

BOOK 123R

Notes:

spine "CA-1"

front "CA-1"

Blank pages: page opposite 1, 1-4, 14-100, page opposite 100, inside back cover sheet

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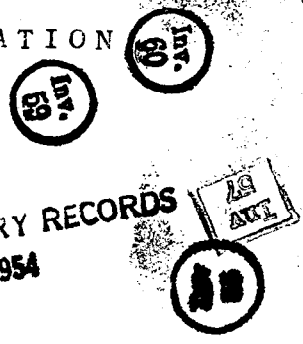
June 1, 2001

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10-9-21

CARBIDE AND CARBON CHEMICALS CORPORATION
OAK RIDGE, TENNESSEE

NOTEBOOK NO Y-NB-13 20



Assigned to Dr. A. O. Callahan
Department 3405
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Subject

Page

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C-1

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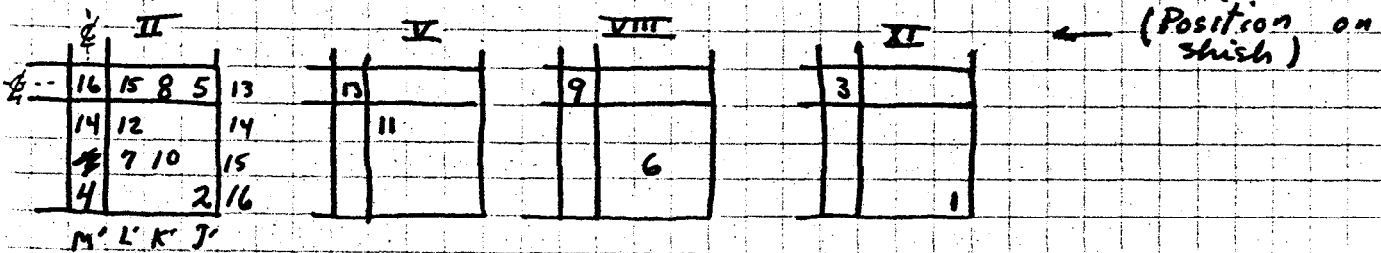
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8. The notebook should be periodically reviewed by one or more independent persons in the department and should be signed and dated by them. Likewise, they should make a statement that they have "read and understood the foregoing material." Witnessing stamps for this purpose are available in your department's office.
9. It is advisable to preface each new item, such as a heat treatment, process or reaction, etc., with a very brief description of the purpose, objective or approach.
10. Description of the invention or discovery should be complete enough to be understood by anyone skilled in the art.
11. Reference to name or catalogue number should be made when standard items are being discussed, i.e., Westinghouse pump.
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8-May 51

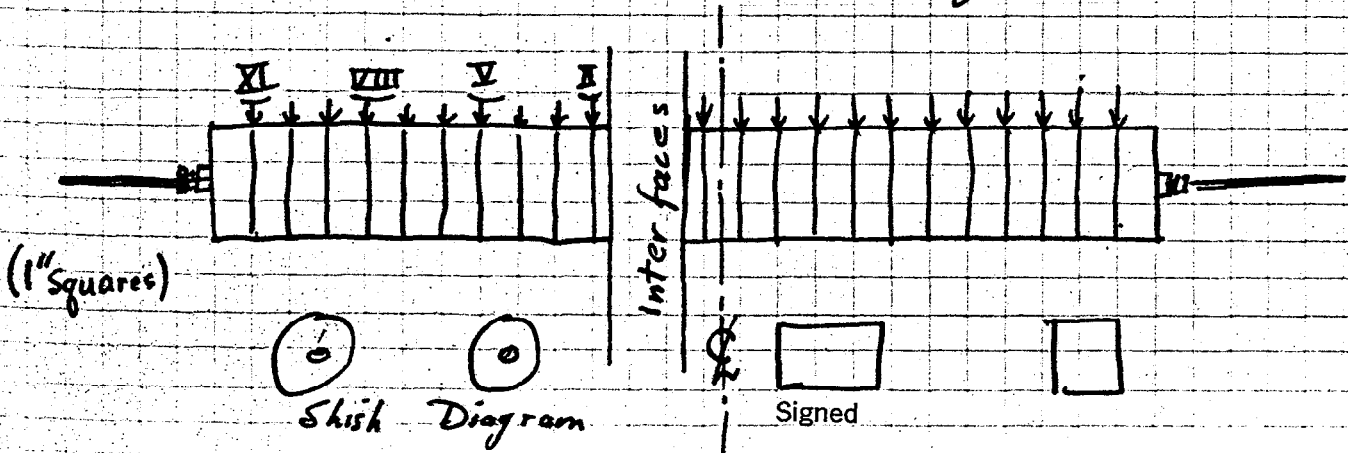
Measurement of power distribution CA-1 Exp 3, Run 61
 (See notebook YNB 1321 p 81 (5/1/51))
 (21" x 21" x 23" Be + Fuel (See Sketch Diagram Below))

One octant of the reactor was loaded with 16 solid fuel discs. The loading number indicates the relative flux levels (anticipated) from cold to hot.

Position	Disc number	mass	sketch#	Position (on sketch)	Disc removed.	Counter 182	Counter 334
1	14	17.970	J'16	11.6	11	80	✓
2	53	17.968	J'16	11.6	2	71	✓
3	85	17.947	M'13	9.1	11	520	✓
4	139	17.829	M'16	11.3	2	22	✓
5	476	17.803	J'13	9.4	2	1078	✓
6	192	17.977	K'15	10.7	8	866	✓
7	169	18.056	L'15	10.6	2	848	✓
8	178	18.072	K'13	9.3	2	680	✓
9	877	17.995	M'13	9.1	8	517	✓
10	1113	17.855	K'15	10.7	2	860	✓
11	513	18.017	L'14	9.9	5	598	✓
12	650	17.675	L'14	9.9	2	595	✓
13	1129	18.070	M'13	9.1	5	514	✓
14	1218	17.865	M'14	9.8	2	607	✓
15	875	18.027	L'13	9.2	2	535	✓
16	1184	17.966	M'13	9.1	2	510	✓



(Note - Removed discs were stored on pin 261)



Activity normalized to center disc, corrected for disc background,
 counter background, mass and normalized to center #1 and
 20 min decay time

Position	Disc #	Counter				Av.
		1	2	3	4	
1	14.	.143	0.192			.167
2	53.	.406	0.710			.558
3	95			.569	.605	.587
4	139			.608	.611	.609
5	476.	.853	1.461			1.159
6	192.	.761	1.452			1.106
7	169			.747	.815	.781
8	178			.761	.670	.715
9	877.	1.011	2.015			1.523
10	1117.	1.053	1.861			1.457
11	513			.932	.874	.903
12	650			.845	.923	.884
13	1122.	1.148	2.370			1.759
14	1218	1.252	2.198			1.725
15	875			.978	1.074	1.036
16	1184			1.058	.944	1.001

Signed

5/10/51

①
II

②
VI

③
VIII

④
XI

13	64635478
14	72605374
15	55323136
16	47433529
M'L'K'J'	

13	61593042
14	58547437
15	49753221
16	41332017
M'L'K'J'	

13	57903179
14	39322311
15	3022147
16	187284
M'L'K'J'	

13	38282573
14	2726766
15	247573
16	12527
M'L'K'J'	

91	929399
98	99100100
100	101100
113	114115116

Coldness Number	Diskout Number	Mass	Shish	Position in Shish	Disk in Number	Shish Position	Corrected		Specific Activity
							+2	-38	
1	80	18.032	116	11	+1291	J'16-11	.0296		.0251
2	105	17.885	115	11	+1423	K'16-11	.0490	✓	.0499
3	1111	17.866	108	11	+3676	J'15-11	.0483	✓	.0491
4	77	17.970	116	8	+1354	J'16-8	.05725	✓	.0582
5	5686	17.950	114	11	+1454	L'16-11	.0647	✓	.0658
6	1099	18.028	101	11	+3745	J'14-11	.0616	✓	.0626
7	1108	18.010	108	8	+3692	J'15-8	.1188	✓	.1208
8	102	17.940	105	8	✓1452	K'16-8	.1182	✓	.1202
9	869	17.758	107	11	✓3695	K'15-11	.1059	✓	.1078
10	52	18.065	114	8	✓1477	L'16-8	.1602	✓	.1630
11	1096	18.003	101	8	✓3746	J'14-8	.1561	✓	.1588
12	31	18.089	113	11	✓1488	M'16-11	.0686	✓	.0698
13	1087	18.091	94	11	✓3770	J'13-11	.0650	✓	.0662
14	866	17.873	107	8	✓3715	K'15-8	.266.271	✓.2510	.2770
15	857	17.930	106	11	✓3741	L'15-11	.1368	✓	.139
16	677	18.082	100	11	✓3749	K'14-11	.1355	✓	.1378
17	74	17.209	116	5	✓1301	J'14-5	.0796	✓	.0810
18	28	18.042	113	8	✓1502	M'16-8	.175	✓	.178
19	1084	17.941	94	8	✓3788	J'13-8	.1728	✓	.1759
20	99	18.093	115	5	✓1427	K'16-5	.1720	✓	.1750
21	1105	18.067	108	5	✓3693	J'15-5	.1693	✓	.1722
22	854	17.946	106	8	✓3742	L'15-8	.355	✓	.361
23	674	18.002	100	8	✓3750	K'14-8	.358	✓	.364
25	689	18.042	93	11	✓3791	K'13-11	.1465	✓.149	.148
26	604	17.991	99	11	✓3753	L'19-11	.1870	✓	.190
27	616	18.018	98	11	✓3766	M'14-11	.2055	✓	.209
28	544	17.933	92	11	✓3939	L'13-11	.2025	✓	.206
29	71	17.951	114	2	✓1372	J'16-2	.0921	✓	.0936
31	686	18.068	93	8	✓3792	K'13-8	.3825	✓	.389
32	601	17.943	99	8	✓3754	L'14-8	.480	✓	.488
33	49	17.966	114	5	✓1480	L'14-5	.234	✓	.238
34	1083	18.008	101	5	✓3747	J'14-5	.225	✓	.229
35	96	17.991	115	2	✓1430	K'16-2	.2005	✓	.204
36	1102	17.889	108	2	✓3694	J'15-2	.1986	✓	.202
37	863	18.075	107	5	✓3716	K'15-5	.392	✓	.399
38	520	17.883	91	11	✓3985	M'13-11	.2133	✓	.217
39	613	17.974	98	8	✓3767	M'14-8	.543	✓	.552
40	541	17.898	92	8	✓3961	L'13-8	.591	✓	.550
41	2525	17.995	113	5	✓3602	M'14-5	.2495	✓	.254

Signed

Coldness No	Disk out No	Mass	Shish No	Position in shish	Disk in No	Shish Position	Corr sp counter	Specific Activity
42	1081	18.023	94	5	✓3789	J'13-5	.2558	✓.260
43	46	17.964	114	2	✓3675	L'14-2	.2735	✓.278
44	1090	18.007	101	2	✓3748	J'14-2	.2703	✓.275
45	851	17.998	106	5	✓3743	L'15-5	.543	✓.552
46	671	18.056	100	5	✓3751	K'14-5	.539	✓.548
47	22	17.787	113	2	✓3625	M'14-2	.3025	✓.308
48	1078	17.937	94	2	✓3790	J'13-2	.2815	✓.284
50	683	18.009	93	5	✓3793	K'13-5	.572	✓.582
51	860	17.881	107	2	✓3717	K'15-2	.448	✓.455
52	848	17.870	106	2	✓3744	L'15-2	.630	✓.642
53	668	17.967	100	2	✓3752	K'14-2	.613	✓.624
54	598	17.968	99	5	✓3764	L'14-5	.721	✓.734
56	680	18.057	93	2	✓3915	K'13-2	.679	✓.690
57	517	18.055	91	8	✓3986	M'13-8	.573	✓.583
58	610	17.910	98	5	✓3768	M'14-5	.791	✓.805
59	538	17.852	92	5	✓3923+62	L'13-5	.792	✓.806
60	595	17.941	99	2	✓3765	L'14-2	.833	✓.847
61	514	17.793	91	5	✓3987	M'13-5	.855	✓.870
62	607	17.986	98	2	✓3769	M'14-2	.903	✓.923
63	535	18.026	92	2	✓3963	L'13-2	.890	✓.905
64	510	17.861	91	2	✓3988	M'13-2	.984	✓1.000

352 | 351 | 350 | 349 | 348 | 347 | 346 | 345

Disks from

Pin	Pin
116 ✓	260
115 ✓	259
114 ✓	258
113 ✓	257
108 ✓	256
107 ✓	255
106 ✓	254
101 ✓	253
100 ✓	252
99 ✓	251
98 ✓	250
94 ✓	249
93 ✓	248
92 ✓	247
91 ✓	246

Added 5/25/54 SDS (norm. factor X .984) use this column

Dispm Shish (s)	Posn	II (15")	III (45")	IV (75")	V (105")	Edge (115")
0.0 M'13		.982	.835	.561	.206	1.000
0.1 M'14, L'13		.984	.855	.573	.213	.911
1.1 L'14		.896	.792	.542	.204	.830
0.2 K'13, M'15		.833	.721	.480	.187	.661
0.3 J'13, M'16		.679	.572	.383	.147	.294
1.2 L'15, K'14		.292	.2526	.179	.0668	.603
2.2 K'15		.622	.541	.357	.1362	.437
1.3 J'14, L'16		.448	.392	.266	.1059	.268
2.3 J'15, K'16		.2719	.230	.1582	.0632	.1942
3.3 J'16		.1996	.1707	.1185	.0487	.0865
Averages raised 4% x (.982)		.0921	.0796	.0573	.0246	
00		✓1.0234	.8892	.5959	.2215	1.000
01		✓.9318	.8276	.5637	.2122	.911
02		✓.7062	.5949	.3983	.1529	.661
03		✓.3037	.2627	.1809	.06947	.294
11		✓.8663	.7498	.4992	.1945	.830
12		✓.6469	.5626	.3713	.1416	.603
13		✓.2828	.2392	.1645	.0657	.268
22		✓.4659	.4077	.2766	.1101	.437
23		.2076	.1775	.1232	.05065	.1942
33	Signed	.09578	.08278	.05959	.02558	.0865

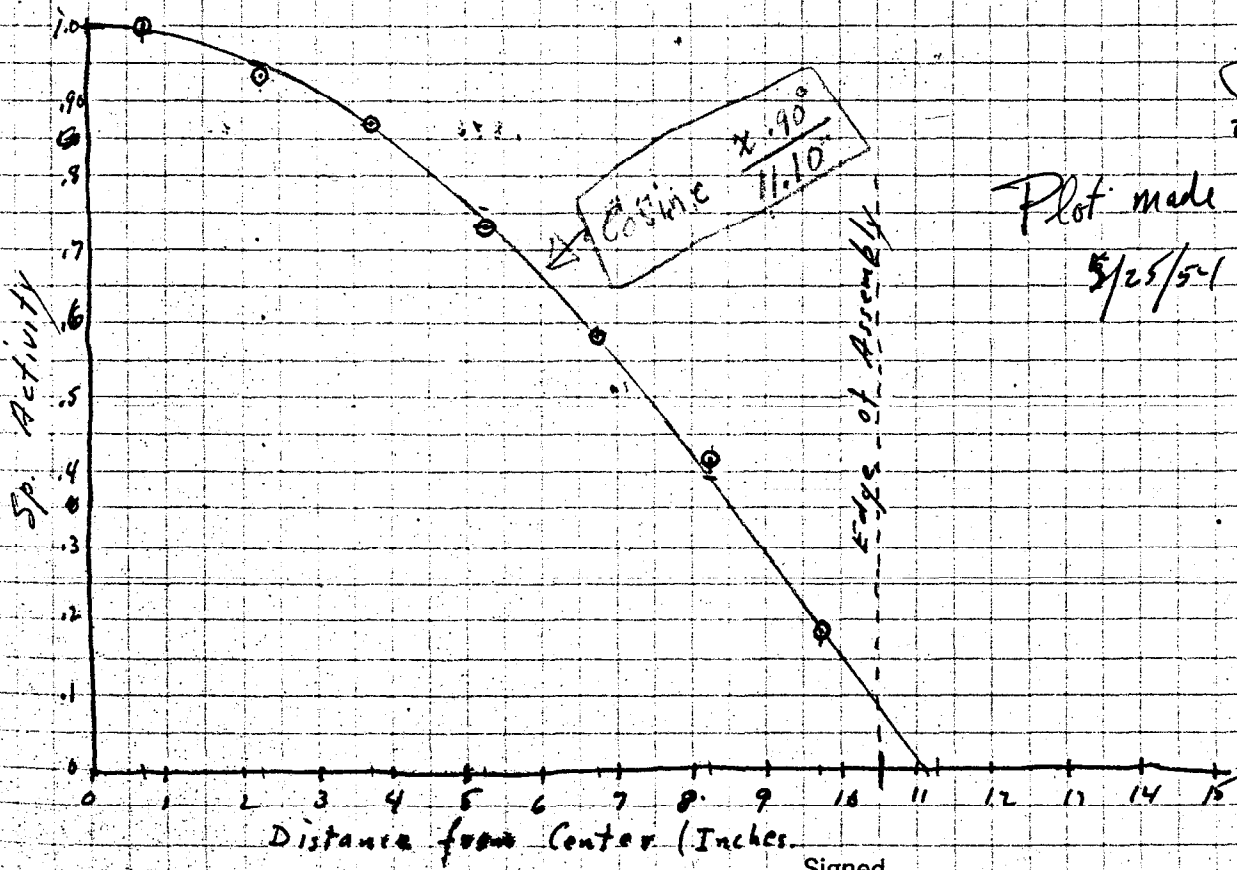
5/11/51 Fine Power Distribution

641732711	741702712672676
710719677708	743740685687
731739	99 100 101
730695	
696738	106 107 108
684744	
686718	114 115 116
705723	

1504

Average
sp Act

Coldness No	Disk No	Mass	Shish	Sp Act #1	Sp Act #2	corr sp Act	Average sp Act
1	✓ 1504	4.484	674	.2035	.175	.186	.189
2	✓ 1516	4.468	705	.2130	.168	.187	.190
3	✓ 1509	4.517	692	.4110	.413	.405	.412
4	✓ 1517	4.499	686	.428	.395	.405	.412
5	✓ 1513	4.459	742	.596	.558	.567	.577
6	✓ 1505	4.473	684	.597	.620	.598	.609
7	✓ 1506	4.449	702	.672	.778	.713	.725
8	✓ 1514	4.507	696	.719	.757	.726	.738
9	✓ 1511	4.463	741	.877	.842	.855	.870
10	✓ 1515	4.444	730	.862	.884	.858	.873
11	✓ 1512	4.507	711	.900	.918	.894	.909
12	✓ 1510	4.486	731	.936	.984	.945	.960
13	✓ 1507	4.426	732	1.000	1.028	1.001	1.019
14	✓ 1519	4.511	710	.985	.974	.965	.981
15	✓ 1508	4.506	647	1.010	1.000	.989	1.005



Normalized
to 1 at the
Center.

Plot made
5/25/51 S.S.

Signed

10 May '51

Measurement of power distribution using same discs from the run 61 (see p 5) Discs have decayed approximately 48 hours after shut-down.

All counting rates have been corrected for disc background, counter background, and have been normalized to counter #1 sensitivity, to starting time 10 AM 10 May 51, and expressed in Counts/min/gram.

Posture	Disc #	Counter #				Avg Rate
		1	2	3	4	
1	15					
2	53					
3	85					19.45
4	139					26.50
5	476					
6	192					
7	169					52.55
8	178					56.25
9	877					
10	1113					
11	513					59.0
12	650					70.2
13	1127					
14	1218					
15	875					73.7
16	1184					80.9

Signed

5/17/51 - 5/23/51

64

Compilation of Counts on 40 Disks used on power Distribution

Older No	Disk No	Counter 1	Counter 2	Counter 3	Counter 4	Average	* not Included
1	1291	53.7	57.6	52.1	53.9	54.3 ✓	
2	1423	106.2	109.8	109.9	106.3	108.1 ✓	
3	3676	106.6	108.8	103.0	106.2	106.2 ✓	
4	1354	130.0	129.0	121.3	124.0	126.1 ✓	
5	1454	144.9	137.5 148.2	137.5	140.2	142.7 ✓	
6	3745	132.1	136.0	131.9	143.3	135.8 ✓	
7	3692	261.5	263.8	258.0	264.5	266.9 ✓	
8	1452	263.5	263.5	254.0	264.0	261.3 ✓	
9	3695	238.5	239.5	227.5	500 *	233.5 233.5 ✓	
10	1477	361.0	347.0	348.5	359.0	353.9 ✓	
11	3746	342.0	343	344.5	346.5	344.0 ✓	
12	1488	149.0	153.5	150.7	151.5	151.2 ✓	
13	3770	143.5	142.9	142.3	144.0	143.2 ✓	
14	3715	581	587	576	602	586.5 ✓	
15	3741	?	305.0	301.0	296	300.7 ✓	
16	3749	297	298	293	306	298.5 ✓	
17	1301	178.2	178.2	173.1	172.4	175.5 ✓	
18	1502	350	357.5	355	392	356.1 ✓	
19	3788	375	373	355	392	381.2 ✓	
20	1427	373	377	373	396	379.8 ✓	
21	3693	380	364	366	354	373.5 ✓	
22	3792	824	755	760	794	783.8 ✓	
23	3750	792	796	767	805	790.0 ✓	
25 25	3791	304 323.5	323.5	323.5	318	322.1 ✓	
26 26	3753	312*	409	419	407	411.7 ✓	
27 27	3766	449	458	447	459	453.3 ✓	
28 28	3939	452	433	442	457	446.0 ✓	
29 29	1372	201.5	203.5	200	206.0	202.8 ✓	
30 31	3792	848	795	835	894	843 ✓	
30 32	3754	1035	1032	1072	1093	1058 ✓	
31	33	1480	516	523	510	511	515 ✓
32	34	3747	520	504	454	507	496 ✓
33	35	1430	444	437	433	456	443 ✓
34	36	3694	439	439	447	424	437 ✓
35	37	3716	868	845	876	869	865 ✓
36	38	3785	480	456	457	488	470 ✓
37	39	3767	1212	1203	1165	1202	1196 ✓
38	40	3961	1221	1212 1161	1182	1200	1191 ✓
39	41	3602	548	530	548	577	551 ✓
40							
41							

Signed

Address No	Disk No	Counter 1	Counter 2	Counter 3	Counter 4	Average
42	3789	555	552	586	558	563 ✓
43	3675	612	586	605	612	604 ✓
44	3748	596	569	603	620	597 ✓
45	3743	1218	1212	1162	1199	1198 ✓
46	3748 3751	1140	1170	1190	1253	1188 ✓
47	3625	700	662	658	652	668 ✓
48	3790	632	575	768 647	647 627	620 ✓
50	3793	1242 70	955*	968 1260	995 1285	998 1262
51	3717	992	990	968	995	986 ✓
52	3744	1382	1342	1448	1392	1391 ✓
53	3752	1335	1368	1325	1377	1351 ✓
54	3764	1602	1539	1588	1632	1590 ✓
56	3915	1481	1482	1462	1558	1496 ✓
5657	3986	1248	1252	1242	1311	1263 ✓
5758	3768	1694	1725	1490	1855	1741 ✓
5859	3962	1752	1680	1748	1791	1743 ✓
5960	3765	1828	1800	1825	1892	1836 ✓
61	3987	1868	1851	1860	1950	1882 ✓
62	3769	1995	1988	1950	2065	2000 ✓
63	3963	1918	1918	1950	2055	1960 ✓
64	3988	2150	2095	2165	2260	2168 ✓

Signed

Little Dists

Coldness No	Disk No	Counter 1	Counter 2	Counter 3	* Not Included		
					Counter 4	Average	
1	1504	1909	1900	1859	1990	1915 ✓	
2	1516	2040	1961	1919	2100	2005 ✓	
3	1509	3815	3840	3735	4070	3870 ✓	
4	1517	4000	4030	3760	4060	4028 ✓	
5	1513	5440	5460	2500*	5720	5607 ✓	
6	1505	5430	5540	652 5430	6100	5625 ✓	
7	1506	5070	6520	6520	7220	6333 ✓	
8	1514	6890	6920	6410	6840	6765 ✓	
9	1511	7950	8060	8450	8000 8600	8265 ✓	
10	1515	17930*	8340	7720	8290	8117 ✓	
11	1512	8600	8410	8420	8440	8468 ✓	
12	1510	9060	8960	8160	9100	8820 ✓	
13	1507	9380	9360	9300	9960	9508 ✓	
14	1519	9600	9650	9000	8850	9275 ✓	
15	1508	9500	9280	9110	10100	9498 ✓	
						Average of Last 3 Nos	[9427]

1	1504	10.9	12.2	12.7	14.3	12.5 ✓	
2	1516	13.2	15.9	7.7	11.1	12.0 ✓	
3	1509	30.3	32.1	26.8	28.8	29.5 ✓	
4	1517	27.8	29.4	28.6	27.2	28.2 ✓	
5	1513	40.1	39.2	38.9	40.8	39.8 ✓	
6	1505	44.7	44.9	43.9	43.4	44.2 ✓	
7	1506	57.3	54.0	56.2	76.6*	55.5 ✓	
8	1514	56.0	55.2	50.7	53.9	54.0 ✓	
9	1511	57.3	65.0	62.5	61.1	61.5 ✓	
10	1515	62.2	60.2	65.0	64.7	63.0 ✓	
11	1512	67.4	66.3	66.7	61.5	65.5 ✓	
12	1510	68.3	71.9	70.6	69.4	70.1 ✓	
13	1507	74.2	73.0	71.0	75.0	73.3 ✓	
14	1519	71.0	68.2	69.0	70.7	69.7 ✓	
15	1508	71.1	71.0	72.5	70.5	71.3 ✓	
						Average Last 3 Nos	[71.93]

Signed

Classification Change to Decl. Ex

Authority of S.J.M. Date 5/27/60