbs./mo. during 1956 are as follows: Jan.152,460; Feb. 47,550; Mar. 34,181; April 5,964; May 979; June 702; July 0.0 Aug. 0.0;Sept. 14,147; Oct. 21,337; Nov. 54,156 Dec. 24,319.	SO_2 released in lbs./mo. during 1954 are as follows: Jan. 235,600; Feb. 59,200; March 191,200; April 84,000; May 60,000; June 800; July 0.0; Aug. 0.0; Sept. 0.0 Oct. 0.0; Nov. 133,600; Dec. 332,400.

* Appears where there has been a reduction in effluent since 1954.

** History of cascade purge shown in appendix no.____

*** Appears Where There has been a Reduction in Effluent Since 1954

Table I

SURVEY OF ATMOSPHERIC EFFLUENT OF THE ORGDP - April 10, 1957

Building	Type Operation	Contaminant	Amount of Contaminant Emmitted/Month Cal. as F_2 except where Indicated 1957	1954
K-31	Cold Trapping	F_2, HF, UF_6	102 lbs.	102 lbs.
K-33	Cold Trapping	F_2, HF, UF_6	516 lbs.	516 lbs.
K-402-8	Cold Trapping	F_2, HF, UF_6	5.4 lbs.	11 lbs.
K-413	Cold Trapping & Side Withdrawals	F_2, HF, UF_6	5.4 lbs.	11 lbs.
K-633	Test Loops	F_2	18 lbs.	18 lbs.
K-631	Tails Withdrawal	UF_6	A release approx. once/year	A release approx. once/year
K-1302	F_2 Cells Conditioned	HF, F_2	3620 lbs. HF/month	3620 lbs. HF/month
K-1401	Converter Conditioning	F_2, ClF_3, UF_6	10 lbs. ClF_3/month, 30 lb. F_2/month	13 lbs. ClF_3/month, 40 lbs. F_2/month
K-1420 ***	Nitric Acid Spray Booth	NO_2, NO, N_2O, N_2O_4	* 1335 lbs./month cal. as HNO_3	Nitric Acid Booth was operating in K-1303 333 lbs./month as HNO_3
K-1420	Furnace Stand Converter Conditioning	F_2	20 lbs.	20 lbs./month
K-1420				
K-1420	Oxide Fluorination	F_2	159 lbs.	Operating in K-1301 40 lbs/month cal. as HNO_3
K-1421	Incineration	Fly Ash	Possible Traces of UO_2F_2 & UF_4	Operating in K-1410, possible traces of UO_2, F_2 & UF_4
K-1420	Drum Dryer Calciner	NO_2, NO, N_2O, N_2O_4	150 lbs./month as HNO_3	Not in operation

Building	Type Operation	Contaminant	Amount of Contaminant Emmitted/Month Cal. as F_2 except where Indicated 1957	1954
K-~~1410~~	Decontamination	UF_6	UF_6 releases possible on occasions	UF_6 releases possible on occasions
K-~~1131~~	Cold Trapping	UF_6	~~50 lbs.~~ 35 lbs. UF_6/mo.	62 lbs./mo. UF_6
K-~~1131~~	Feed Manufacturing	F_2, HF	~~200 lbs. F_2/mo.; 1000 lbs. HF/Mo.~~	Approx. 250 lbs. F_2 & 1250 lbs. HF discharged to stack/mo.
K-1413	EDD Pilot Plant	UF_6, F_2	20 lbs. UF_6/mo. 960 lbs. F_2/Mo.	20 lbs. UF_6/Mo., 960 lbs. F_2/mo.
K-1004-L	UF_6 Pilot Plant	UF_6	Release of 1/2 lb. approx. 3 times yearly	1/2 lbs. 3 times/yr.
K-1004-L	UF_6 Pilot Plant	F_2	4.5 lbs./month	4.5 lbs./mo.
K-1004-L	UF_6 Pilot Plant	ClF_3	Trace quantities of ClF_3 released 3 times/mo.	Trace ClF_3 times/yr.
K-302-5	Purge & Product	UF_6, F_2	1 lb.	1 lb.
K-33	K-33 Cooling water	CrO_4	~~2880~~ lbs.	Not using CrO_4
K-701	Power House	SO_2, F Fly Ash	SO_2 released in lbs/mo. during 1956 are as follows: Jan. 5,016,200; Feb. 186,144; Mar. 57,806; Apr. 0.0; May 0.0; June 0.0; July 0.0; Aug. 0.0; Sept. 0.0; Oct. 20,580, Nov. 2,771,160; Dec. 2,949,380.	SO_2 released in lbs/mo. during 1954 are as follows: Jan. 5,320,000; Feb. 2,940,000; Mar. 2,881,600; Apr. 653,600; May 368,000; June 42,000; July 6,400; Aug. 0.0; Sept. 51,600; Oct. 1,110,400; Nov. 2,744,800; Dec. 4,105,200. These values will increase by 20% per yr. for 57, 58 & 59.

Building	Type Operation	Contaminant	Amount of Contaminant Emmitted/Month Cal. as F_2 except where indicated 1957	1954
K-1501	Steam Plant	SO_2, F Fly Ash	SO_2 released in lbs./mo. during 1956 are as follows: Jan. 152,460; Feb. 47,550; Mar. 34,181; Apr. 5,964; May 979; June 702; July 0.0; Aug.0.0; Sept. 14,147; Oct. 21,337; Nov. 54,156; Dec. 24,319.	SO_2 released in lbs./mo. during 1954 are as follows: Jan. 235,600; Feb. 59,200; March 191,200; April 84,000; May 60,000; June 800; July 0.0; Aug. 0.0; Sept. 0.0; Oct. 0.0; Nov. 133,600; Dec. 332,400.
K-1037		Borox	100#/month	100#/month

* Changes Which Have Occurred Between February 1957 and April 10, 1957

K-1131	Cold Trapping	UF_6	50 lbs. UF_6/Mo.	
~~K-1131~~	~~Feed Manufacturing~~	F_2, HF	100 Lbs. F_2/Mo.; 70 lbs. HF/Mo.	
~~K-1131~~	~~Clean-up Reactor~~		407 lbs. F_2/Mo.	
~~K-311-1~~	Started Feed Back to K-1131 2:55 P.M. 2-18-57			
K-1420	Nitric Acid Spray Booth			

** History of Cascade Purge Shown on Attached Graph.

33

Feb. of 1954 Effluent

K-1131 - increase all effluents by 25%

K-311-1 Marane - Oct. 15th of 1954 was first time did any side purging, 4,000 SCFDay on Oct. 15th

Jan. 1st 1965 average purge rate of 12,000 SCFD

Feb. - 13,500 SCFD - 14,000 SCFD

Fed back to 1131 Feb. 18 1954 - 8 to 4 shift

2:55 P.M.

As of Mon - 17,000 - 18,000 SCFD

Ryer + Maybe Varlan

1955

J

F

M

A

M

J

J

A

S

O

N

D

1956

J

F

M

A

M

J

J

A

S

O

N

Jan Produce 11,000 lbs. from 1300 Acres
1453 wants 8,000 lbs/month

J.R. Franzrub - 50% of Present 8568

Checkwith Gene Rocks on Metter Same - 1954

Schaffer - 8568 8740 Jack Pitty

T. Northern 8386 - Monthly Progress Report - Chemical Operations Division
Plant Record - Oct 1954 -

~~Monthly Operating Reports~~

Chem. Div. Monthly Progress Report
June 1954 - KP 590 part 12
B - 1131
E - 1301

K-1131 - ~~Jan~~ - July 7th 1955 Dawn

Sept. 1955 - 7700 lbs	April 1956 - 1240 ✓
Oct. 1955 - 10,900 lbs.	May 1956 - 765 ✓
Nov. 1955 - 13,326 lbs	June 1956 - 4,256 -
Dec. 1955 - 13,551 lbs.	July 1956 - 13,341 -
Jan 1956 - 8,850 lbs.	August 1956 - 7,220 ✓
Feb. 1956 - 10,100 lbs.	Sept. 1956 - 13,026 ✓
March 1956 - 8,000 lbs.	Oct. 1956 - 15,261 ✓
	Nov. 1956 - 10,908 ✓
	Dec. 1956 - 5,932

89633

Confirm with Al Varlan

Al Varlan wants to take a look

K-1131 - Cold Trapping - No change appreciable gone up some 50 lbs.

K-1131 - Fed Manufacturing - 100 lbs of F_2 - Condensing on 7% HF loss 7% of 1000 lbs/month

Check on approx % Purge is lost

Purge K 311-1 → 100% goes to 1131 - 96% of purge

K-1420 - 60% of what it was -

150
60
90.00 60 ppm

agreed

Getting up to date

MEMO AVOID ORAL INSTRUCTIONS Date _____ 19__

To _____

[illegible]

[illegible] 1956-7

Nov 19550

Dec 21.000 + 20% Nov '57

Jan 28000 [illegible] 58

Feb 21,000 " 59

[illegible]

Signed _____

WCX-48 (7-50)

V. Tang
K-1003

SO_2

Power Plant 1954

~~19580~~

~~21,000~~

Jan	38,000	~~27,545~~
Feb.	21,000	~~17,280~~
M	20,583	
A	4,669	
M	2,629	
J	300	
J	47	
A	0	
S	371	
O	7,931	
N	19,606	
D	29,322	

Jan. 38,000
.035
190000
114000
1330000
4000
5,320,000 lbs/mon
SO_2

Feb. 21,000
.035
105000
63000
735000
4000
2940,000

April 4,669
.035
23345
14007
163415
4000
653600

March 20,583
.035
102915
61749
720405
4000
2881,600

May 2629
.035
13145
7887
92015
4000
368,000

June 300
.035
15 00
900
10500
4000
42000

July 47
.035
235
141
1645
4000
64000

August 0.0

Sept. 371
.035
1855
1113
12985
4000
51,6000

Oct. 7931
.035
39655
23793
277685
4000
111,4000

Nov. 19,606
.035
98030
58818
686210
4000
2,744,8000

Dec. 29,323
.035
146615
87969
1026130
4000
4105,2000

Steam Plant SO_2 emmission

Jan. 1683
.035
8415
5049
58905
14000
235,000

Feb. 422
.035
2110
1266
14870
14000
59,2000

March 1365
.035
6825
4095
47875
14000
191,2000

April 60
.035
300
180
2100
14000
84,000

May 43
.035
215
129
1505
14000
60,000

June 7
.035
35
21
.245
4000
8000

July 0.0 August 0.0 Sept. 0.0 Oct. 0.0

Nov. 955
.035
4775
2865
33425
14000
133,6000

Dec. 2376
.035
11880
7128
83160
4000
332,4000

MEMO AVOID ORAL INSTRUCTIONS Date 19

To

F. L. Moran

K. M. Jones

H. C. P. Snyder

Furman Strong

J. Northern

M. Dykstra

8602

8334

1953 - August

1954 - Continuation

1955 - Sept. 1955 stepped up.

Oct. 1955 ran at

1956 -

WCX-48 (7-50)

DISTRIBUTION

1. K-25 Site Records (RC)
2. ChemRisk/Shonka Research Associates
3. DOE Public Reading Room
4. S. G. Thornton (K-25 EMD)