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HW-7-5630-Del

HW-7-5630-Del

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This Document consists of 165 Pages

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January 17, 1947

HANFORD ENGINEER WORKS

MONTHLY REPORT

DECEMBER 1946

1213196

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GENERAL SUMMARY

The power levels of the Piles at 100 D and 100 F were maintained at 250 MW and 200 MW respectively. The operating time efficiency was 93.5.

Forty-seven batches were started in the Canyon Buildings and fifty-seven were delivered from the Isolation Building.

There were no major injuries during December. The plant safety record as of December 31 was seventy-seven days.

On December 2 Dormitory W-10 was dedicated to the Educational Program of the Hanford Engineer Works. This program will be under the direction of F. Ellis Johnson and will be rapidly expanded as soon as the dormitory facilities are converted into classrooms.

Mr. C. C. Tallman has been appointed Assistant to the Manager and will be responsible for coordinating the activities on labor relations. Mr. Tallman's first activity will be directed at an overall survey of plant operations to determine the probable liability under portal-to-portal decisions.

Plans have been completed for the installation of the General Electric Company procedures in place of the du Pont procedures that were retained in effect after the September 1 transfer. The new procedures will become effective as of January 1.

[redacted]

HW-7-5630-D

HW-7-5630-Del

STAFF

MANAGER	D. H. LAUDER
ASSISTANT MANAGER	G. G. LAIL
PRODUCTION SUPERINTENDENT	C. N. GROSS
TECHNICAL SUPERINTENDENT	A. B. GREININGER
WORKS ENGINEER	W. P. OVERBECK
P DEPARTMENT SUPERINTENDENT	J. E. MAIDER
S DEPARTMENT SUPERINTENDENT	W. K. MAC CREADY
POWER SUPERINTENDENT	H. H. MILLER
MAINTENANCE SUPERINTENDENT	W. W. PLEASANTS
ELECTRICAL SUPERINTENDENT	H. A. CARLBERG
INSTRUMENT SUPERINTENDENT	H. D. MIDDEL
SERVICE SUPERINTENDENT	E. L. RICHMOND
TRANSPORTATION SUPERINTENDENT	R. T. COOKE
MEDICAL SUPERINTENDENT	W. D. NORWOOD, M.D.
DESIGN AND CONSTRUCTION SUPERINTENDENT	F. W. WILSON
WORKS ACCOUNTANT	F. E. BAKER

1213199

DECLASSIFIED

FORCE REPORT
DECEMBER 1946

	Non-Exempt		Exempt		Total	
	11-30-46	12-31-46	11-30-46	12-31-46	11-30-46	12-31-46
Management	-	-	4	5	4	5
Design & Construction	-	8	1	6	1	14
P Department	175	173	44	48	219	221
S Department	246	242	53	54	299	296
Technical	122	128	89	92	211	220
Power	354	352	78	79	432	431
Maintenance	465	499	94	97	559	596
Electrical	164	168	35	36	199	204
Instrument	108	107	30	34	138	141
Service	578	581	144	146	722	727
Transportation	555	555	60	61	615	616
Medical	264	269	105	108	369	377
Accounting	572	584	47	47	619	631
TOTAL	3603	3666	784	813	4387	4479

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PERSONNEL DISTRIBUTION - DECEMBER 1946

	100-B Area	100-D Area	100-F Area	200-E Area	200-W Area	300 Area	Plant General	700-1100 Area	Total
P DEPARTMENT									
Supervisors	6	14	13	-	-	11	-	4	48
Operators	10	40	41	-	-	82	-	-	173
Total	16	54	54	-	-	93	-	4	221
S DEPARTMENT									
Supervisors	-	-	-	22	27	-	1	3	53
Operators	-	-	-	108	121	-	12	1	242
Engineer on Assignment	-	-	-	-	-	-	1	-	1
Total	-	-	-	130	148	-	14	4	296
TECHNICAL DEPARTMENT									
Supervisors	-	5	-	6	5	10	-	7	33
Chemists, Engineers & Physicists	2	5	3	5	16	44	-	7	82
Analytical Personnel	2	14	6	33	19	27	-	-	101
Others	-	1	-	2	-	1	-	-	4
Total	4	25	9	46	40	82	-	14	220
POWER DEPARTMENT									
Supervisors	7	25	22	6	10	-	2	7	79
Operators	36	96	96	24	31	8	-	34	325
Others	4	5	5	-	7	4	-	2	27
Total	47	126	123	30	48	12	2	43	431
MAINTENANCE DEPARTMENT									
Supervisors	1	2	12	4	12	3	11	17	62
Engineers	-	-	-	-	-	-	35	-	35
Mechanics	8	22	68	33	66	29	24	182	432
Others	1	1	7	12	13	1	25	7	67
Total	10	25	87	49	91	33	95	206	596

	100-B Area	100-D Area	100-F Area	200-E Area	200-W Area	300 Area	Plant General	700-1100 Area	Total
ELECTRICAL DEPARTMENT									
Supervisors	1	2	3	2	3	1	11	7	30
Electricians	5	10	14	16	13	7	50	36	151
Others	1	1	2	2	3	-	10	4	23
Total	7	13	19	20	19	8	71	47	204
INSTRUMENT DEPARTMENT									
Supervisors	1	3	4	2	4	5	-	4	23
Engineers	-	-	-	-	-	8	-	3	11
Mechanics	4	15	13	15	15	16	-	5	83
Others	-	3	2	3	4	7	-	5	24
Total	5	21	19	20	23	36	-	17	141
SERVICE DEPARTMENT									
Supervisors	7	7	5	9	7	12	13	84	146
Patrolmen	23	52	51	84	72	28	8	55	373
Firemen	13	-	-	-	-	12	-	52	77
Laundry Operators	-	-	-	-	1	-	-	1	2
Inspectors	4	4	4	4	4	-	1	1	22
Janitors	2	5	5	6	9	7	-	38	72
Others	-	-	-	-	11	-	-	24	35
Total	51	68	65	103	104	59	22	255	727
TRANSPORTATION DEPARTMENT									
Supervisors	1	2	2	2	2	1	9	42	61
Drivers (Based on Areas Served)	12	22	27	32	32	18	29	39	211
Mechanics	1	1	1	1	2	-	8	63	77
Trainmen	-	4	4	4	4	-	-	2	18
Laborers	3	4	4	4	4	4	-	66	89
Others	5	10	9	9	14	4	13	96	160
Total	22	43	47	52	58	27	59	308	616

	100-B Area	100-D Area	100-F Area	200-E Area	200-W Area	300 Area	Plant General	700-1100 Area	Total
MEDICAL DEPARTMENT									
Physicians	-	-	-	-	-	-	7	12	19
Dentists	-	-	-	-	-	-	-	8	8
Nurses	-	4	-	3	3	1	7	73	91
H. I. Specialists	-	8	12	29	35	70	-	13	167
Technicians	-	2	-	2	-	1	-	18	23
Others	-	-	-	-	-	-	-	69	69
Total	-	14	12	34	38	72	14	193	377
ACCOUNTING DEPARTMENT									
Supervisors	-	-	-	-	-	-	-	47	47
Clerks	1	4	5	3	7	5	-	113	138
Telephone & Teletype Operators	-	-	-	1	-	-	-	33	34
Others	1	3	4	7	11	17	-	369	412
Total	2	7	9	11	18	22	-	562	631
DESIGN & CONSTRUCTION									
Exempt Employees	-	-	-	-	-	-	-	6	6
Non-Exempt Employees	-	-	-	-	-	-	-	8	8
Total	-	-	-	-	-	-	-	14	14
MANAGEMENT	-	-	-	-	-	-	-	5	5
GRAND TOTALS	164	396	444	495	587	444	277	1,672	4,479

ARRIVALS AND DEPARTURES OF EXEMPT PERSONNEL

ARRIVALS

Name	Department	Physical Arrival	Origin
Charles G. Lewis	P	12-30-46	New
William L. Sapper	P	12-2-46	New
John T. Carleton	Technical	12-31-46	New
Sigmund J. Lawrence	Technical	12-2-46	New
Barbara Ray Mc Intosh	Maintenance	12-23-46	New
John Anderson Carlen	Electrical	12-31-46	New
Robert E. Connally	Instrument	12-11-46	New
Hendrik D. Middel	Instrument	12-16-46	Trans.-Schenectady
John W. Brands	Transportation	12-2-46	New
Donald H. Eckles	Medical	12-4-46	New
Phillip A. Olson, Jr.	Medical	12-2-46	New
Dixon P. Schiveley	Medical	12-2-46	New
Alvin J. Stevens	Medical	12-2-46	New
William J. Tupper	Medical	12-12-46	New
Phillip D. Moore	Accounting	12-9-46	(Not on Roll - visiting Auditor)
Abram J. DeLong	Design & Const.	12-2-46	New
Robert D. Flanders	" " "	12-30-46	New
Charles G. McIntosh	" " "	12-2-46	Trans.-Schenectady
Leslie A. Vosmer	" " "	12-16-46	New
John V. Wright	" " "	12-2-46	New

DEPARTURES

Name	Department	Physical Departure	Destination
James D. Mayfield	Service (Prot.)	12-20-46	Voluntary Quit - to enter private business
M. H. Smith	Management	12-1-46	Trans.-Clinton, Iowa

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	WP	WQ	WR	WS
NR	843	54	3,388	214
NS	398	21	492	25
NT	19,658(a)	77(a)	19,168(b)	75(b)
NU	12,443	49	8,820	34
NV	32,803	129	37,454	146
NW	9,139	36	6,960	28
NX	-	5	-	4
NY	-	32	-	4
NZ	-	27	-	27
GA	55,969	220	55,969	218(c)
GB	63,780	250	63,707	249(c)
GC	63,954	251	63,798	249(c)
GD	183,703	721	183,474	716(c)
GE	28,340	111.2	27,642	108.5
GF	-	25.2	-	8.0
GG	-	1,404.3	-	1,477.2

	WT	WU
GH	0	98,107
GI	7,256	168,895
GJ	5,733	137,974
GK	12,989	404,976
GL	0	78,073
GM	5,292	139,257
GN	5,354	112,742
GO	10,646	330,072

	WK	WL	WM	WN	WO
GP	7,223,000	3,987,000	-	11,210,000	307,610,000
GQ	7,618,000	3,894,000	-	11,512,000	~~287,457,000~~ 286,100,000
GR	514,200	327,400	-	841,600	18,097,600
GS	9,196,000	6,689,000	-	15,885,000	278,582,000
GT	-	557,200	-	557,200	10,781,300
GU	9,196,000	6,131,800	-	15,327,800	267,800,700
GV	2,896,000	2,373,000	-	5,269,000	-
GW	-	-	-	735,000	-
GX	-	-	-	15,244,000	268,884,160

from Charles Bross
Feb 10, 1947

(a) Does not include 1,367 unbonded pieces at 5 units.
(b) Does not include 507 unbonded pieces at 2 units.
(c) Figures adjusted to new factor weight of 7.80 as determined by physical inventory as of December 31, 1946.

1213205

WHH

	WW	WX	WY	WZ
CA	3,363	213	39,823	2,709
CB	-	11	-	1,498
CC	-	224	-	4,207
CD	817	49	36,166	2,277
CE	10,832	44	684,895	2,602
CF	1,660	6	245,341	955
CG	2,179	9	29,469	117
CH	15,531	60	921,789	3,527
CI	17,915	70	677,603	2,569
CJ	-	6	-	181
CK	-	9	-	626
CL	-	6	-	567
CM	-	7	-	76
CN	-	3	-	74
CO	-	6	-	616
CP	-	8	-	176
CQ	-	6	-	69
CR	-	1	-	62
CS	-	9	-	-
CT	-	3	-	-
CU	-	6	-	-
CV	-	12	-	-
CW	-	4	-	-
NA	-	-	153,473	601.0
NB	6,656	26.1	234,466	918.7
NC	6,592	25.9	199,698	782.2
ND	13,248	52.0	587,637	2,301.9
NE	-	-	97,504	382.7
NF	6,729	26.4	170,759	670.2
NG	6,748	26.5	135,900	533.4
NH	13,477	52.9	404,163	1,586.3
NI	9,240	36.3	220,566	865.7
NJ	4,935	19.4	157,826	619.5
NK	-	-	-	-
NL	14,175	55.7	378,392	1,485.2
NM	-	-	-	386.6
NN	-	-	-	376.1
NO	-	26.1	-	238.8
NP	-	46.8	-	475.7
NQ	-	72.9	-	1,477.2

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HW-7-5630-D

HW-7-5630-Del

P DEPARTMENT

DECEMBER 1945

I. GENERAL

The D and F Piles were operated at a nominal power level of 250 M.W. and 200 M.W. respectively except for scheduled outages and one scram in the D Pile. The B Pile was maintained in standby condition with a water flow of 4000 g.p.m.

The 300 Area production rate continued on a 60 ton per month basis to meet the 100 Area requirements.

II. ORGANIZATION AND PERSONNEL

One shift supervisor, C. G. Lewis, returned to the Project during the month and was assigned to the 100 Areas. Two supervisors, R. G. Clough and M. T. Lewis, were transferred from the Health Instrument section of the Medical Department and assigned to the 100 Areas as Supervisors in training. W. L. Sapper, a Supervisor in Training in the Design and Construction Department, was temporarily placed on the "P" Department roll. Two operators were transferred at their request from the 300 Area to the Maintenance Department to fill vacancies.

III. AREA ACTIVITIES

PILE SUMMARY	PILE B	PILE D	PILE F
Time Operated (%)	-	94.2	92.8
Operating Efficiency (%)	-	93.6	92.5
*Power Level (MW)	-	250	200
*Inlet Water Temperature (°C)	6.6	6.0	6.0
*Outlet Water Temperature (Maximum °C, 10 tubes, .240 zone)	6.6	42.8	38.0
Number of scrams	-	1	0
Number of purges	0	1	1
Helium consumption (cu. ft.)	25,222	55,234	66,065
Metal discharged (tons)	0	26.4**	26.4
Inhours gained (this month)	0	13	6
*Inhours poisoned	-	356	342
*Inhours in rods	-	64	51

* Month end figures

** The total metal discharged is below quota because of the necessity of taking complete physical inventory of metal. The scheduled December 31 push at D Area was postponed until January 2 to expedite this work.

1213207

DECLASSIFIED

PILE BUILDING

Outage Breakdown

Date of Outage	Scheduled Outages: Metal Discharge	Scheduled Outages: Maintenance	Unscheduled	Length of Outage (Hrs.)
12-3-46	D			21.4
12-4-46		F		16.2
12-10-46			D	0.6
12-11-46	F			19.1
12-17-46	D			20.9
12-26-46	F			16.7

The unscheduled outage at D Area on December 10 was caused by the accidental tripping of a phase load relay in the D Area Electrical Sub-Station (Bldg. No. 151-D).

Operating Experience

A number of Special Request slugs were processed during the month. Details may be found in the Technical Section of this report.

The increased loading of bismuth into the F-Pile as part of an expanded program of irradiation of this material was completed on December 4. Tubes No. 2071-F, 2077-F, 2671-F, and 2677-F which contained regular metal were discharged and then recharged with 45 slugs each of bismuth; tubes No. 1274-F and 2085-F which contained 60 irradiated bismuth slugs each were discharged and recharged with 45 each. The bismuth loading pattern at the F-Pile now consists of 12 stringers each containing 45 slugs. As recommended in Classified Document No. 7-5288 the average concentration per slug is being increased by charging fewer slugs in each tube. The increased loading of bismuth into the D Pile will be completed in February.

In conformance with Production Test No. 105-74-P, a reactivity test of F-Pile was performed on December 3 and of D-Pile on December 27. An additional reactivity test and rod calibration were made at F-Pile on December 18. The results of the tests will be reported separately by the Technical Department.

Functional tests of the High Tank check valves were completed satisfactorily at B-Pile on December 2 and at F-Pile on December 26. The D-Pile High Tank check valves will be tested in January.

The monthly foil exposure in the B-Pile was made December 17 by members of the Technical Department.

On December 11, Tubes No. 3171-F, 3172-F and 3277-F were discharged of regular metal and each recharged with 6 capsule ("papoose") slugs and 26 regular metal slugs as provided in Production Test No. 105-1-P, Supplement A.

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Operating Experience, Cont'd.

On December 26, in conformance with Production Test No. 105-79-P, Supplement A, the following regular metal tubes at the F-Pile were discharged and then charged as indicated below: Tubes No. 1270-F, 1482-F, 1884-F, 2062-F, 2881-F, 3170-F and 3672-F with slugs marked "UR" which were recanned from a stock of unbonded pieces in the 300 Area and are thought to be rolled metal; tubes No. 1268-F, 2482-F, 2866-F, 3089-F and 3175-F with slugs marked "R" and known to be rolled metal; tubes No. 2160-F, 3058-F, 3273-F, and 3482-F with slugs marked "N" which were extruded in the normal fashion but cast from the same material as that marked "R".

Mechanical Experience

A total of 10 tubes at D-Pile and 15 tubes at F-Pile was plug gauged as stipulated in Production Test No. 105-81-P to determine the amount of bending at the inner ends of the gun barrels. The results of these tests are analyzed in the Technical section of this report.

The remaining 17 thimbles of the vertical safety rod system at the D-Pile were pneumatically tested on December 3. This completes the semi-annual testing of the vertical thimbles at B, D, and F-Piles. All tests were satisfactory;

During the outage of December 4, the No. 2 horizontal rod thimble at the F-Pile was boroscoped to determine the cause of scratching which had been observed previously along the top of the rod tip. No obstructions were found and there appeared to be no excessive corrosion in the thimble. It was noted, however, that there was an accumulation of water droplets on the rod itself and some indication of water leaking down the near face of the pile below the lip of the thimble. On December 26 the rod was withdrawn from the pile and hydrostatically tested at 80 lbs/sq. in. A nearly continuous drip of water was evident about 5" from the underneath side of the tip end of the rod. The rod was left out of the pile and will be replaced early in January with the only complete spare on hand. Progress is being made to purchase or fabricate additional spares. This program is being expedited in that on December 30, the No. 9 Rod of the B Pile was found to be leaking also.

On December 4, a new mattress plate extension was installed in the discharge area at the F-Pile in the second position from the near side. The replaced extension plate was badly torn. At the same time, the mattress plates were rearranged so that those in the best condition were located near the center of the basin, this being the point where the most severe service is encountered.

On December 3, members of the Technical Department ran a hydrostatic traverse of Tube No. 4674-D for the periodic bowing measurements specified for studying graphite expansion under Production Test No. 105-48-P.

Mechanical Experience, Cont'd.

Inspection cat walks for servicing the overhead cranes in the work areas were installed at the D and F-Piles in December. A similar installation will be made at the B-Pile in January.

A number of small gas leaks which became evident around the base of the F-Pile in November are still present in a minor form. Repairs made with plastic sealing compound were not completely successful. A new type material is on order and will be applied as soon as received.

At the D-Pile, Vertical Safety Rod No. 37 continued to give trouble through binding. On December 3 and 17, the rod tested satisfactorily while the pile was shut down, but when tested about 12 hours after startup would not move freely. Further work is planned to determine if the rod guide is out of plumb. Vertical Safety Rod No. 25 and its rod guide at the D-Pile, which had given some trouble through binding, were buffed on December 17. The assembly has since operated satisfactorily.

Under Production Test No. 105-52-P, Supplement F, Tube No. 4082-B was purposely ruptured at the rear Van Stone flange on December 24 and removed from the pile. The tube has not yet been replaced, pending completion of the investigation of the channel by members of the Technical Department.

The orifices on Tubes No. 3788-D, 3887-D, 3986-D, 4084-D, and 4180-D were changed from 0.175" to 0.200" diameter on December 17. Prior to this change, the temperatures of these tubes limited the operating level of the pile during the first 12 hours after a startup.

At the B-Pile, the 4" cross header screens on "A" Riser were changed to assure proper water flow.

Gas Processing Building

One carload of helium was unloaded to the F-Area storage tanks during the period December 13 to 15.

On December 3, the lines to the No. 1 and No. 2 Purification Rooms were blanked off to segregate these rooms from the D-Pile helium circulation system. The lines are not used and this will eliminate gas leakage to or from the circulation system at this point. This change was made at B Area some time ago and will be made at F Area.

Special Hazards

Minor contamination still exists in the F Area ash pit. The Health Instrument group is making a series of studies to determine if a leak exists in the sewer line between the Pile Building and the Retention Basin (Bldg. No. 107-F) which would allow radioactive water to make its way to the ash pit.

300 AREA - METAL FABRICATION

Extrusion, Outgassing, and Machining

Extrusion, Machining, and Billet Yields were as follows:

	% Yield		
	November	December	To Date 1946
Extrusion	93.7	92.6	92.5
Machining	82.1	79.6	79.9
Billet	76.9	73.7	73.9

Extrusion operated December 3, with some difficulty on startup due to excessive oxidation of the first few billets apparently caused by vapors trapped in the rotary furnace resulting from flushing the ball race on November 29.

On December 4, twenty-seven TX billets were satisfactorily extruded from the August and September shipment. The rods were packed and shipped to Site Y.

Inspection of the ball race in the rotary furnace indicated the original flushing was only about 75% effective in the removal of the carbonized grease. The furnace was flushed again during the week beginning December 9, using A-15 flushing oil and Duponal solution. The ball race was completely cleaned and lubricated with A-7 grease. In order to prevent the difficulty previously experienced with the oxidation of billets following flushing, the furnace was preheated for 64 hours at 1200° F, 48 hours at 1700° F (operating temperature), and purged sufficiently to remove all undesirable impurities from the furnace atmosphere prior to extruding December 18. Operations were normal on this date.

A temporary thermocouple was installed in one of the inspection plates to check the temperature of the ball race during operation. The maximum temperature recorded was 352° F.

The remaining sixty-two TX billets from the August and September shipments were extruded December 18 under "Supplement A" of production test No. 314-42-M. The rods will be machined and tested in the 305 Building test pile during the next month.

A total of 223 four-inch slugs were machined to A dimensions for production test No. 313-83-M.

Eleven tons of rolled rods were received from Fort Wayne and were machined in December. The rods were grouped into four machining lots based on analytical data. The fourth lot, consisting of twenty of the longest rods, is being held following machining for a production test. The remaining three lots will be processed normally. The machining yield on the four lots was 70.4%. The subnormal yield was chiefly due to irregular rod lengths.

The processing of unbonded slugs was continued at a rate of 800 per week.

Chip Recovery and Oxide Burning:

The Chip Recovery yield was as follows:

	% Yield		
	November	December	To Date 1946
	91.8	92.5	92.7

Chip Recovery was operated seven days during December. A damper was installed in the circulating air duct of the centrifuge to decrease the air flow. Parts of the same lots of turnings processed when three fires occurred November 25, were processed through the centrifuge with the damper set to cut off approximately one-third of the circulating air, without any fires being encountered. One fire occurred during the month, but was due to a centrifuge basket being loaded with chips which had partially dried before centrifuging.

The 12,450 pounds of turnings received from Fort Wayne were processed successfully during this period. The yield on briquetting was 95.4%.

The Oxide Burner was shut down December 2 for repairs. The feed hopper and part of the exhaust duct were renewed. The burner was placed back in service on December 13 and has been operated daily.

The material burned is as follows:

	Weight Out - Lbs.		
	November	December	To Date 1946
Extrusion Skirts & Floor Sweepings (D-2)	0	2567	5511
Chip Recovery Floor Sweepings (D-2)	0	999	1419
Extrusion Oxides (D-6)	890	1173	23125
Chip Recovery Oxides (D-6)	565	1460	16190
Site Y Material (D-6)	13448	0	13448
Fort Wayne Material (D-6)*	--	1279	1279
	14903	7478	60972

* All D-6 material received from Fort Wayne has now been burned.

Canning Operation:

Metal Slugs - Type canned and yields were as follows:

	% Canned		% Yield	
	December	To Date 1946	December	To Date 1946
New Machined - A's (Stripped Unbonded)	7.3	8.5	82.8	80.3
New Machined - A's (Cast)	0.0	0.5	0.0	78.8
New Machined - MZ's	76.4	76.3	90.5	87.6
Recovered - Z's	13.0	8.6	94.2	88.0
Recovered - X's	3.3	6.1	95.9	91.0
	100.0	100.0	90.6	87.2

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Canning Operation, Cont'd.

Seven hundred and fifty- two Bismuth slugs were canned during December.

Two hundred and seventeen four-inch "A" uranium slugs were canned for production test No. 313-83-M. The final yield was 82.9%, with twelve rejections for wrinkled cans, five marred surface, six frost test, one air pocket, two thin caps, one Al-Si, eight no-seats, and one complete failure in autoclave. The wrinkled cans were found to be due to slight collet depressions, resulting from cutting 8" cans to size. These depressions were not readily visible until after canning. Further improvement of yields will be forthcoming through the modification of equipment and the development of canning technique following receipt of 4" cans.

Canning rejects, by cause, were:

	% of Total Canned (Regular)		
	November	December	To Date 1946
Non-Seating	2.2	2.3	2.2
Wrinkled Cans	2.4	1.5	1.9
Marred Surface	2.1	2.1	3.3
Al Si on Outside of Can	0.1	0.1	0.2
Air Pckets	0.2	0.1	0.1
Frost Test	1.3	1.2	1.3
Warp	0.7	0.6	0.2
Bad Welds	0.3	0.5	0.4
Miscellaneous Causes	0.8	1.0	3.2
	10.1	9.4	12.8

The recovery of BFC_6 (Uranium Oxide) from bronze flux was continued on a twenty-four hour schedule. A total of 12,264 pounds of BFC_6 and approximately 18,000 pounds of bronze were recovered this period.

A production test, No. 313-85-M, was started December 2 to determine if it would be feasible to use the can etch acid (H_3PO_4) two weeks or longer. Results on two two-week periods of use have been satisfactory.

Production test No. 313-82-M was run from December 10 through December 26 to determine if the aluminum silicon canning baths could be used two days without exceeding specification limits After one and one-half days' use on December 13, it was necessary to recharge the canning baths with virgin metal since the limit on tin had been reached.

The canning baths were used satisfactorily for two days throughout the remainder of the test, although the maximum limit for tin was very closely approached in several instances. The test is still in progress.

Recovery Operation:

	% Recovered		Average Weight--Lbs.	
	December	To Date 1946	December	To Date 1946
Z Slugs	45.5	53.9	7.798	7.803
X Slugs	53.2	40.3	7.729	7.728
Rejects	1.3	5.8	--	--
	100.0	100.0		

Inspection and Testing:

Autoclave rejects were as follows:

	November	December	To Date 1946
New Machined - A's (Stripped Unbonded)	0.30/M	0.00/M	0.05/M
New Machined - A's (Cast)	0.00	0.00	0.00
New Machined - MZ's	0.09	0.16	0.07
Recovered - Z's	0.00	0.50	0.05
Recovered - X's	0.00	0.00	0.07
	0.14/M	0.19/M	0.07/M

Three autoclave failures occurred during this period. Two failures involved MZ material, one of which resulted from lifting of the cap due to a small unbonded area at the base of the cap. The other showed evidence of penetration to a point near the can surface. The third failure involved Z material and was due to a small unbonded area on the sidewall of the can, too small to be detected in frost testing.

The "As Received" quality of cans, caps, and sleeves inspected prior to use was as follows:

	% Useable (Regular)		
	November	December	To Date 1946
Aluminum Cans	90.8	85.8	83.4
Aluminum Caps	97.5	97.8	96.8
Steel Sleeves	63.8	74.0	72.3

The yield on "Special Request" cans inspected this month was 99.7%; the yield to date is 94.5%. A total of 5,280 aluminum boss type caps were received for canning four-inch uranium slugs; the yield on 4[illegible]0. caps inspected was 95.0%.

The final etch (HNO_3) acid has now been used through eight two-week periods with satisfactory results. This completes the initial phase of production test No. 313-84-M. The second phase of the test was started December 23 and involves using the acid for a three-week period.

On December 2 the high voltage transformer failed in the marking fluoroscope. Attempts to repair the transformer were not successful and a new transformer was obtained. The new transformer was installed December 12 and has been functioning normally. The transformer that failed has now been successfully repaired and is being held in reserve.

300 Area - Test Pile

The unit was operated eight eight-hour days, making 114 regular tests on canned slugs, sixteen tests on TX bare slugs for production test No. 314-42-M, two tests on four-inch "A" canned slugs for production test No. 313-83-M, and sixteen tests on billet eggs.

Beginning December 3 the control rod Selsyns were checked, the safety and control rod thimbles vacuumed, the control rods cleaned, and brakes adjusted. In addition, the ionization chambers and galvonometers were checked and the instrument lead wires were renewed where necessary. This work was done in an effort to stabilize day to day test results. Tests made, however, since the work was completed indicate a difference of 0.06 to 0.10 dih on tests performed on the same stringers of material on different days althought the results on any one day are reproducible. Further study will be made of this condition.

I. GENERAL

Forty-seven batches were started in the Canyon Buildings during the month and fifty-six were processed through the Concentration Buildings. Fifty-seven batches were completed in the Isolation Building with an average purity of 98.9%.

The material balances for T and B Plants averaged 97.7% and 103.3%, respectively, for a combined average of 101%. Waste losses were lowered approximately 0.2% in both Plants as compared to November's performance.

The production schedule of both Plants was readjusted during December in order to maintain the desired balance between all waste storage facilities.

Production Performance Data (12/1/46 – 12/31/46, inclusive)

	B Plant	T Plant	Combined
Number of charges started	29	18	47
Number of charges completed	33	23	56
For completed charges:			
Percentage of starting product in waste			
This month	5.5	5.0(a)	5.3
Last month	5.7	5.2(b)	5.6
Cumulative to date	6.4	6.6(c)	6.4
Percentage of starting product recovered			
This month	97.8	92.7	95.7
Last month	96.7	95.3	96.4
Cumulative to date	95.7	94.8	95.3
Percentage of starting product accounted for			
This month	103.3	97.7	101.0
Last month	102.4	100.5	102.0
Cumulative to date	102.1	101.4	101.8
G Decontamination Factor (Log.)			
This month	7.16	7.32	7.21
Last month	6.96	7.08	6.99
Cumulative to date	7.27	7.23	7.25

(a), (b), and (c): Includes waste from processing recycle. The recycle wastes are estimated as: (a) 0.19%, (b) 0.21%, and (c) 0.23%.

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Isolation Building Performance Data (12/1/46 – 12/31/46, inclusive)

	% of Incoming Product			
	Prepared for Shipment	Recycle	Losses	Material Balance
Average for this month	95.7	3.5	0.17	99.3
Average for last month	95.0	3.2	0.13	98.3
Average to date	96.8	3.9	0.14	100.8

II. ORGANIZATION AND PERSONNEL

R. A. Hultgren was transferred from the H.I. Group to the S Department effective December 1, 1946 and assigned to the B Plant Canyon Building as a Shift Supervisor in Training. J. B. Chaney, a former Senior Supervisor in the Isolation Building, was transferred to the Technical Department effective December 1.

III. AREA ACTIVITIES

PRODUCTION PERFORMANCE

T and B Plants

Decontamination Factors

No significant improvement was noted in the erratic decontamination behavior of runs processed in B Plant during December. In no case, however, was the Beckman limit of 150 mr/hr. exceeded on the bottom of any transfer can delivered to the Isolation Building. The Technical Department continued its study of the problem. Data accumulated at B Plant during the month indicated relatively constant decontamination factors in all cycles except the first half of the first decontamination cycle in Section 13 where the factor was shown to vary from 4 to 19. No final evaluation of data collected to date was made, however.

Acid Wash

The T Plant acid wash reported in process at last month-end was completed during December. The total product pick-up through the Concentration Building was normal at 20% of a full run. At B Plant Acid Flush B-6-12 AW1 was made with a total overall product pick-up of 21.75%.

Process Leaks

During the early part of December two process leaks were discovered and repaired in B Plant with no appreciable loss of product. The first leak occurred on December 2 as the result of a G9 gasket failure in the Section 16 centrifuge to solution tank jet. Replacements in both the "A" and "B" transfer jets were made with Teflon gaskets. On Run B6-12-F8 a leak occurred during the transfer of metal solution from Section 6 to Section 8. The jumper was discarded and replaced with a new assembly employing Teflon gaskets.

Dissolver Heel

As explained last month the large heel in the 3-5R Dissolver at B Plant was reduced by taking an extra full-sized cut from the dissolver. A program of correlating dissolving times with quantity of acid used in each dissolution has been adopted to attain and maintain proper-sized dissolver heels.

Recovery of I^{131}

The Iodine absorbing scrubber in the B Plant Stack Gas Monitoring Building was operated during eight dissolver cuts in December. Use of potassium sulfite absorbing solutions recovered only slightly more iodine than had been obtained with sodium carbonate. These tests indicate that varying the scrubbing media will not result in significant changes in the concentration of recovered iodine solutions.

Special Flush of "A" Cell Precipitator Tank

Although the plugging of the Cell "A" precipitator tank to centrifuge transfer jet in the B Plant Concentration Building was somewhat improved in December it was decided to make a second nitric acid – peroxide flush of the precipitator tank. A larger volume was used and the digestion time was extended to thirty-six hours. At month-end the plugging had not been eliminated, however, and indications were that the bismuth phosphate solid originates ahead of Cell "A".

Cell "E" Product Effluent Waste Losses

During the month the skimming time of the Cell E Centrifuge in B Plant was extended from a normal time of 5 minutes to a set time of 15 minutes, in an effort to reduce the product effluent waste losses. A small improvement of from 0.05 to 0.1% was gained but losses continued to run much higher than the Cell E losses in T Plant. Since this and all other Process efforts to reduce the B Plant losses had failed it was felt that the difficulty may be mechanical and peculiar to the centrifuge itself. At month-end the interchange of the Cell B and Cell E machines had been accomplished. January figures are expected to indicate the effectiveness of this move.

Recycle Difficulties

Early in December at T Plant considerable difficulty was experienced in obtaining satisfactory lanthanum analyses of the product recycle solutions in the Concentration Building. Since the acidities reported were lower than normal the addition of nitric acid and potassium permanganate corrected the trouble and the desired values were obtained upon resampling. Steps were immediately taken to maintain the acidity of recycle solutions at 1.0 N by controlling this factor in the Isolation Building. No further difficulties were encountered during the balance of the month.

F Cell Process Difficulties

Incomplete removal of the final lanthanum hydroxide cake from the Cell F Centrifuge was indicated on several runs processed in T Plant. Run T-6-12-F10 was sent to the Isolation Building carrying only 85% of the original product content of the charge. The amount left behind in the centrifuge was subsequently picked up by the next charge with the result that this run was delivered to the Isolation Building in two transfer cans to maintain batch size control. The Technical Department will study the problem in an effort to effect complete cake removal.

Production Test No. 224-T-10

During December Production Test 224-T-PA-10 "Recirculation of Metathesis Wash Waste" was started in the T Plant Concentration Building. The first phase of the test involving the recirculation of approximately two-thirds of the metathesis wash waste to the metathesis tank as dilution water for the succeeding run prior to its first centrifugation was completed and a savings of approximately 0.25% were realized. The test will be continued into January.

Reworking of Run T-6-12-F1

A high (5.9%) Cell D lanthanum fluoride by-product cake solution waste was encountered on Run T-6-12-F1 in T Plant. The waste was successfully recovered by returning the by-product cake to the precipitator tank and processing it as a normal full volume run, repeating the oxidation and precipitation. The reason for the loss was not known although there appeared to be a definite connection between it and the sudden lowering of the Cell D precipitator tank Beckman background to normal. Up until this run had been processed the Beckman background of this tank increased sharply after processing each of the several preceding runs.

Isolation Building

Hydrogen Peroxide Study

Measurements made in the Isolation Building indicated that the concentration of hydrogen peroxide used in the first cycle strike was lower than the desired 10%. In an effort to restore this standard and determine its effects upon the product content of the P-1 supernatant solution a special study was started in November and completed in December. Ten runs from each Plant were involved. On five runs from each Plant the hydrogen peroxide concentration was maintained at 10% while the other five runs from each Plant were processed normally at a final concentration of hydrogen peroxide of 8%. Data collected indicated less product in the supernatant for the runs which were processed at the higher concentration. However, since it was necessary to use more than the normal time for adding the increased quantity of hydrogen peroxide another variable was introduced which may have accounted for the results noted. Since the results were inconclusive the original 8% concentration has been retained. The changes made in this study were within the established limits of the Operating and Technical Standards.

WASTE DISPOSAL

T and B Plants

Partially Plugged Metal Waste Transfer Line

The water flushing of the 10-1 metal waste transfer line between the 154-B Diversion Box and process cell was completed in December. Water was forced through the line at a rate of 116 gallons per minute and at 75 pounds pressure. Since this flow checks very closely with the theoretical flow possible it is thought that the line is now open and an attempt to use it will be made during January.

Sludge Measurements in Process Waste Storage Tanks

Sludge measurements made of the first cycle waste tank, X-105T, indicated no appreciable amount of sludge present. A similar measurement made in the metal waste storage tank, X-101-T, established a sludge depth of approximately 2 3/4 feet in this first in a cascade series of three such tanks. A sample taken of the supernatant of this tank analyzed about 10^4 product alpha counts/m/ml. It is suspected from this analysis that the bulk of the product sent to these tanks in the metal waste has remained in solution and has not settled out in the sludge.

Additional Waste Storage Facilities

Work was commenced on December 4 on Project C-112, providing for additional underground waste facilities in B Plant known as Tank Farm 241BX. Considerable progress was made on the preliminary phases of this work in an effort to provide the maximum possible protection to operations afforded by the additional transfer lines to be installed during the initial stage of the work. At month-end maintenance work was being delayed because of the lack of 3" 18-8 stainless steel pipe.

Waste Status

The status of the Waste Storage Areas on December 31 is shown in the following table:

Bldg. 241 Tanks	Type Waste	% Full				Reserve Capacity in Batches to Process				Total
		B	T	C	U	B	T	C	U	
x101,2,3	Metal	100	100	100	59.6	0	0	0	109)	
x104,5,6	Metal	—	—	22.5	0	—	—	209	269)	717
x201,2,3,4	Metal	0	0	0	0	28	28	37	37)	
x107,8,9	1st Cycle	100	100	0	0	0	0	338	338)	
x110,1,2	1st Cycle	—	—	80.8	17.1	—	—	65	280)	1021
x104,5,6	1st Cycle	—	100	—	—	—	0	—	—)	
x104,5,6	2nd Cycle	30.8	—	—	—	314	—	—	—)	
x110,1,2	2nd Cycle	100	100	—	—	0	0	—	—)	562
x105,6	2nd Cycle	—	18.0	—	—	—	248	—	—)	

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MECHANICAL PERFORMANCE

T and B Plants

Replacement of Dip Tubes

At B Plant the dip tubes of the Section 10 centrifuge which had formerly failed in service at Section 8 were replaced using a remotely operated pipe extractor. New tubes were installed which were 1/4" shorter than standard to prevent their striking the bottom of the bowl. No serious difficulty was experienced in making this change — the first time it has ever been attempted — and the centrifuge was readied for service when needed.

Failure of Brake Shaft on Crane

On December 17 the mechanical brake shaft of the 75 ton crane hoist on the B Plant 75 ton crane failed while a cover block from Section 10 in the Canyon was being lowered into place. It was estimated that the block, weighing approximately 30 tons, fell six feet. Although the block was badly cracked and will have to be replaced, no damage was done to process equipment. An Engineering study to determine the cause of the failure and means of preventing its recurrence was in progress at month-end. In the meantime the cranes in both Plants will be limited to the minimum amount of work necessary and daily checks of the mechanical brake will be made to insure their proper functioning.

Teflon Gasket Testing Program

A detailed study of U Canyon trench piping was started during the month to determine the problems that will be encountered during the actual replacement of critical gaskets and piping assemblies in the T and B Canyon trenches. Details and methods developed in this study will be submitted to the Project Engineering Group for consideration and guidance in developing the final scheme to be followed in this work. At T Plant a detailed survey was started of the T Canyon trench to determine the radiation levels that will be encountered in actually performing the job. At B Plant the use of Teflon gaskets in Section 18 was evaluated under conditions simulating actual use. As a result of this study it was indicated that Teflon is satisfactory for process lines. Some indication has been obtained that heat treating Teflon gaskets at 350°F may improve their resistance to flow. This study will be continued. In the meantime both Plants will continue to use Teflon gaskets for replacement purposes in process lines.

Section 17 Centrifuge

The old Section 17 centrifuge which failed on November 30th was partially decontaminated during December. It is expected that final decontamination will be completed in January and that repairs can be made in the near future.

Canyon Process Leak Detection

Installation of the three conductivity meters in T and B Plants for the detection of process leaks in the Canyon Buildings has been held up pending arrival of meters from the manufacturer. In the meantime the presently installed unit in B Plant will be removed from Section 5R and examined for condition. Based on this examination any necessary changes in design will be incorporated in the construction of the cells of the future installations.

Fan Shielding Project

Fabrication of special portable shielding to be used in maintenance and/or replacement of the 291 Building fans and motors in either T or B Plants was in progress during the month. Rearrangement of lubrication and instrument lines to the 291-U Building fans and motors to conform to standard design in order to facilitate trial use of special shielding was being made at month-end.

SPECIAL HAZARDS

T and B Plants

R-15 Stairwell

In an effort to remove an apparent spot of contamination at ground level in the R-15 Stairwell at B Canyon it was necessary to chip out some of the concrete. In so doing a small hole was knocked through the concrete almost directly over the first cycle waste line. It was then discovered that a cavity existed under the stairwell and that the radiation was coming from the waste line. A reading of 3500 mr/hr. was obtained by means of a probe directly over the line and about six feet below the floor level. Soil samples were taken from the cavity and no contamination was found, indicating that there was no break in the line at this point. The cavity will be backfilled in the near future.

241 BX Waste Area

Prior to the start of excavation work for the proposed waste lines provided for in Project C-112 test holes were dug to within 18" of the existing waste lines at R-15, R-8 Stairwell and at the point where the proposed lines cross the existing lines east of the B Plant Canyon Building. No contamination was found at any of these points which define the areas to be excavated.

R-3 Danger Zone

The climb-proof fence about the R-3 Danger Zone in B Plant was completed early in December and the zone is now posted as a permanent Danger Zone. All recommendations arising as a result of this incident which has been previously reported upon in detail have been completed in both Plants.

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Constant Iodine Monitoring Unit

Revisions to the CRM unit installed in the B Plant crane cab were not completed by month-end. In T Plant this unit performed satisfactorily over Section 14 while the covers were off. There were no indications of contamination passing through the air filter of the cab.

METEOROLOGICAL SECTION

Ninety forecasts were furnished to the T and B Plants and five high wind or special forecasts were issued to the Electrical Department.

General weather conditions for the month are shown in the following table:

Maximum average hourly wind velocity at 200'	43 mph
Minimum average hourly wind velocity at 200'	.0 mph
Maximum average hourly wind velocity at 50'	30 mph
Minimum average hourly wind velocity at 50'	0 mph
Prevailing wind direction	WNW
Prevailing wind quadrant	W
Maximum air temperature (4 feet)	64°F
Minimum air temperature (4 feet)	6°F
Number of days precipitation and/or fog occurred	6
Number of days precipitation occurred	4
Number of days snow occurred	2
Number of days fog occurred	5
Greatest duration of precipitation	7.5 hours

TECHNICAL DEPARTMENT

DECEMBER 1946

GENERAL

Business trips of Technical personnel during December may be summarized as follows:

J. C. L. Chatten accompanied H. H. Zornig, of Dr. Coolidge's group, on a visit to the Argonne National Laboratory (December 4-6) and to Clinton Laboratories (December 8-13) for the purpose of inspecting hot laboratory facilities and discussing their design.

W. K. Woods visited Schenectady the week of December 7-13, to inspect laboratory facilities and discuss the research program.

T. W. Hauff headed a party of six Hanford representatives who made a two-week study of DP West operations at Los Alamos in the period December 5-23. Two other Technical Department people were in this group: W. M. Harty and L. M. Knights.

R. E. Curtis spent December 14-22 at the University of California, Berkeley, in connection with the recruitment of technical personnel.

R. Ward left on December 13 for Schenectady, where he is spending several weeks in the formulation of a metallurgical development program for Hanford.

Inasmuch as the Central Files now record and distribute comprehensive bi-weekly listings of all significant documents issued at Hanford, the bibliography of Technical documents previously appended to these monthly departmental reports is being discontinued.

ORGANIZATION AND PERSONNEL

As noted in the Plant Force Report, total personnel in the Technical Department increased from 211 to 220. The divisional month-end strengths were:

	Nov. 30	Dec. 31
Laboratories	155	161
100-300 Technical	28	30
200 Technical	9	10
Chemical Development	12	12
Statistics	5	5
Administration	2	2
Total	211	220

Laboratories roll additions were all in the non-exempt category, mostly as laboratorians. The 100-300 Technical and the 200 Technical additions were as monthly-salaried technical personnel.

100 AREAS

Physics

General

A general cleanup of the Test Pile was carried out during the month and in addition all cables in the ionization chamber circuits were replaced with shielded cable, and all faulty batteries in these circuits were replaced. This produced an improvement in the precision of the test results of any given day. Disagreement between the results of tests run on the same samples on different days still occurs, however, and current work is directed toward the elimination of these day-to-day variations.

Six lots of uranium billet eggs which were tested previously at the Argonne National Laboratory have been retested in the Test Pile. Results of all tests were in reasonable agreement with Argonne test results. A request has been made that all test eggs be shipped to H.E.W. after testing at the Argonne National Laboratory so that sufficient data can be accumulated for a comparison of results

At the end of the month, the reactivity status of the two operating piles was as follows:

	D Pile	F Pile
In rods	64 inhours	51 inhours
In Special Requests:		
within poison pattern	320	267
outside poison pattern	0	11
In Plant Assistance irradiations	0	0
In bismuth columns	34	62
In dummy columns	2	2
In xenon	492	427
In overall coefficient	-92	-76
Total cold, clean reactivity	820 inhours	744 inhours

The D Pile gained 13 inhours during December while the F Pile lost 10 inhours.

Graphite Monitoring - Production Test 105-1-P

Transverse cut pieces machined from the graphite removed from the No. 9 rod thimble of the D Pile after 1054 MD/AT exposure at ambient pile temperatures were annealed at 600°C in helium and helium plus 1.78% oxygen atmospheres to determine whether the displaced atoms could be removed by oxidation. The results were as follows:

Atmosphere	Annealing Time Hours	% Recovery of Length Change	% Loss in Weight	Crushing Strength C/Co
He	5-1/2	55	0	1.48
He + Oxygen	5-1/2	66	0.80	1.41
He	10	55	0	1.26
He + Oxygen	10	68	1.28	1.24

The oxygen produces a definite increase in the recovery of length change. There is little to be gained by extending the annealing time beyond 5 to 6 hours.

Reactivity of B Pile Under Shutdown Conditions - Production Test 105-58-P

Foil exposures in the B Pile on December 17 gave an nv of 105.2 neutrons/cm^2 sec. with a gas purity of 98.9%. This result indicates that the pile is 1.5% k below critical and represents no significant change since the measurements in November.

Reactivity Coefficients - Production Test 105-74-P

A power coefficient test was run at the F Pile on December 3 and longer tests, for calibrating the control rod as well as measuring the coefficients, were run at the F Pile on December 18 and at the D Pile on December 27.

The results of the rod calibrations indicate some change from the calibration curve which has been in use for the past ten months. Results of the coefficient tests based on the new rod calibration are as follows:

	F Pile Dec. 3	F Pile Dec. 18	D Pile Dec. 27
Graphite Coefficient	0.50 ih/MW	0.65 ih/MW	0.70 ih/MW
Metal Coefficient	-0.21 ih/MW	-0.25 ih/MW	-0.32 ih/MW
Overall Coefficient	0.29 ih/MW	0.40 ih/MW	0.38 ih/MW
Graphite Period	60 minutes	66 minutes	60 minutes

As in the case of past measurements, large variations occur between the results obtained on different dates.

Special Irradiations

The present status of this program is summarized below. Those items which were active during December are marked with an asterisk. Items listed as completed last month receive no mention. The number in parentheses under "status" indicates the number of the Production Test, Series 105-P, and "Final" indicates that a final report has been issued. The letter suffix after a tube number denotes the pile.

Req.No.	Material	Quantity	Exposure	Status on Dec. 31,1946	Inhours Absorbed
3-1*	Thorium	43 slugs	2 months	Shipped, completed (49-B)	
3-2	Thorium	133 lbs.		Awaiting canning	
5	Np^{237}	200 Area Item			
6	U^{233}	1 slug	1 year	Charged 3282-F 4/2/46 (57)	5
10-B	Gd oxide	1 slug	--	Postponed	
11	Radium	1 gm	120 days	Charged F-Test Hole 10/2/46 (77)	0

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Req.No.	Material	Quantity	Exposure	Status on Dec. 31,1946	Inhours Absorbed
12-A	U^{235}	--	--	Postponed	
12-B	Pu^{239}	540 mg-1 slug	14 months	Charged 3378-F 4/18/46 (59)	3
13-1	Be_3N_2	69 slugs	60 days or longer	Pcs. Tube Charge Date 35 Completed, shipped 10/11/46 34 3274F 7/2/46 (70)	16
13-2	Be_3N_2	60 slugs	60 days or longer	30 3169D 8/6/46 30 2666F 8/7/46 (70-A)	15 15
13-3		250 slugs		Awaiting loading	
13-4		35 slugs		Awaiting loading	
14*	Al-U alloys	3 slugs	2,12, 12 mo.	Slugs received and undergoing canning	
15-4*	LiF	99 slugs	50 days	Completed, shipped (55D)	
15-5*	LiF	197 slugs	50 days	Completed, shipped (55E)	
15-6*	LiF	100 slugs	50 days	Discharged, Awaiting Shipment (55F)	
15-7*	LiF	100 slugs	40-50days	Pcs. Tube Charge Date ih 87 Discharged, awaiting shipment 13 3169F 11/6/46	14
15-8	LiF	99 slugs	40-50days	Pcs. Tube Charge Date ih 27 2066D Discharged, awaiting shipment 10 3169F 11/6/46 39 2374F 11/6/46 23 1579D Discharged, awaiting shipment (55F)	11 35
15-9*	LiF	198 slugs	40-50 day	12 3274D Discharged, awaiting shipment 21 2374D 11/26/46 31 2666D 11/26/46 36 2682D 11/26/46 19 1474F 11/27/46 23 1569F 11/27/46 25 2082F 11/27/46 25 2682F 11/27/46 6 1579F 12/ 4/46 (55F)	21 33 36 22 25 27 27 6

Req.No.	Material	Quantity	Exposure	Status on Dec.31,1946			Inhours Absorbed
15-10*	LiF	400 slugs	40-50days	Pcs.	Tube	Charge Date	ih
				13	2374D	11/26/46	13
				19	1579F	12/ 4/46	21
				24	2082D	12/17/46	27
				32	3179D	12/17/46	33
				26	1569D	12/17/46	29
				27	2066D	12/17/46	30
				27	1474D	12/17/46	30
				23	1579D	12/17/46	27
				27	3274D	12/17/46	30
				23	2066F	12/26/46	27
				24	3179F	12/26/46 (55F)	27
16-2	95-241	2mg-1slug	14 months	Charged 3378-F 4/18/46 (59)			2
20*	Thallium Nitrate	5mg-1slug	3 months	Discharged 12/4/46 Shipped 12/17/46 (71)			
21,22,23	Unallocated						
26*	Antimony	50 mg.	60 days	Charged Test Hole of F Pile 12/4/46 (83)			0
27	Calcium Oxide			Under discussion			
28	Iron			Under discussion			
29	P_2O_5	2 slugs 2.07 gms. 2.6 gms.	3 days	Slugs in fabrication at another site			

Engineering

Corrosion and Blistering

The results of examination of exposed material are summarized in the following table:

Tube	Type	MD/Tube	Exposure Days	No. of Blistered Pieces			Penetration, mils/mo.	
				Sl.	Mod.	Ext.	Av.	Max.
0989-D	Corrosion	54	455	20	11	--	0.04	0.06
1762-D	Cast NBS	27	182	18	12	--	0.03	0.05
2184-D	Cast Ames	36	231	15	13	3	0.03	0.04
2658-D	Regular	25	196	12	14	12	--	--
3161-D	Regular	25	185	23	3	--	--	--
2665-F	Regular	25	209	22	1	--	--	--

All data agree that cast slugs are as susceptible to blistering as are extruded slugs. It is planned to discharge 21 of the remaining 32 tubes of cast material during January.

[redacted]

A boroscopic examination of the No. 2 horizontal rod thimble of the F Pile on December 4 showed that the rod had been rubbing against the "kick-plate" in the shield portion of the thimble.

Probe Tests on Top Central Tubes

The erratic nature of tube bending in the pile is illustrated by the fact that Tubes 4674-F and 4676-F will not pass a 1.485-in. probe through the front gun barrel, whereas Tube 4671 will pass a 1.490-in. probe. The front ends of 46 tubes have been probed with the following results:

	D Pile	F Pile
No. of tubes passing 1.490-in. probe	9	11
No. of tubes passing 1.485-in. probe max.	14	9
No. of tubes passing 1.480-in. probe max.	1	2
Total	24	22

The above results are interpreted to mean that the D Pile is in somewhat worse condition than the F Pile, especially in view of the fact that eight of the tubes in the F Pile were located in the top two rows whereas only one of the tubes in the D Pile was located this high in the pile.

Graphite Expansion

Tube 4674-D was traversed for vertical bowing on December 3, using the hydraulic equipment. The observed bowing of 2-1/2 inches is about 1/8 inch higher than expected and is viewed with suspicion.

Jacking forces greater than 1500 lbs. were used on a process tube for the first time during the month. The tube under test was 4082-B which had shown gun barrel binding in previous tests. Each gun barrel was jacked individually and binding of the rear gun barrel increasing during the test to the extent that full movement could not be obtained at 4000 lbs. and only 3/32-in. movement could be obtained with a force of 1750 lbs. The tube was ruptured by pulling on the front gun barrel. Rupture occurred at the rear Van Stone flange at an estimated load of about 3200 lbs. tension and was associated with a tube stretch of only 1/2 in. The low force at failure is attributed to weakening of the Van Stone joint by corrosion. The observed amount of tube stretch under this load is evidence that the aluminum had not been annealed under process conditions.

Miscellaneous

Preliminary design is in progress for equipment to measure bending, modulus, hardness, tensile strength, and breaking strength of irradiated uranium slugs under water.

Techniques for the photographing of blistered slugs have been developed.

A technique for casting surface replicas of blistered slugs under water was developed using dental materials. Casts of three extensively blistered slugs were made.

The assembly which contains a special slug equipped with a thermocouple well has been tested and is scheduled for loading into the F Pile early in January..

A special tube in the Flow Laboratory of the D Pile has been equipped with a Lucite window for a study of slug chattering..

200 AREAS

General

Acid Wash

The monthly acid wash at B Plant recovered a normal amount of product (21.7%) and did not pick up an unusual amount of by-product activity. As in the November wash, the 8-3 Tank flush was sent to waste in order to keep the activity of the run low.

Decontamination Efficiency

Special gamma analyses of samples from 8-4, 14-1, and 14-4 Tanks on 20 B Plant runs during the month enabled the determination of step-wise decontamination factors through the Canyon Building.. These data reinforced the previous indications from tank Beckman readings that erratic decontamination in Section 13 (first by-product precipitation) has been responsible for the variations in activity of runs entering the Concentration Building. Final product solution activity (in PR cans leaving Concentration) seemed independent of gross decontamination through the Canyon, however, due to variable decontamination in Cells D and E.

Canyon Buildings

Stored Metal Waste Solution

Ionization chamber readings in Tank X-101-T (first of three buried metal waste tanks in series) have shown only about 3 feet of sludge. A sample of supernate contained about 10^4 product alpha counts/min./ml; if all three tanks contain this concentration, most (ca 85%) of the product sent to these tanks has remained in solution.

Recovery of I^{131}

In the B Plant stack gas monitoring building (292) potassium sulfite scrubbing of dissolver off-gases has recovered slightly more I^{131} than was obtained in immediately preceding control runs with sodium carbonate. No more than seven millicuries were recovered on any run, however.

Sampling Difficulties

A number of turbid 8-4-P, 14-4-P, and 17-4-P samples (about 15) were encountered at T and B Plants during the month. Extra nitric acid and agitation clarified the solutions in most cases and all succeeding by-product precipitation losses were normal except three slightly high ones on T-6-12-F-10, -11, and -12.

[redacted]

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Concentration Buildings

Recovery of Product from High D-4-BP Loss

Run T-6-12-F-1 furnished a 5.9% D-4-BP loss which was successfully recovered by returning the lanthanum fluoride by-product cake into a "synthetic" run in D-1 Tank and repeating the oxidation and precipitation. The reason for the high loss is not known, but it may have been connected with the attendant ten-fold drop in D-1 Tank Beckman background to a normal level, since a previous run (T-6-11-F-10) suffered a slightly high D-4-BP which accompanied a lesser drop in D-1 background.

Production Test 224-T-10

The first phase of Production Test 224-T-10 (Recirculation of Metathesis Wash Waste) showed a product saving of about 0.25% of a standard run through use of part of the wash waste for dilution of the succeeding run before the metathesis centrifugation. The test is being continued.

Lanthanum Fluoride Product Precipitation Losses

Improvements in skimming technique (15- instead of 5- minute skim) reduced E-3-WS losses at B Plant by only 0.05 to 0.1% of a standard run. Samples taken before and after skimming indicated less than 0.1% additional loss due to skimming. Since a differential of about 0.4% still existed between E-3-WS losses at B and T Plants, replacement of E-2 Centrifuge at B Plant was started at the close of the month.

Jetting Difficulties

The yellow-green solid removed from a plugged A-1 to A-2 jet at B Plant was shown spectrographically to contain mainly bismuth and phosphorous with some chromium. Visual inspection of the inside of A-1 Tank at both B and T Plants revealed all surfaces to be clean. Plugging on succeeding runs indicated the solid to originate ahead of A-1 Tank.

Removal of Cake from F-2 Centrifuge

High F-1 PS values, low P-1's, and increased Beckman background of F-2 Centrifuge at T Plant have indicated occasional incomplete removal of the final lanthanum hydroxide cake. Minor procedure changes have been made in an attempt to effect complete cake dissolution.

Analysis of Recycled Product

Erratic lanthanum values for E-4 Tank recycle were encountered during the month. Addition of extra nitric acid and potassium permanganate gave acceptable lanthanum values on resamples. Product assays were not affected. The low acidity and high reducing power of the E-4 solution were not occasioned by normal Isolation Building recycle solution, but may have been caused by special solutions recycled from an Isolation Building test of increased hydrogen peroxide concentrations.

Isolation Building

Weight of Product Recycled

A test of increased H_2O_2 concentration was inconclusive due to inconsistent results on the control runs. It appeared, however, that about 15% less product was recycled when about 35% more H_2O_2 was used in the first cycle of five B and five T Plant runs.

Continuation of a survey started last month has given additional evidence that the presence of larger amounts of potassium ion, which results from back-neutralization of high acidity P-1 solutions, may be beneficial in reducing the weight of product recycled.

The possibility that insufficient sulfite is added for complete reduction before product peroxide precipitation has led to corrosion tests which showed no increased corrosion by a four-fold increase in ammonium sulfite concentration of synthetic P-1 solutions. A Production Test has been proposed to evaluate the effect of increased sulfite upon weight of product recycled.

Isolation Building Material Balance

Efforts to make individual run material balances fall within limits have resulted in frequent resampling of the AT solution. Only one out of 23 such resamples in the past 4 months gave an assay significantly (>1.5%) different from the original value and that single result was shown erroneous by a second resample. This reliability of AT assays stems from the independent check furnished by specific gravity measurements. The P-1 assay is not checked by such an independent method; resampling of P-1 would therefore seem a more fertile field for investigation of runs outside the material balance limits.

300 AREA

Metal Quality Studies

Evaluation of Impurities in TX Metal - Production Test 314-42-M

Further work on this Production Test is being withheld until the reasons for day-to-day variations in Test Pile behavior are clarified.

Study of Rolled N Material - Production Test 314-43-M

To obtain a comparison of the distribution of impurities in rolled and extruded uranium rods, 29 rolled rods have been machined into slugs which are identified with respect to their position in the rod. Density and purity are to be determined as functions of position in the rod.

Abnormal UM Material - Production Test 314-44-M

Two lots of UM uranium which are high in impurities and T.D.S. have been extruded and machined and are to be followed through canning and functional testing to determine their suitability for use in the piles.

[redacted]

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Canning Studies

Extended Period of Use of Al-Si Canning Bath - Production Test 313-82-M

Five two-day cycles of canning bath use have shown that it will be feasible to extend the period of use of this bath to two successive days, provided that adequate control measures are employed. It has been recommended that the two-day cycle be given more extensive trials before adoption as standard practice.

Four-Inch Bonded Slugs - Production Test 313-83-M

Test Pile results on two stringers of four-inch bonded slugs of "A" diameter show that the reactivity is approximately equivalent to that of regular eight-inch "MZ" slugs. This result is in agreement with expectations, inasmuch as the stringer of four-inch slugs contained enough more aluminum in the thicker end caps to offset the effect of the larger diameter. Representative samples are to be radiographed and stripped.

Extended Period of Use of Final Etch - Production Test 313-84-M

Four two-week cycles of use of the final etch solution have shown that this solution works satisfactorily at least for this period. A three-week cycle is to be tested next.

Extended Period of Use of Can Etch solution - Production Test 313-85-M

Use of the can etch solution for four two-week periods has shown that, although the solution functions satisfactorily, the rate of attack on the stainless steel tank is markedly accelerated during the second week. It is therefore considered inadvisable to extend the use of this solution beyond the standard one-week period.

Metallurgical Studies

Thermal Cycling of Uranium Slugs - Production Test 313-81-M

The heat treatment of uranium slugs for special pile exposure has continued without further furnace trouble.

LABORATORIES

Work Volume Statistics

The following tabulation shows the source and volume statistics for samples on which analysis were completed:

	November		December	
	Samples	Determinations	Samples	Determinations
Routine Control 200 Areas	1,396	2,397	1,796	3,031
Routine Control, 300 Areas	596	1,065	983	3,248
Water Control, 100, 700 Areas	9,887	18,058	10,227	18,811
Process Reagents, 200 Areas	591	1,058	826	1,509
Essential Materials	175	934	210	1,046
Special Samples	683	1,539	672	1,366
Total	13,328	25,051	14,714	29,001

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200 Area Process Control

Routine measurements of the geometry of the methane proportional alpha counting instruments (accepted value = 50.5%) in the 200 Area Control Laboratories were as follows:

Laboratory	November		December	
	Geometry	No. of Tests	Geometry	No. of Tests
B Plant	50.52%	199	50.44%	133
Isolation Building	50.52%	40	50.54%	35

The following tabulation summarizes the precision for the last 100 routine determinations on the starting solution from the B and T Plants (Sample 8-1-MR), the starting solution from the Isolation Building (Sample P-1) and the final solution from the Isolation Building (Sample AT):

Sample	November		December	
	Precision(±%)	No. out of Control	Precision(±%)	No. out of Control
8-1-MR	1.25	9	1.61	13
P-1	1.81	2	1.54	2
AT	1.05	7	1.13	6

The standard iron solution used in the Isolation Building Laboratory as a means of checking the accuracy of the chemical titration procedure for plutonium assay of Samples P-1 and AT was analyzed 120 times during the month. Of these titrations, 68 or 56.7% were within ± 1% of the assay value, 34 or 28.3% were within ± 2% of the assay value, and 18 or 15.0% were outside of ± 2% of the assay value. The following tabulation summarizes the data obtained from each of the four synthetic solutions which were used:

Assay Value	Group Ave.	% Diff.	No. Det.	Precision ±%	
				Single	Duplicate
15.93	15.91	0.12	32	3.08	2.18
14.56	14.64	0.50	32	2.66	1.88
10.76	10.83	0.65	38	3.84	2.71
15.93	16.15	1.38	18	1.73	1.23

300 Area Process Control

Spectrochemical Analyses

The spectrochemical unit which began acceptance tests on re-cast uranium billets the first of November has been receiving approximately 650 samples per month whereas the program as originally outlined called for 300-400 samples per month. This excessive sample schedule has resulted in a back-log of some 675 samples requiring approximately 4700 analyses in duplicate. The addition of personnel and equipment and the establishment of better routine methods and procedures is expected to reduce this large back-log. A six day work week for this unit is scheduled to begin in January.

Essential Material Control

During the month, laboratory analyses indicated that shipments of methane, bronze, sodium silicate and potassium chloride were outside of specifications. The specifications of all suspected shipments were subsequently

waived after proper approval was obtained, except for the bronze. An investigation calling for analyses of each of the twelve heats in the shipment of bronze showed that only three of the twelve were actually outside of limits.

Routine work over the past several weeks has indicated that some additional investigation and development is required on methods and procedures for the following analyses:

1) Hyflo-Supercel - A simple method is required to determine the particle sizes which are present.

2) A more convenient "C" and "H" combustion chain for coal analysis is required.

3) A study to determine the reason for certain discrepancies between spectrochemical and wet chemical analyses for tin in Al-Si canning bath control samples.

These investigations will be started as soon as time and man-power permit.

Several special samples were received during the month which required considerable time in their analysis. These were:

1) Mixed acid composition consisting of HNO_3 and HF.
2) Percent chromium in phosphoric acid.
3) Qualitative analysis of a grease sample.
4) Determination of cerous and ceric ions in ceric ammonium nitrate.

Analytical Development and Special Studies

Fission Product Investigations

Bromate Oxidation in Cerium Analyses

The use of bromate (CC 2845X) as the oxidizing agent in cerium analyses has been found to possess advantages over the chlorate oxidation which had been used previously. Using this bromate oxidation a pure cerium tracer was analyzed for % cerium, and the following results were obtained:

Analysis No. 1 (chlorate oxidation), FC-2a -------104.5%
Analysis No. 2 (bromate oxidation), CC 2845X------105.5%

These values (over 100%) are probably due to an inaccurate standardization of the cerium carrier.

Absorption Curves

A beta absorption curve was plotted for sample E-4-RC Composite, Serial No. 344-B, which was received 9/18/46. Comparison with standard absorption curves of 28-day and 300-day cerium indicated that the composition of the E-4-RC sample was (as of 11/30/46) 18% 28-day and 67% 300-day cerium. Correcting to the original date (9/18/46) these values

become 48% 28-day and 37% 300-day cerium, which together make up the 85% beta activity due to cerium which the sample contains.

Beta absorption curves were also plotted for a sample of pure cerium tracer, and for an F-10-P sample. Results are as follows:

Sample F-10-P (received 11/21/46) - 81.9% 300-day cerium
13.9% 28-day cerium
95.8% total cerium (as of 11/21/46)

Ce Tracer

A comparison of this absorption curve with that of the F-10-P above indicates that the ratio of the 300-day to the 28-day cerium is essentially the same as the F-10-P ratio.

Per Cent Gamma Radiation due to Cerium in F-10-P

Since all previous results for % cerium present in a sample have been based on beta radiation, it was deemed desirable to attempt to account for a part of the gamma radiation present. The first question to be answered was: How much of the gamma radiation is due to cerium?

To solve this problem, a reference point was chosen and a gamma/beta ratio was computed, as follows:

Pure Ce tracer sample was chosen (approx. 100% Ce activity). This sample counted 4.69×10^6 beta/min./ml. and 1.23×10^3 gamma/min./ml. The gamma/beta ratio, therefore, is 2.62×10^{-4} gammas/beta.

For F-10-P samples, the expected gamma counting rate should be obtained by multiplying their beta counting rate by the above ratio. When this is done, an expected gamma activity of 555 gamma/min./ml. is obtained. The actual total gamma from the F-10-P counted 607 gamma/min./ml. Therefore the theoretical % gamma radiation which is due to the cerium present is 91%.

To check these computations, another cerium analysis was performed using a one ml. sample of the F-10-P, so that the final precipitate obtained could be used for gamma counting. The % Ce present (by gamma) was 78%, as opposed to the expected 91% calculated in the above manner.

Standardization of BGO Instruments

In order to report radioactive iodine (from stack gas) in millicuries it will be necessary to obtain an absolute calibration on the BGO instruments. Standard disc D-2 prepared by W. H. Sullivan from RaE on 11/16/44 was used to obtain the geometry of the BGO-#1 in the Technical Building (3706). Final calculations for the geometries will be made when Sullivan's value of 18,680 d/m for the D-2, as of 11/16/44, is corrected to the present date.

[redacted]

A coincidence correction curve was determined using Sullivan's method, which involves the use of half-discs. The discs were prepared for this work by cutting 15/16 inch diameter cirles from 20 ml. aluminum sheet. Each disc was cut in half and approximately 2500 c/m of a strontium tracer was placed on each half-disc. A dummy set, containing no activity, was prepared in this same manner and was used in conjunction with the first set to make up the coincidence curves.

Stability of Ceric Sulfate Solutions

Ceric sulfate solutions 0.05N and 0.1N were found to be unstable below room temperature. Since this trouble was experienced with solutions in which the sulfuric acid concentration was 1.0N, a few tests were made with various normalities of sulfuric acid. The use of approximately 3.0N sulfuric acid resulted in ceric sulfate solutions which were stable at 0°C.

A new type of bottle to be used for dispensing the ceric sulfate solutions is now being designed. No stopcocks will be incorporated into the system.

Redox Analytical Development

All the Redox solutions have been made up, and their specific gravities determined at 23°C. When making up the solutions, considerable difficulty was experienced in effecting the solution of 4% hexone in water and 3% water in hexone in several cases. To effect continuous solutions, water-saturated hexone and hexone-saturated water solutions were used.

A preliminary analysis for % UNH based on a gravimetric procedure has given reliable results, but the method is quite long, and shorter volumetric procedures will be studied.

Separation of chromium as lead chromate and subsequent titration with $FeSO_4$ appears to give reliable results, and offers a method which may be used in case insufficient precision is obtained by colorimetric methods.

A direct pH titration for hydrogen ion in the presence of UNH and dichromate provedunsatisfactory as no breaks in pH were noted. A titration by the Chicago method was satisfactory in that a break was obtained, but it was not very sharp.

REDOX PROCESS DEVELOPMENT

Semi-Works Design

Redox Specifications Letter No. 5 (Doc. 3-5159) was issued under the date of December 19. Equipment requirements for the monitoring and control instrumentation of the demonstration apparatus were described in this letter. Included were the metering (bellows) pumps, rotameters, liquid level indicators, interface level indicators and controllers, static and differential pressure indicators, etc. The intention of this letter was to outline for the Instrument Department the instrumentation requirements for all parts of the apparatus.

Redox Specifications Letter No. 6 (Doc. 3-5165) was issued December 24. This letter outlined design specifications for the solvent (hexone) handling equipment. Apparatus arrangements and flowsheet operations were suggested for the

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pretreatment, recovery distillation, and solution make-up for all hexone to be used in the demonstration battery.

Frequent joint meetings between this Division and the Design and Construction Department have resulted in final approval of the following working drawings for issuance to the field:

1) Bellows pump details and assembly (Drawings No. H-3-5001, -2, -3, -4).
2) Ventilation plans (Drawings No. H-3-5006, -7, -8, -10)
3) Structural arrangements (Drawing No. H-3-5014)
4) Concrete and architectural revisions (Drwg. No. H-3-5011).

In addition, similar joint meetings have obtained agreement on the design (preliminary study sketch stage) of the metal solution preparation equipment, column enclosure, gauge-board arrangement, head tanks, feed tanks, receivers, solvent treating equipment, and solvent storage facilities.

Materials and Equipment Procurement

With few exceptions, the procurement of materials and equipment for the construction of the demonstration apparatus has been adhering to schedules predicted earlier. The status of procurement at the end of December was as follows:

	Class A	Class B	Electrical
% Ordered	98	90	95
% Received	60	40	10

Electrical equipment accounting has been separated from the Class A (critical) and Class B (non-critical) breakdown, since this group of items is so large and its procurement so diversified.

Among the Class A items, procurement of 1/2-inch tees, globe valves, and sight-glass fittings is still considered critical. In Class B procurement, the promised early delivery of rotameters has not materialized and expediting of the shipment has been requested. In Electrical procurement, promise of shipment of at least one 15 horsepower explosion-proof motor (for centrifuge drive) and certain types of condulets and unions before February 15 is still being attempted.

Fabrication and Construction Schedules

On the basis of plans and work orders submitted, the Maintenance Department has issued estimates of work schedules involved in a major part of the Redox Semi-Works construction. These are as follows:

		Man-Hours
1)	Bellows pumps construction and assembly	1075
2)	Ventilation duct fabrication	400
3)	Preliminary structural revisions to Building 321	200
4)	Special Work Permit facilities for radiation hazards control	120

Shop fabrication and construction activities have already started on the first three jobs listed above and are well underway. Construction of the Special Work Permit facilities is to be started early in January.

[redacted]

Equipment Overhaul and Clean-up

Conversion of the precipitation process Semi-Works Building (321) to a solvent extraction Semi-Works will involve extensive relocation of existing installations. In addition to having been used previously for low-product operations and thus widely contaminated, the equipment has not been in operation for approximately 18 months. It has been necessary to plan the following program in preparing the process equipment for safe handling in relocation: (1) inspect for and correct all equipment in obvious disrepair, (2) carry out water flushes to test for leaks and instrument behavior, (3) flush entire system with acid to remove product contamination, and (4) dismantle all piping and tank auxiliaries under carefully controlled Special Work Permit conditions.

The first two steps in the schedule above have been completed for Cells A and B. Continuation of the program in these and the rest of the cells is planned. In addition, immediate revisions to the present change-room facilities in the building are planned, to provide for the efficient application of safe Special Work Permit procedures.

Integration of Activities

During the past month, integration of all activities connected with the design and construction of the Redox Semi-Works has progressed considerably. At the present time, in addition to the Chemical Development Division, the following groups are already engaged in co-operative effort or will be very shortly. The Redox Design Section of the Design and Construction Department has expanded to a staff of five engineers and five draftsmen. A special procurement agent has been assigned to Redox in Purchasing. The Electrical Department has assigned an engineer to design. The Instrument Department has assigned one engineer to design, and space is being allocated in the Semi-Works Building to provide a shop for two or more development engineers. The Health Instrument Section has assigned one engineer to special problems for Redox. The Accounting Department has supplied a materials control clerk for equipment inventorying and disbursement. The 300 Area Maintenance Division is expanding its crew of mechanics, tinsmiths, pipe-fitters, and carpenters to carry out the forthcoming construction operations.

Analytical and Process Chemistry Laboratory Programs

The analytical service needs for the preliminary scale-up studies to be carried out with the demonstration apparatus in the Semi-Works have been discussed with the Laboratories Division. A detailed memorandum (Doc. 3-5132) has been issued, outlining the types, frequency, and precision of assay methods required. Development of analytical methods has been started and space assignements for the service group allocated.

A critical review of the equilibrium data available from the Argonne National Laboratory has been made, and a Process Chemistry Laboratory program planned to correct certain deficiencies found to exist. The review and laboratory program are to be published shortly in a forthcoming memorandum.

STATISTICAL STUDIES

At the start of Test Pile operations each day, both the canned standards and the bare standards are run. The difference between these standards expressed

in dih provides a check on the condition of the unit and of the standards themselves. A review of these results indicated that on about August 22, 1945 a shift in dih between standards occurred as summarized in the table below:

	Dih of Bare Standards vs. Canned Standards		
	Lower Limit	Average	Upper Limit
October 27, 1944 to August 22, 1945	3.01	3.07	3.13
August 22, 1945 to December 13, 1946	3.00	3.15	3.30

The average shifted from 3.07 to 3.15, and the 99% limits increased from ± 0.06 to ± 0.15 dih. The lower limit remained substantially the same as before, with the average and upper limit shifting upward. The reason for this shift has not yet been determined.

During special tests in November, highly significant differences between Test Pile reported reactivities on the same stringers on different days was found to exist. After a general clean-up of the Test Pile in December, another experiment was conducted to determine whether day-to-day differences still exist. Further objectives were to determine whether significant within-day differences, operator differences, and reading differences are present. Day-to-day differences were the only highly significant source of variation found in this experiment. The range of 24 dih readings on the same stringer on the two days were:

December 24	-0.20 to -0.29 dih
December 27	-0.30 to -0.44 dih

These results show that the cause of day-to-day differences observed in November has not been eliminated.

Further progress was made in the statistical study of uranium metal quality, using data recently submitted by the Corps of Engineers. Six correlations were completed as follows:

1) 125 TDS values of virgin metal supplied by Electro-Met did not correlate significantly with density, iron, nitrogen, and manganese. In general, this material is the most uniform and the highest quality material received.

2) 128 TDS results of virgin metal supplied by Mallinckrodt were found to correlate significantly with nitrogen content of the billets. Other significant correlations were density and nitrogen, manganese and nitrogen, iron and nitrogen, and iron and manganese. This virgin metal has been less uniform and of lower quality than virgin metal supplied by Electro-Met.

3) 92 TDS values of TX metal from Ames showed this material to be of better quality than Mallinckrodt virgin metal, but not as high in quality as that from Electro-Met. The TDS results correlated significantly with density and iron. The iron in Ames billets had been found to be erratic in previous studies.

4) 52 TDS results of TX metal from Metal Hydrides correlated with density and manganese. The correlation between TDS and nitrogen was of question-

able significance. This material is less uniform and of poorer quality than the other materials studied during this period.

5) 37 TDS values of G metal correlated with density and nitrogen. The quality of this material is poorer than Ames TX metal, but better than Mallinckrodt virgin metal.

6) The 52 TDS values of Metal Hydrides TX metal and the 92 TDS results of Ames TX metal were combined to determine factors which account for the difference between the two. These TDS values correlated with density, iron, nitrogen, and manganese, and accounted for 78% of the difference in reactivity.

Additional metal quality correlations are in progress. Control charts for TDS, density, iron, nitrogen, and manganese of virgin and reclaimed metal have been completed. The metal quality study is nearing completion.

Preliminary estimates of the precision of iron, silicon and nitrogen analyses of uranium billet eggs were made. The precision of duplicate determinations was ± 7.02% for iron, ± 12.82% for silicon, and ± 17.85% for nitrogen. These precisions are expressed as percentage of the reported value.

Correlation and regression analyses were made of Argonne National Laboratory data submitted by the Chemical Development Division to obtain the relationship between density, UNH, nitric acid, and ammonium nitrate contents of the aqueous and hexone layers encountered in the Redox Process. Correlation coefficients of the order of 0.999 were obtained (1.000 being perfect). Further work along this line is in progress.

A correlation analysis indicated that 26% of the variation in uranium slug blistering is associated with MW and exposure time (as reported in Doc. 3-5166, dated December 23, 1946).

HW-7-5630-De

POWER DEPARTMENT

DECEMBER 1946

GENERAL

The effectiveness of Filter Plant chemicals continues to receive first attention in the 100 Areas. For several weeks a program has been under way at the B Area Filter Plant in which quantities of chemicals fed to the water have been evaluated in terms of water quality for various water conditions. Information already developed has proved of considerable benefit to our operations.

ORGANIZATION AND PERSONNEL

There have been no changes of a significant nature during the current month.

100 AREAS

Some recent difficulty has been experienced in the areas with tumbleweeds entering the ten million-gallon raw water reservoir and passing into the Filter Plant supply pumps. In order to prevent future occurrences, plans have been formulated to install screens at the Filter Plant supply pump flume. This has already been done at F Area and it is expected that a similar installation in D Area will be made in the coming month. Due to the low flow conditions at the B Area, it has been decided that it will not be necessary to make the installation there.

On December 10 an electrical interruption occurred at the D Area substation affecting one-half of the electrical feeders to all power buildings and causing the process water pressure to drop below operating limits. Electrical power was restored immediately and normal power services were quickly resumed without further incident.

On December 18 the No. 11 river pump in B Area was inspected and found to have an aggravated erosion condition at its lower bowl section similar to that found on recent inspection of other river pumps. A brass liner was installed at the lower bowl in accordance with our usual repairs for this condition.

On December 28 No. 4 boiler in F Area was taken out of service when difficulty with the grates developed. The front section of the No. 1 grate had dropped away from its hangars. No. 3 boiler was placed in service at the time in order to make the necessary repairs.

On December 27 difficulty was experienced with the Redler conveyor in the Filter Plant in F Area. A broken link was found in the vertical section for which repairs were made and the unit restored to service.

200 AREAS

A recent analysis of the heat balance of the boiler plants in the East and West Areas has resulted in a plan which utilizes exhaust steam from the boiler auxiliaries that is in excess of requirements during the summer months. In order to do this, the process heating system has been lowered from 15 psi to 5 psi and connected to the boiler plant 5 psi exhaust system, thus allowing considerable quantities of exhaust steam to be used in heating buildings. Significant annual savings of steam will be effected in both areas. The installation was completed in the West Area on December 6, and it is expected that the similar installation in the East Area will be made at an early date.

On December 11 a section of the eight-inch fire and sanitary water main in the West Area was broken during the excavation of an area adjacent to the Maintenance Shop. Repairs were made and the line restored to service on December 12.

300 AREA

The cold weather conditions occurring during the latter part of the month have caused steam peaks of 31,000 pounds per hour to occur. Although no difficulty has been experienced in meeting these requirements, the full capacity of the two boilers has been needed at those periods.

700 AREA

On December 23 No. 3 boiler was removed from service in order to replace a leaking tube. Investigation disclosed that the tube had been cut by the impingement of soot blower steam and, further, that due to the design position of certain tubes, it would be impossible to prevent further impingement from the "A" element. The blowing of this element will be discontinued until a solution to the problem has been found.

1100 AREA

On December 5 the Sewage Disposal Plant digester was opened for inspection. The sludge blanket was considered to be in good condition and improved over the previous inspection. Because of the limited capacity of the drying beds, temporary beds were made approximately one-half mile southeast of the Plant, and approximately 106,000 gallons of sludge were transported to the new beds for drying.

On December 31 the gas line to the excess gas burner was levelled to prevent the formation of condensate pockets in the line. Earth settlement had apparently caused the line to drop below its normal position.

POWER DEPARTMENT STATISTICS — DECEMBER 1946

	Unit		100 Areas		
			100-B	100-D	100-F
River Pump House (Building 181)					
River Stage	Ft. above sea level	(max.	388.7	380.5	366.5
		(min.	385.1	377.7	364.0
		(ave.	386.9	379.2	365.5
River Temperature	ave. ° F		45.3	45.5	45.1
Water Pumped to Reservoir	gpm ave. rate		9527	41229	39176
Water Pumped to Refrigeration Plant (condenser water)	gpm ave. rate		-	0	0
Reservoir (Building 182)					
Water Pumped to Filter Plant	gpm ave. rate		6991	35235	35064
Water Pumped to Export System	gpm ave. rate		1880	2028	588
Water Pumped to Condenser System	gpm ave. rate		656	3966	3524
Chlorine Added at No. 1 Inlet	lb.		0	0	0
Water Pumped to Export System	gpm normal rate		4496	4496	4496
Filter Plant (Building 183)					
Filtered Water to Power House	gpm ave. rate		93	322	275
Filtered Water to Process	gpm ave. rate		4388	31440	30587
Filtered Water to Fire and Sanitary	gpm ave. rate		99	140	156
Chlorine Used in Water Treatment	lb.		1904	7700	9460
	ppm ave.		.73	.59	.73
Lime Used in Water Treatment	lb.		0	66000	66780
	ppm ave.		0	5.03	5.10
Ferrifloc Used in Water Treatment	lb.		20870	250000	272890
	ppm ave.		8.0	19.0	21.0
Carbon Used in Water Treatment	lb.		0	0	0
	ppm ave.		0	0	0
Raw Water Analysis	pH ave.		8.1	8.1	8.1
Finished Water Analysis	pH Ave.		No. Anal.	7.40	7.38
Alkalinity - M. O. Raw	ppm ave.		61	61	62
Alkalinity - M. O. Finished	ppm ave.		58	54	56
Residual Chlorine - Settled	ppm ave.		.34	.20	.17
Residual Chlorine - Finished	ppm ave.		.14	.15	.06
Iron - Raw	ppm ave.		.13	.11	.13
Iron-N. Clearwell	ppm ave.		No Anal.	.010	.011
Iron - S. Clearwell	ppm ave.		No Anal.	.010	.013
Chlorides - Filtered Water	ppm ave.		1.0	1.2	1.0
Hardness - Finished Water	ppm ave.		67	69	70
Turbidity - Raw Water	ppm ave.		4.5	3.9	5.8
Turbidity of Filtered Water	ppm ave.		0	0	0
Refrigeration (Building 189)					
Refrigeration Produced	tons/day		-	0	0
Temperature Process Water In	ave. ° F		-	-	-
Temperature Process Water Out	ave. ° F		-	-	-

	Unit		100 Areas		
			100-B	100-D	100-F
Power House (Building 184)					
Steam Generated - Total	M lb.		33661	113117	104202
Steam Generated - Ave. Rate	lb./hr.		43490	152039	140056
225# Steam to Plant (est.)	M lb.		29372	98367	91698
15# Steam to Plant (est.)	M lb.		150	1176	765
Coal Consumed	Tons		2215	8700	7695
Coal in Storage (est.)	Tons		9305	30493	27010
Deaerator Plant (Building 185)					
Water Flow (ave.)	gpm		4138	31190	30337
Chemicals Consumed:					
Dichromate	lb.		3200	24600	24200
Sodium Silicate	lb.		48644	278584	310100
Chemical Analysis:					
pH	pH		7.62	7.65	7.65
Dichromate	ppm		No Anal.	1.9	2.0
Silica	ppm		No Anal.	6.6	7.1
Dissolved Iron	ppm		.02	.01	.009
Process Pump Room (Building 190)					
Total Water Pumped	gpm ave.		4103	31015	30162
Water Temperature, Unchilled	ave. $^{\circ}$ F		47.5	47.5	47.5
Water Temperature, Chilled	ave. $^{\circ}$ F		-	-	-
Total Water Pumped	gpm normal rate		4103	31955	31118
Valve Pit (Building 105)					
Chemicals Consumed:					
Lime	lb.		0	0	0
Hydrogen Peroxide	lb.		0	0	0
Oxalic Acid	lb.		0	0	0
Solids	lb.		0	1100	1800
Chemical Analysis:					
A, B, C & D Headers Standard Limits					
pH 7.5-7.8		(max.	7.70	7.70	7.70
		(min.	7.55	7.60	7.60
		(ave.	7.64	7.64	7.64
SiO_2	ppm	(max.	9.0	7.5	9.0
		(min.	5.5	5.0	6.0
		(ave.	7.5	6.5	7.3
$Na_2Cr_2O \cdot 2H_2O$ 1.8-2.2	ppm	(max.	2.1	2.0	2.1
		(min.	1.8	1.8	1.9
		(ave.	2.0	1.9	2.0
Iron	ppm	(max.	.08	.02	.02
		(min.	.01	.005	.005
		(ave.	.03	.01	.009
Free Chlorine as Cl_2	ppm ave.		.12	.14	.15

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	Unit	200 Areas	
		200-E	200-W
Reservoir (Building 282)			
Raw Water Pumped	gpm ave. rate	2383	2113
Filter Plant (Building 283)			
Filtered Water Pumped	gpm ave. rate	422	400
Chlorine Consumed	lb.	244	217
Alum Consumed	lb.	1700	2448
Chlorine Residual - Sanitary Water	ppm	.58	.71
Power House (Building 284)			
Steam Generated - Total	lb.	22209000	27643000
Steam Generated - Ave. Rate	lb./hr.	29972	37155
Coal Consumed (est.)	tons	1850	2280
Coal in Storage (est.)	tons	9774	9005

		300, 700, 1100 Areas		
		300	700	1100
Power House (Buildings 384 and 784)				
Steam Generated - Total	lb.	11463000	21324000	
Steam Generated - Ave. Rate	lb./hr.	15407	28661	
Coal Consumed - Total (est.)	tons	903.5	1614	
Coal in Storage (est.)	tons	1135.5	4846	
Sanitary and Fire System (1100)				
Well Water Pumped - Total	gal.			63895000
Well Water Per Day	gal.			2061000
Well Water	gpm ave. rate			1431
Chlorine Residual	ppm			0.2
Sewage Treatment Plant (1100 Area)				
Total Treated	gal.			50600000
Treated Per Day	gal.			1632000
Ave. Rate	gal.			1133

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HW-7-5630

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MAINTENANCE DEPARTMENT

DECEMBER, 1946

GENERAL:

There were two sub-major injuries in the Maintenance Department during December. A pipefitter repairing an underground water line in 200-West Area fractured his little finger when it was caught between a rock and the pipe in the bottom of the trench. The other injury was sustained by a rigger in 200-East Area when he fractured his elbow while swinging a sledge hammer. As far as can be determined, the movement of his elbow was entirely normal and his elbow was not struck or crushed in any way but apparently some weakness caused the elbow to fracture.

The first phase of the four month safety contest was completed during December. The December topic was Housekeeping and a noticeable improvement in housekeeping was made during the month as a result of this activity.

On December 2nd the program of painting the interiors of Village residences was started. Although one month's experience is not a good basis for forecasting future progress, the indications are that about 100 houses can be completed each month. This work is starting at the south end of Richland and will proceed northward. Two area shops have been established and three paint crews organized with a total of about fifty men.

A decision was made during December to restore to their original condition the two 42" diameter process water effluent lines in 100-F Area. These lines extend approximately 150' out into the river and last summer they broke loose and snapped off near the bank. To prevent recurrence it is planned to weight them down with concrete before backfilling. The exact method of re-excavating for them and placing the concrete to weight them down has not been definitely decided upon. However, the most likely method is to employ a U.S. Engineers dredge to make the excavation and to use precast blocks of concrete to weight them down. This work will have to be completed by April 1st to avoid complications arising from increased flow in the river.

Two new projects were started by the Minor Construction section One was the conversion of womens dormitory W-13 to form ten apartments. The other was the erection of seven hutments in the 300 Area to provide additional office space

ORGANIZATION AND PERSONNEL:

Total enrollment in the department increased from 548 to 589. These figures are different from the payroll records because of Design and Construction personnel who still show on the Maintenance payroll. The new personnel added to the department wereas follows:

1 Assignment Engineer	1 Draftsman
1 Sheetmetal Worker	2 Machinists
16 Carpenters	12 Painters
	10 Helpers

Eight of the above men were transferred from other Departments. There was one termination from the roll during the month.

Organization changes within the department included the establishment of a General Foreman and a Craft Foreman in Minor Construction, both of which were promotions. One painter was promoted to Foreman to help supervise the painting of residence interiors.

WORK ORDER SUMMARY:

FIELD FORCES

Area	Work on Hand Dec.1 No. of Orders	Work on Hand Dec.1 Estimated Man Days	Work Completed in Dec. No. of Orders	Work Completed in Dec. Estimated Man Days	Work on Hand Dec. 31 No. of Orders	Work on Hand Dec. 31 Estimated Man Days
100-B	106	216	174	269	81	172
100-D	57	192	254	437	76	207
100-F	133	211	159	383	154	205
Overhaul	84	1379	214	976	84	1277
200-E	237	883	326	922	294	1055
200-W	579	1543	463	1479	678	1522
300	142	402	207	629	172	663
700-1100	1204	3985	1066	3507	1176	4515
Minor Const.	7	280	6	588	8	703
Total	2549	9093	2869	9194	2723	10321

ENGINEERING SECTION

	Work on Hand Dec. 1 Est. Man Days	Work Completed in Dec. Est Man Days	Work on Hand Dec.31 Est. Man Days
Studies	576	235	476
Projects	899	339	1605
Total	1475	575	2081

As indicated in the above Work Order Summary the backlog of work for the field forces increased about 10%. In terms of manpower the required number of men on the basis of additional work received during the month was 527. The actual manpower on hand was 480 This indicates a need to continue the present hiring program. The backlog of work for the Engineering Section increased about 50% during the month. The Engineering force was increased during the month but working space has now become the controlling factor. How to provide additional working space for Engineering Section personnel in the Administration Building is a problem now under study.

100 AREAS:

Premanent access ladders were installed into the far and near side high tank pipe galleries of Building 105-B. The pipe tunnels can now be entered without having to lift up the floor grating and rope off the entire area. Number 1 shim rod oil gear pump was overhauled to determine the cause of vibration and chattering. The stroke adjustment locking screws were loose. The pump is in first class condition.

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Number 2 boiler in Building 184-B was checked for soot blower alignment. Several tubes were bowed and had been rubbing on the element piping. Wearing plates were installed on the tubes that had been rubbing and the elements moved forward as far as the boiler construction would permit.

The vertical rod thimbles in Building 105-D were tested for leaks at 87 psi air pressure and did not leak. Number 27 and number 35 vertical rod and rod guides were buffed in an effort to free up the travel so they would operate normally without sticking in descending. A small gas leak at the "B" test hole was caused by a faulty gasket A new gasket corrected this condition. A unit heater was installed near the manipulator pit to provide heat for the operators of this equipment. A 6" elbow was installed on the 6" flushing valves on the high tank lines This controls the direction of the water when the flushing is done and prevents excessive splashing.

Gas leakage from the tunnel piping into #1 purification room of Building 115-D was stopped by installing blanks on the lines to the #1 room.

Number 1 boiler in Building 184-D was overhauled on schedule. A new back wall baffle was poured with Kasset cement. External boiler walls were insulated with Ebco boiler plastics. New piers were formed between the fire doors. The R.K. control valve on the steam driven emergency generator was leaking steam. It was replaced with a re-conditioned valve. A gas analyser was installed on #1 boiler. This was done in order to enable the Power Department to check stack gases.

All vertical rod thimbles in Building 105-F were tested with air at 87 psi and none were found to be leaking. Number 2 horizontal rod was removed from the unit to allow the Technical Department to boroscope the rod thimble. At that time the H.I. Engineer reported that about one pint of water ran out of the thimble on the inner rod room floor. On December 26th the rod was again removed from the thimble and tested hydrostatically at 150 p.s.i.. Water was observed running from the tip end of the rod. The rod was left out of service and a new rod was secured and tested and made ready to install at a later date. The storage basin water was pumped down and one new mattress plate extension was put in and the mattress plates were removed so that the plates in good condition would be near the center of the chutes. A unit heater was installed near the manipulat in the transfer basin so the operators would not get cold. A platform to permit work area crane servicing was installed along the near side wall of the work area.

New cup piston leathers were installed in both Darling valves in #2 dryer room of Building 115-F. Special lubricators were installed in bottom head of air cylinders

Number 6 and number 7 filter plant supply pumps in Building 182-F were dismantled and an accumulation of tumble weeds were removed from the pumps. Number 6 pump packing wearing sleeves were reconditioned by metallizing. When those pumps were down for cleaning tumbles weeds out, a complete check was made of bearings and alignments. No other repairs were needed. Box shaped screens made of subway grating were installed over two sluice way gates to keep tumble weeds out of pumping equipment.

A broken link in vertical flight of Redler conveyor in Building 183-F was repaired and the conveyor housing cleared of ferrisul, which had gotten damp

and set like concrete Several holes were cut in housings and pipe connections were welded in place for steam and hot water to be used when cleaning crystalize ferrisul from conveyor. The west clear well was pumped down for repairs to be made on leak on north west corner of clear well flume..Stonetite was used to make repairs. Expanded metal screens were installed under 12 vent fans over filter floor. This is a safety precaution against fans dropping on people walking underneath.

Drain troughs and spouts were installed over the lab section of Building 185-F to prevent roof water from running through the concrete block walls on to the lab equipment.

The original McQuay unit heater cores are being replaced with new copper cores in Building 182, 183, 184 and 185 in all 100 Areas. In the 100-F Area, this change includes Building 189.

200 AREAS:

A temporary jumper was installed in division box 154B connecting line 10-4 to 221B to water supply for the purpose of flushing out a block in the line. The block was removed by this method and the line is again available for use.

All fire hydrants were checked in East Area. It was necessary to replace gaskets and lubricate with graphite to facilitate operation of the valve.

Further repairs are constantly being made to high boy heaters in the East Area shop New coils are on order but delivery dates are set for March, 1947..

The tile field draining the septic tank serving the power and administration area failed to remove all of the water and fluid was backed up into the sewer. Temporary relief was obtained by digging down to a main laterial in the tile field and permitting the water to rise to the top of the ground. A permanent solution has not been agreed upon.

Repainting of the "B" canyon building deck is in progress

In the "B" concentration building, general service painting is being renewed. This includes such items as doors, trim, panels, pipe, hangers, etc..

The high speed or motor driven shaft on the "B" canyon 75 ton crane developed a whip It was removed and straightened. No reason for the failure was found The second reduction shaft on the crane failed while lowering a 35 ton cell cover block. The shaft failed at a shoulder next to the brake face plate. It was replaced from spare parts. A metallurgical study is being made of the broken shaft to determine the cause of failure

All steam traps in the "B" canyon acid storage and concentration building have been inspected and renewed where necessary.

The shaft on the sulphuric acid car spot pump, at the "B" canyon tank farm, was replaced. Investigation showed that the old shaft had been attacked by acid. Since a similiar failure occurred at a previous time a method of cleaning and repacking at frequent intervals has been worked out with the "S" Department. This should increase the service life of these pumps.

In the laboratory building the lead line sink drains continue to fail from

internal corrosion These lead lines are not adequate for the service and it will be necessary to replace them with duriron at some future date.

In the "B" concentration building, centrifuge E-2 has not operated at high speed to the satisfaction of the "S" Department Various attempts to improve this have not been successful and therefore E-2 was exchanged with B-2, B-2 being a standby unit in the building.

Copper heating coils for the Buffalo units in the West Area shop were installed in place of existing steel coils.

The 10" water main near the 272-W high tank was repaired. A section was broken due to heavy equipment moving over it. A study is being made to prevent a recurrence by proper marking and encasing lines at some points.

A bearing failed in the freon compressor for the cool air unit serving the West Area gate house. Inferior bearing material seemed to be the cause of the failure.

The 3" water main broke at the salt pit. The pipe had an old mark around it, made with a hack saw, at the point of failure. This partly severed pipe had been installed by construction crews.

In the West Area Power House the Coppas stoker drive turbine bearings were replaced.

In the #3 boiler of the Power House the heat baffles were repaired and partially replaced Greatest source of the damage had been from the soot blower jets

Two of the 1¼" valves installed recently in the H.F. system in the canyon tank farm were replaced, since they would not seat up tightly. Corrosion of the steel seats and plugs in these valves is very rapid. A study will be initiated to determine the possibility of using a Teflon seat in H.F. valves.

Steps have been taken to reactivate the laboratory building in the "U" Area Steam, air and water service will be provided to the building.

The original skimmer and plow were replaced, in the T canyon building centrifuge 7-2, with new design skimmers. The entire machine was placed on the deck to do the work rather than working in the cell. Replacement was made as a preventive measure, rather than as a result of failure.

To aid in contamination control in the isolation building, floors in cells 3, 4, and 5 and corridors, were repainted.

Further efforts to clean the Lorraine Motor crane by sandblasting have not been successful. The lower turning mechanism will have to be dissassembled and cleaned by washing.

300 AREA:

5 A new concrete driveway was poured at the entrance of 304E to replace the damaged driveway.

Number 1 Lodge and Shipley lathe was given a complete overhaul, in addition to the regular repairs to the Grisholt Turrett lathes in Building 313. A spare de-greaser was re-coated with zinc for service in this building.

The ball-race of the rotary hearth furnace in Building 314 was cleaned again and most of the remaining carbonized grease was removed Inspection holes were cut in three locations so the periodic inspections of the ball-race can be made.

The oxide burning furnace was completely overhauled and the dust collecting hoods were revised to collect a greater portion of the dust from the furnace.

A heating system and storage bins were installed in the construction hut adjacent to Building 321.

The damper controls for the boilers in Building 384 were given a complete overhaul and lubrication, and the Blow-down System also was overhauled.

A large pujp bowl from the 100-F Area was machined and faced with bronze.

The first set of field drawings on the new semi-works in Building 321 were released by the Design and Construction Department on December 11th. Shop fabrication was started at once in the 300 Area Machine Shop and is progressing satisfactorily.

700 AREA:

During the month temporary roof repairs were made on the 720 and 784 Buildings which had been damaged by high winds Permanent repairs will be made in the spring.

The west section of the Sewage Disposal Plant fence was repaired and new posts installed to replace those broken by the high winds.

Cat-walks were installed in the attic of the Kadlec Hospital to eliminate hazards encountered during the servicing of equipment

Trusses were inspected and bolts tightened in Buildings 722A and 722C.

A depth gauge as recommended by the Safety Department was fabricated and installed on the jointer in the 722C Carpenter Shop

Number 1 boiler was given its periodic inspection including the cleaning of the breeching and soot hopper, patching of holes in the baffles, and making minor adjustments Number 4 boiler is now down for its periodic overhaul. It was necessary to replace one tube in #3 boiler and at the same time the fire wal were chipped and the fire box cleaned

Wooden cabs and tool cabinets were installed on five weapon carriers now being used by the Maintenance Department.

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1100 AREA

An average of 48 men were used in the residence interior painting program during the month. Ninety-six completed houses, 16 bathrooms, and 17 kitchens were painted during the month Also, 35 bathrooms in which the paint had deteriorated were recaulked and enameled.

Due to a reduction in volume of renovation work it was necessary to reduce the force of women laborerssby six. At present there are 61 renovation orders on hand including the reconnected prefabs.

Roofs were repaired on eight mens dormitories and 19 womens dormitories and approximately 100 Village houses.

The hydrostatic testing of all 1100 Area hot water tanks was completed. All commercial air receivers have been tested with the exception of the two at the Commercial Laundry.

The removal of dampers from heat registers in the Village houses is 65% complete.

MINOR CONSTRUCTION:

Employment Building alterations are approximately 72% complete. A delay in obtaining paint has set back the completion date for this building to January 10, 1947.

Alteration of Dormitory W-4 for Design and Construction office is approximately 92% complete A revision of electrical plans, delay in receipt of lighting fixtures, and paint procurement difficulty has set back the completion date for this building to January 10, 1947.

The 3000 AreaCoal Bunker is approximately 8% complete. Higher priority given to other jobs caused a delay in starting date. Timbers are on hand and are being framed in the 700 Area lumber yard.

Work started on conversion of Dormitory W-10 to Education Building on December 9, 1946 and is now approximately 40% complete. Should be completed by January 24, 1947.

Work started on the addition to 3706 Building on December 9, 1946 and is now approximately 5% complete. The outside foundation walls have been poured and the forms removed. Excavation is in progress for the intermediate foundation walls. Completion date is set for April 1, 1947. The material situation for this job is very critical.

Conversion of Dormitory W-13 to an Apartment Building started on December 12, 1946 and is now approximately 5% complete. To date only wrecking out has been accomplished. The estimated completion date is March 21, 1947.

Work on 300 Area hutments was started on December 19, 1946 with the hauling of the hutment sections from the 700 Area to the 300 Area. Erection will start at an early date.

Projects and Suspense Codes Authorized and Under Construction:

100 AREAS

Proj. No.	Title	Complete	Date Auth.	Est. Cost
C-116	Lightning Protection for Communication Circuits - 100-B-D-F	0	12/19/46	$ 4,600
	Total Estimated Cost 100 Area Projects			$ 4,600

200 AREAS

C-67	Dismantle T.C. Extra Machinery Storage and T.C. Pipe Warehouse	100	11/26/45	$ 3,161
C-100	Fan Shielding and Replacement Equipment 291 - TUB	20	9/17/46	9,600
C-103	Remodel 2713-W Building for Transportation Garage	78	9/17/46	4,400
C-106	Intermediate Waste Tank by-pass Jumper 221-T & B	90	9/20/46	3,350
C-107	Rerouting of Waste Lines from Sec. 9 to 221-B	100	9/20/46	1,300
C-112	241-B Waste Storage Tanks	1	11/18/46	1,667,000
	Total Estimated Cost 200 Area Projects			$1,688,811

700-1100 AREAS

C-87	Telephone Cable Moisture Proofing	99	4/22/46	$ 1,950
C-97	Street Paving - Village	50	8/16/46	10,450
C-99	1444-1446 Thayer - Fire Damage Repair	65	8/13/46	3,125
C-101	Bus Heaters and Defrosters	85	8/30/46	12,150
C-102	Schools - Install Sixteen Hutments	99	8/30/46	24,960
C-105	Build 20 Zeuto Instruments	80	9/11/46	1,900
C-108	Village Walk-in Refrigerators - Thermometers	0	11/15/46	4,350
C-109	Reactivate 87 Prefabs	95	10/30/46	5,655
C-111	Sewage Lift Station-Revise Pumps	0	11/4/46	2,200
C-113	Relocate 251 Disconnect Switch	0	11/21/46	3,275

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S.C. 10115	Building 705-Alterations to Employment Building	72	12/19/46	$ 6,025
S.C. 10117	Dorm W-10-Educational Building	40	12/16/46	4,700
S.C. 10123	Dorm W-13-Conversion to Apartments	5	12/30/46	15,200
S.C. 10122	Tract House K-777-Reconditioning	5	12/24/46	2,450
S.C. 10124	Landscape Planting of Existing Nursery Stock	0	12/19/46	-----
	Total Estimated Cost 700-1100 Areas Projects			$ 98,390

370 Bldg

MULTIPLE AND MISCELLANEOUS AREAS

C-96	Riverland R.R. Shops-Electric Heat	85	7/10/46	3,700
C-110	3000 Area Barracks - Construct Coal Bunker	8	11/13/46	4,700
	Total Estimated Cost Multiple Areas			$ 8,400
	Total Estimated Cost for Active Approved Projects - All Areas			$1,775,000

Projects Being Routed for Authorization:

E.R. No.	Title	Estimated Cost
813	S.C. 10110 - Alterations to Dorm W-4	$ 5,800
804 (C-115)	Dormitories - Install Fire Alarms	4,100
146-3 (C-118)	Outside Ponds, Etc for Fish Laboratory	11,775
2249(C-120)	Diversion of Second Cycle Supernates from 241-T & B to Ground	134,200
105-33-1	"B" Test Hole Facility	7,900
2256	Central Lint Catchers for 2723 Laundry	2,525
	Total	$ 166,300

Project Engineering - Area Reports

100 AREAS

Design jobs added during the month, but not completed, include "Tension and Compression Machine." A project is being prepared on the replacement of 100-F Area effluent line. Repair work has been started

1213255

Designs completed during the month include:

Modified Mattress Plate for 105 Building
Buffing Machine for Cleaning Vertical Rods
"B" Test Hole Facility
Exposure Facility
"B" Slug Cask and Crate

Recommendation Report No. 77, Pomona Pump Study, was issued. A design request for bumper blocks in 105-B-D-F Buildings has been received.

200 AREAS

Design jobs added, but not completed, during the month include:

Underground Tie Line between 24" Export Line & Raw Water Distribution System - 200-E-W.
Unloading Cages for Recycle Handling
Move HF Scale Tanks in E & W Areas
Build and Install Two Conductivity Meters in Tank 221-T
Ten Ton Crane Hook
Steel Handling Crane

Studies are being made on a bumper stop in 200-N Area, and on pipe crossings of roadways.

300 AREA

Projects are being prepared and work has been started on designing and installing six hutments for temporary office space, and addition to 3706 Building

A new study is being made on billet casting operation for 314 Building.

700-1100 AREAS

E.R. No.	Title	% Engr'g Comp.
766	Village "Shot & Cover" Paving	90
780	Irrigation Completion - Divisions 1 & 2	85
803	Dorms 15, 16, 17, 20 & 21 Replace Shingle Roofs	90
812	Irrigation Extensions - Village	0
822	Village Public Grounds - Pop-up Irrigation System	0
828	Bldg. 702 - Automatic Dial Exchange	30
834	Bldg. 720 - Alterations	0
839	Header Pipe - Village Wells to Reservoir	0
841	1947 Part of Long Range Landscape Program	0
842	351-D Substation - Replace Switchgear	0
843	M.P. Quarters - Richland	5
844	Commercial Laundry - Add'n. to Equipment Room	5
846	Richland Airport - Runway Extensions	0
847	Marcus Whitman School - Install one Hutment	5
848	Move and Equip 27 Hutments for Apartments	10
849	Consolidation of Transportation Department-Richland	5
854	300 Area - Increased Capacity of Telephone Exchange	5

[redacted] 7 5630

Engineering Studies

Completed During the Month

E.R. No.

4272	Well Drilling Cost Estimate
4266	*Increased Swimming Facilities
4269	*Improved Fuel Handling Facilities - 300 Area
4282	*Increased Use of Electric Water Coolers

*Indicates Study Awaiting Approvals

Studies Added This Month

4285	700 Area Central Shop
4286	Improved High School Cinder Track
4287	J.I. Sheet - Lead Salvage

Active Studies

4245	700-1100 Area Lubrication Sheets
4264	Air Conditioning Survey - 703 Building
4274	Estimated Equipment Needs - Transportation Department
4276	Chlorination of Irrigation Canal
4278	700-1100 Air Conditioning Survey
4279	Improved Food Handling Facilities - Schools
4281	Tract House Reconditioning Survey
4283	Additional Air Conditioning - Nurses'Station - Hospital

Drafting and Print Control Summary

	This Month	Last Month
Drawings and Sketches Completed	180	88
B & W and Blueprints Produced	4,258	4,201
Photostats Produced	11,616	18,645
Portagraphs	59	198
Other Prints Handled	4,778	4,249

1213257

ELECTRICAL DEPARTMENT

DECEMBER 1946

GENERAL

Work Order Summary:

Area	Work On Hand Nov. 30		Work Completed in Dec.		Work On Hand Dec. 31	
	No. of Orders	Estimated Man Days	No. of Orders	Estimated Man Days	No. of Orders	Estimated Man Days
100-B	42	99	39	92	46	114
100-D	46	160	75	233	42	123
100-F	55	164	55	295	56	196
200-E	74	151	78	305	114	225
200-W	81	227	78	284	93	200
300	71	117	70	151	70	112
700-1100	148	433	97	411	164	407
Distribution	173	794	154	1108	155	953
Minor Const.	0	0	3	114	5	110
Totals	690	2145	649	2993	745	2440

ORGANIZATION AND PERSONNEL

No changes in organization took place during the month. Some additions to personnel in line with increasing work backlog were effected. Four Electricians and one Electrician's Helper were employed. One Engineer (Assignment) was added to the department.

AREA ACTIVITIES

100 Areas

The transfer crane in Building 105-D failed at 12:25 P.M., December 11, 1946. The mechanical brake shoe is connected to the brake solenoid by a shackle bolt. The links of the shackle bolt are held in place by a safety wire. The safety wire had broken on one of the links, allowing the bolt to drop out. When the shackle bolt dropped out, the brake would not release. Therefore, the crane could not be operated. The shackle bolt was replaced and two cotter pins were used instead of the usual safety wire to prevent a similar occurrence.

The 13,800/440 volt normal process power transformer bank and the 2300/440 volt emergency process power transformer bank in the C436 substation was checked and found to be 180 degrees out of phase. Also, an error was found on the marking "color code" of the 13,800/440 volt process power bank. The connections on the 2300/440 volt emergency process power transformer bank were changed on December 17, 1946. The marking has also been corrected. The same condition was found and corrected in Building 105-F.

The primary 230 KV substations received operational checks of equipment scheduled for the month. Relay guard bumpers were installed on the 13.8 KV cubicle doors. All station power and lighting circuits received their annual

insulation test and inspection. Overhaul of the 13.8 KV Oil Circuit Breakers supplying refrigeration motors was started. A rotary inverter supplied by station battery power was installed at Station A-2 to provide emergency power to the radio transmitter and receiver.

A differential relay operation cleared the back 13.8 KV bus at Primary Station A-4 and caused process shut down for thirty minutes. The power supply was restored in nine minutes. Outage was caused by vibration and dragging disc in the "C" phase element.

Other work involved routine preventive maintenance in all buildings with minor troubles found and corrected.

200 Areas

On December 18, the "mechanical brake screw and pinion shaft" in the gear reduction unit of the 75 ton Whiting Crane hoist in the 221-B Building broke, allowing the cable drum to unreel and drop the block and hoisting cable into the canyon. The cable was damaged to such an extent that it had to be replaced and a sheave on the block was broken. The pinion shaft broke at the junction of the brake screw and friction collar. Specific cause of the failure has not been determined but the evidence points to crystallization of the shaft metal. Repairs were made and the crane was returned to service on December 20. At the same time, a burned out grid on the bridge travel motor was replaced. A complete report of this failure is being prepared, and the Whiting Corp. will be consulted to see if a satisfactory explanation can be obtained and assurance given that the failure will not be repeated. Thought is also being given to the advisability of providing an emergency braking arrangement to hold the drum in case of similar trouble in the future.

Two 1/3 H.P., single phase exhaust fan motors in Building 224-B failed. In both motors, the centrifugal switch failed to open the starting winding circuit. The motors could not be removed from the restricted area and are too "hot" to be worked on as yet. Consideration is being given to the possibility of replacing these motors with 3-phase, 440-volt motors to eliminate centrifugal switch trouble.

The 40/10 H.P. centrifuge motor which failed in the B Concentration Building in October was rewound and turned over to the Maintenance Department for use in testing a spare centrifuge for the above building.

Brake pins on the 75 ton and 10 ton cranes in the Concentration Building (221-T) were replaced with bolts and castellated nuts with cotter pins in accordance with the recommendation of Project Engineering. This is in line with changes previously made in the 200 North Areas and 200-E.

As the "U" area buildings are not being regularly used, there has been considerable confusion in turning on lights for the occasional men who for various reasons need to go into the 221-U Building. Therefore, a pushbutton control station was installed near the 221-U Building entrance to control one of the main feeder air circuit breakers (E8-X-25) which controls the majority of the lights required.

2

A short section of the 2300 volt line extending east from the old garage was removed. This lin formerly fed construction buildings which have been removed.

Project C-103, covering revisions to Building 2713-W for conversion to Area Garage is about 85% complete.

The Radio Maintenance unit was transferred from the 700 Area to Building 2713 in the 200-E Area. Forty-three two-way sets were serviced and thirty-five units overhauled during the month. Two new installations were made.

300 Area

Repair of the transformer for the marking fluoroscope in Building 313 which had failed on November 29 was unsuccessful and a new transformer was installed. Oil was filtered to a test of 35 KV and the equipment resumed operations on December 16. No loss of production was involved.

The heating element of one canning furnace failed due to terminal corrosion, and one due to a failure of the element. Failure of the element was thought to be due to a pot breakage which had occurred some time before. There was no loss of production.

The plan calling for rearrangement of the equipment in this building has progressed to the extent of moving the following equipment to new locations:

1. Can Inspection Equipment
2. Al-Si test - Equipment and Controls
3. Bronze test - Equipment and Controls
4. Centrifuge - Equipment and Controls

The rotary hearth furnace in Building 314, which was reported in November as being out of service due to the rotating carriage jamming, was back in operation without loss of production after flushing of the carriage ball raceway. To prevent future trouble of this sort, it has been decided to flush and clean the raceway at approximately six month intervals.

The Quadrocondex Industrial X-ray which was down in November due to the failure of a capacitor was back in service on December 23. After replacing the capacito it was found that the X-ray tube had been fractured, and final repairs were made by replacing the tube and head as a unit. New oil was used in the new tube. Consensus of opinion was that the tube failure was a natural result of the life expectancy of that part of the equipment.

700-1100 Areas

The work backlog in these areas has continued to increase and warrants a further increase in manpower. Four men were added to these crews during December.

Projects and their progress are listed below. All materials are on order for these with the exception of W-13 for which design drawings were completed on January 2.

C-10122-E-3 - Remodel Tract Houst K 777	80%	Completed
W.O. 02977 and 70476 - Remodel Dorm W-4	70%	"
W.O. 70351 - Remodel Dorm W-10	50%	"
W.O. 02972 - Remodel Employment Building	90%	"

C-10123-E-3	-	Remodel Dorm W-13	5% Completed
C-10103-E-3	-	School Hutments (12)	90% "
C-102	-	School Hutments (4)	90% "
10121-E-2	-	300 Area Hutments (7)	0% "
1012-E-3	-	3706 Building Adm.	0% "
C-111 E	-	Sewage Lift Motors	0% "

Line crews completed service reconnection to fifty-three prefabs, and replaced two poles on the 66 KV system. Nine telephone poles in vicinity of the Richland Airport were relocated to eliminate flight hazards. Graphic 24 hour load records were taken on all Village 6900 volt feeders, and similar checks are now being made on distribution and power transformers.

Telephone Group

During the month, 192 telephone instruments were installed and 177 were removed in the 700-1100 Areas. In the process areas, 21 units were installed and 14 were removed.

Detailed traffic studies were made in connection with a proposed conversion of the Richland Exchange. The Patrol PBX was relocated in the 720 Building, and a survey was made of the 705 Building facilities with regard to providing telephone service to the increased personnel in this building.

A study was made of the 300 Area Exchange with a possibility in mind of increasing it from 100 lines to provide for future needs.

Poles were checked on the May Junction Railroad Dispatch line and eleven rotted fir poles were replaced. A further check is to be made on the balance of these lines in the near future.

The project for installation of voice repeater on "O" level trunk to BY is now 100% complete except for final calibration.

Power Supply Interruptions

Date	Area	Circuit Affected	Time	Duration	Remarks
Dec. 9	Richland	302 Roberts	7:10 PM	61 min.	Wire broken on trans.
Dec. 10	100-D	Critical Power "Y"	12:55 PM	9 min.	Diff. relay operation
Dec. 10	Richland	813 Willard	4:55 PM	80 min.	High wind, trans. cut-outs blowing
Dec. 11	Richland	Catholic Church	12:48 PM	25 min.	Broken trans. lead
Dec. 12	Richland	Trans. Bank at 213 Goethals	4:05 PM	10 min.	CT trans. ove loaded, chk. load
Dec. 12	Richland	300 & 400 Street Light Circuits	9:45 PM	63 min.	Protective relay not working right
Dec. 27	Richland	1826 Hunt	6:55 AM	80 min.	Blown trans. fuse
Dec. 31	Richland	Thayer, Williams, Torbett	5:12 PM	108 min.	Blown fuse

POWER STATISTICS - ELECTRICAL DEPARTMENT

FOR MONTH ENDING DECEMBER 31, 1946

ITEM	ENERGY - MWHRS. Nov.	ENERGY - MWHRS. Dec.	MAX. DEMAND - KW Nov.	MAX. DEMAND - KW Dec.	LOAD FACTOR - % Nov.	LOAD FACTOR - % Dec.
230 KV SYSTEM						
151 B Out	1,590	1,640	4,000	3,500	55.2	62.0
151 D Out	7,950	7,820	14,500	12,100	76.1	86.9
151 F Out	6,510	7,240	10,800	11,000	83.7	88.5
251 Out	2,120	2,270	3,600	3,700	81.8	82.5
TOTAL OUT	18,170	18,970	32,900**	30,300**	-	-
MIDWAY IN	18,569	19,319	30,000*	28,800*	86.0	90.2
Transm. Loss	399	349	-	-	-	-
Per Cent Loss	2.1	1.8	-	-	-	-
66 KV SYSTEM						
1151 A Out	2,734	3,074	6,500	6,400	58.4	64.6
1151 B Out	2,373	2,643	6,000	6,000	54.9	59.2
751 A Out	2,174	2,395	4,740	5,086	63.7	63.3
351 A Out	239	261	432	516	76.8	68.0
351 B Out	202	224	920	960	30.5	31.4
Hanford Out	206	201	700	500	40.9	54.0
TOTAL OUT	7,928	8,798	19,292**	19,462**	-	-
Hanford In	372	201	700*	500*	-	-
Pasco In	7,595	8,669	18,000*	18,400*	58.6	63.3
TOTAL IN	7,967	8,870	18,700**	18,900**	59.2	63.1
Transm. Loss	39	72	-	-	-	-
Per Cent Loss	0.5	0.8	-	-	-	-
PROJECT TOTAL						
230 KV (Item 5)	18,170	18,970	32,900**	30,300**	-	-
66 KV (Item 15)	7,928	8,798	19,292**	19,462**	-	-
TOTAL OUT	26,098	27,768	52,192**	49,762**	-	-
230 KV (Item 6)	18,569	19,319	30,000*	28,800*	86.0	90.2
66 KV (Item 18)	7,967	8,870	18,700**	18,900**	59.2	63.1
TOTAL IN	26,536	28,189	44,800*	46,000*	82.3	82.4
Transm. Loss	438	421	-	-	-	-
Per Cent Loss	1.7	1.5	-	-	-	-

* Coincidental Demand

** Non-Coincidental Demand

Average Power Factor - 230 KV System—99.6

Average Power Factor - 66 KV System—97.9

INSTRUMENT DEPARTMENT

DECEMBER 1946

HW-7-5630-Del

GENERAL

For the first time in several months, this department is operating with all organization positions filled.

The department will augment its present functions, i.e., development, design, manufacture and operation with a group on process instrument applications. This new activity is designed to cope with the Redox program requirements.

Discussions are in progress to effect better utilization of the manufacturing and development facilities and the "know-how" of the parent organization.

Work Order Summary:

	Work on Hand Dec. 1		Work Completed in Dec.		Work on Hand Dec. 31	
Area	No. of Orders	Estimated Man Days	No. of Orders	Estimated Man Days	No. of Orders	Estimated Man Days
100-B	44	40	61	115	49	30
100-D	58	130	110	303	49	141
100-F	60	130	95	305	53	136
200-E	40	93	206	217	50	165
200-W	63	80	203	264	54	72
300	67	491	106	376	43	436
700	38	81	65	175	49	78
Totals	370	1045	846	1755	347	1058

ORGANIZATION AND PERSONNEL

H. D. Middel and C. A. Hansen, Jr., both of Schenectady, have joined the department as Superintendent and Assistant Superintendent, respectively.

Personnel ratings are being made in each of the areas. This rating covers the period from July through December 1946.

The personnel of the Process Instrument Section of this department is presently assigned to the Design and Construction Department on Redox.

The Division of this department previously known as the Instrument Engineering Section shall hereafter be known as the Development Division of the Instrument Department.

1

1213263

100 AREAS

Trouble was experienced with the orifice lines to the Bailey influent flow meter freezing during the recent cold spell. This will be investigated to prevent any recurrence.

Work in cooperation with the Technical Department has been started to measure and record the metal temperature of an active slug within the pile. A temporary piping connected on a special slug temperature mock-up in 105F flow laboratory proved the feasibility of set up. This project is scheduled for completion by January 8th.

A study is in progress to improve the installation of sensitive elements in the boilers flue gas stacks to obtain more nearly true average temperature.

All instruments in Building 146 (Fish Hatchery) have been checked and are now ready for service.

200 AREAS

On the afternoon of December 20, 1946, the Technical Department in the 222-B Counting Room reported all five of the methane proportional counter units to be out of control. Numerous tests were run during a period of about five hours but no definite conclusions could be reached. The sets showed no signs of circuit element failure or improper alignment. Visual inspection under a magnifying glass of two of the three standards being used revealed evidence of possible damage. A recheck of the units with the acceptable standard showed them to be within the normal limits of operation. The Technical group has been making an extended investigation of the condition, and numerous checks have been made using various standards. A complete report of their findings has not been made available to date.

Several calls were made on the "Standard" type Handee located in the hallway of the 271-T Service Building. The high noise level of this location presents a problem as this type chamber is extremely sensitive to microphonics. The screen and probe assembly was cleaned seven times during the month to eliminate spurious counts caused by high voltage discharge through lint and dust collections in the vicinity of the collecting electrode.

Routine maintenance of Ring Balance instruments occasionally discloses a specific gravity ring that contains a mucky precipitate suspended in the alkazine sealing fluid. Two instruments, 8-4 and 16-3, were found in this condition during the routine check of the 221-T Separations Building meters. To date, we have been unable to determine the cause of such a precipitate formation as there seems to be no regularity as to length of service of equipment or location of meter so affected.

2

300 AREA

The work load for the area has continued to increase so that the present backlog is slightly greater than at the beginning of the month. Some of this work is being diverted to the 700 Area.

The electronic shop has completed two Clinton type "Poppies", one of which has been delivered to 200W. The remaining four are complete except for high voltage transformers.

One Low Background Alpha counter is completed and ready for checking. Four of the chambers used with this counter are also completed.

S. S. White resistors are being substituted for Victoreens to facilitate matching high value resistors of correct value for range changing. The value of the White may be trimmed by filing the resistor body.

In Building 321, the instruments on A and B cells were put in service to permit decontamination of the tanks.

The field groups are having difficulty with the calibration of Victoreen Integrons, and an investigation has been started to find the trouble. No results are available at this time.

In keeping with a new policy, instruments manufactured in the area will receive more attention leading toward better product design. This will have a twofold advantage; it will reduce maintenance and repair, and have a good psychological effect, particularly on the H. I. operators.

700 AREA

Thin wall glass tubes filled with ether quenching mixture have been difficult to make because of erratic results, due mainly to photosensitivity. Very few tubes have been sealed off after filling because checks run on them while they were still on the line have been unsatisfactory, even when they were covered with a light-proof material.

The filling compositions have been varied from 20% to 10% with 15% showing the best results. Filling pressures have varied from 10 cm. to 6 cm. with 8 cm. showing the best results, but in both cases the results are not significantly different to eliminate erratic results.

DEVELOPMENT DIVISION

The greatest obstacle in the path of this Division is the lack of facilities with which to carry out the projected program. Accordingly, development of urgent projects must either be delayed or referred elsewhere. A critical review of all projects on the program must therefore be made to apply available facilities to our most pressing problems.

3

The Canned Slug Fault Detector has progressed considerably. A random chosen slug was examined by the detector and a spot was selected which indicated a thin spot fault where the shell was eroded by the Aluminum-Silicon. The slug was opened and a photo-micrograph taken of the section. This examination confirmed the thin shell condition indicated by the Detector. (See T. H. Quinn - W. A. Shanks Report No. 3, dated 12-16-46.)

A work order is being issued to cover Periscope improvements for the 221 Building. The improvements include greater brightness, binocular vision, wider field of vision, and a rapid objective lens change to eliminate blind spots. If this improvement results in as great a psychological improvement as physical, the other periscopes will be similarly modified.

The prese nt backlog of projects listed for development activity totals 42. Some of these will require extensive research and developments, others new applications for existing instruments.

SERVICE DEPARTMENT

DECEMBER 1946

PERSONNEL

GENERAL

Remodeling work presently in progress on Building 705 is almost completed. Remaining work consists of primarily inside painting and it is anticipated that the Personnel Division may be able to move into its new quarters within the next two weeks.

ORGANIZATION AND PERSONNEL

Employment and Investigations

During the month of December one employment investigator was added to this Division's organization for use in determining suitability for employment strictly from a qualification standpoint.

Industrial Relations

No organization changes were made in this Division during the past month.

Education

No organization changes were made in this Division during the past month.

ACTIVITIES

Employment and Investigations

Approximately 90% of the personnel employes on or before November 18 and who customarily would have been required to execute Patent Agreements as a condition of employment, executed such agreements during the month of December. Arrangements are in process for completing this program at the earliest possible date and the execution of Patent Agreements by all new employes and reclassified employes, as required, is being maintained on a current basis.

The progress of the program for reproducing investigation and personnel files in order that the original may be released to the former operating contractor continues at a comparatively slow pace because the Maintenance Department is not in a position at the present time to handle the volume of the required reproduction work daily.

All active applications for employment have been classified and indexed in a card index file as to qualifications of each applicant. This classification is being maintained on a current basis on all applications received.

[redacted]

7-5630

Service Department

In spite of the holiday season, employment interviews increased slightly during the month. A total of 1,106 applicants for employment were interviewed during December as compared to 1,064 during the month of November. New cases received by the Investigation Section dropped from 231 for November to 207 for December.

Industrial Relations

Plans for a Supervisor Training Discussion Program are presently in process and material for ten discussion periods has been prepared. It is planned to start the first training period around the first week in February.

The Women's Training Program for the clerical and stenographic groups has been completed and the first training session for this group will be held approximately January 20. The Accounting Department is handling the scheduling of the female employes for this training course. This course will include ten one-hour sessions, covering the following subjects:

Session 1.	a.	Introduction: What the sessions are to include and why the program is being offered.
	b.	General Electric Company history.
Session 2.	a.	Ideal office personality.
	b.	Lesson in speech.
Session 3.		Some office don'ts
Session 4.		Industrial Relations Plans and Company Policies.
Session 5.		Industrial Relations Plans and Company Policies
Session 6.		Personal Appearance
Session 7.		Job Procedures
Session 8.		Job Procedures
Session 9.		Security
Session 10.	a.	Safety
	b.	Summary

During the month of December, a total of 904 contacts was made by the Industrial Relations counselors in the field. These contacts are summarized as follows:

Service Department

CONTACTS

Policy	209
Military Service	30
Ration Applications	30
Insurance	277
Recreation	33
Housing	62
Facilities	36
Personal	119
Miscellaneous	108
Total	904

Approximately fifty meetings were held by the Industrial Relations Counselors during the month of December for the purpose of explaining Group Life and Group Disability Insurance plans to employes of various departments. A total of 800 employes attended these meetings.

During the month of December, 132 new employes were given orientation by the Industrial Relations Division; 71% of these employes making application for Group Life Insurance and 90% making application for Group Disability Insurance.

The employes handbook entitled "You and General Electric", has been completed, proofread, and is currently in the hands of the printers. It is expected that the finished booklet will be delivered within the next few weeks. Blue leatherette folders to contain material handed out to new employes at orientation have been ordered from Schenectady.

The status of employes affected by the March Selective Service Act is set forth below:

19 through 29 group

Technically Trained	1C	4F	Other	Total
Married	14	3	20	37
Single	7	6	32	45
Total	21	9	52	82
Not Technically Trained				
Married	90	33	0	123
Single	65	31	3	99
Total	155	64	3	222

TOTALS

Technically Trained	82
Non-technically Trained	222
Grand Total	304

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[redacted] 7 5630

Men called into Military Service during the month of December	0
42-A (Spec. Revised) Forms completed and mailed for month of December	0

Compensation and Insurance

The Compensation and Insurance Section activities for the past month covered a total of six compensation claims and three liability claims. A conference was held on the coverage that will be afforded sub-contractors under the Workmen's Compensation Act. A memorandum outlining suggestions and recommendations on this matter has been submitted to the local Legal Section.

A member of the Industrial Relations Section attended compensation hearings in Tacoma and Seattle during the month.

Statistics relative to the Workmen's Compensation claims are listed below:

	November	December	Total Since Sept. 1, 1946
1. Workmen's Compensation Claims reported to the Department of Labor and Industries	2	6	14
Workmen's Compensation Claims reported to Travelers	0	0	0
Liability cases reported to Travelers	3	2	7
Unreported cases	3	4	9
Cases handled for du Pont	4	3	18

[redacted]

and submitted for approval. Considerable progress was made during the month in affecting these building changes and efforts were initated toward securing necessary equipment for the classrooms, lecture room, and library facilities.

The "Interest Questionnaires" as distributed among employes proved sufficiently popular so that nearly the entire printing of 6,000 was required. Over 1,000 questionnaires were returned and tabulated during the month with interests sufficiently concentrated on 38 different subjects to indicate that it will probably be necessary to provide classes in all of them. Eventually from two to five classes may be required in some subjects.

STATISTICS

Employment and Investigations

Number of Employes on Rolls	11/30	12/31
Exempt	784	813
Non-Exempt	3603	3666
Total	4387	4479

Additions to the Rolls

	Exempt	Non-Exempt	Total
New Hires	17	115	132
Reemployees	0	0	0
Reinstates	0	0	0
Transfers from Other Plants	3	0	3
Net Additions	20	115	135
Payroll Exchanges	10*	0	10
Gross Additions	30	115	145

* Employes added to exempt roll from non-exempt

Terminations From the Rolls

	Exempt	Non-Exempt	Total
Actual Terminations	1	42	43
Payroll Exchanges	0	10*	10
Gross Terminations	1	52	53

*Employes removed from non-exempt roll to exempt roll

Approximately 70% of terminations were on a voluntary basis, and most of these were for the following reasons: (a) Another job, (b) To keep house, (c) To return to school or husband returning from service.

[redacted] 7 563

General

	Nov.	Dec.
Applicants Interviewed	1,064	1,106
Absenteeism Statistics (Weekly Salary Roll)		
Male	2.00%	2.23%
Female	2.97%	3.11%
Total Plant Average	2.21%	2.41%

Investigation Statistics

	Nov.	Dec.
Cases pending at beginning of month	572	580
Cases received during the month	231	207
Cases closed	223	326
Cases pending at end of month	580	461
Number of employes approved for clearance	89	165
Number found satisfactory for employment	147	165
Number found unsatisfactory for employment on project	5	5
Number of Mohawk Wrecking & Lumber Company cases where M.I. was advised to issue permanent badges	52	81
Number of Personnel Security Questionnaires concerning Concessionaire employes processed and forwarded to M.I. Office without investigation	112	31

Distribution of Personnel

Exempt Personnel

Assistant Superintendent - Personnel	1
Chief Supervisor - Personnel	1
Chief Supervisor - Education	1
Division Supervisors	2
Assistant Division Supervisor	1
Section Supervisors	6
Industrial Relations Counselors	3
Total	15

Non-exempt Personnel

Investigators	3
Interviewers	2
Fingerprinter	1
Photographer	1
Total	7
GRAND TOTAL	22

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All the personnel listed above is assigned to the 700 Area with the following exceptions:

One Industrial Relations Counselor assigned to the 100 Areas.
One Industrial Relations Counselor assigned to the 200 Areas.
One Section Supervisor assigned to the 300 and 700 Areas.

Personnel Force Breakdown

	Plant General	700-1100	Total
Supervisors	3	12	15
Others	-	7	7
Total	3	19	22

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PLANT

SAFETY & FIRE PROTECTION

Safety

Plant Safety Record - 77 days

Injury Statistics

	November	December	Year to Date
Major Injuries	0	0	3
Non-Tab. Major Injuries	0	0	4
Sub-Major Injuries	2	3	25
Minor Injuries	224	255	3,034

Sub-Major Injury No. 74

December 2 - [redacted] (a foreman in the Transportation Department, 1100 Area) sustained a fracture to the little toe and contusions of the third and fourth toes of the left foot. About 1:15 P.M., the injured was helping to remove a front end gate from a semi-trailer truck. The stakes had swollen because of wet weather and it was necessary to pry the gate loose. Another employe was standing on the semi bed using a post spade bar and heel to loosen stakes while the injured stood on tractor about 18 inches below level of semi bed frame and steadied gate as it was being raised. When the stakes were freed from their sockets, the gate slipped forward off the bar, catching the injured employe's foot. The gate stake struck partly on the safety toe of shoe and partly back of safety toe cap which resulted in fractured bone in little toe.

Sub-Major Injury No. 75

December 11 - [redacted] (an employe of the Maintenance Department, 200-West Area) sustained a complete oblique fracture of the middle phalanx, little finger, right hand. About 10:45 A.M., the injured and three other employes were replacing a seven foot section of a cast iron pipe in a water main near the elevated water tank. The new section of pipe had been placed in approximate position with the bell end engaged in the existing main and the other end resting on small blocks of wood in the ditch. It was necessary to lower the pipe about $\frac{1}{4}$ inch to make alignment with the other pipe. To do this, the injured "chugged" the pipe by raising and lowering it on the blocks several times to bring it in proper alignment. On the fourth time the injured's finger was caught between the pipe and a rock which had apparently rolled unnoticed under the pipe causing the fracture.

Sub-Major Injury No. 76

December 26 - [redacted] (an employe of the Maintenance Department, 200-East Area) sustained a chip fracture of the right elbow.

About 2:30 P.M., the injured was helping to set blocks under the outrigger beams on a motor crane in preparation to replacing the cover blocks on 154 B diversion box. Support is applied to the four outrigger beams on the crane by driving wedges on opposite sides between it and the wooden blocks set on the ground. In the act of driving a wedge with a sledge weighing six pounds, the injured felt a sharp pain in this right elbow. He reported this to the area maintenance general foreman who was witnessing the work. After completion of the crane work, the injured was taken to First Aid where an x-ray examination showed a chip fracture in the elbow. Dr. P. A. Fuqua states that this type injury can and does happen to men using a sledge.

Minor Injuries

See charts appended to this departmental report.

A total of 421 Safety Meetings were held during the month of December, with an attendance of 6,748.

During the month 33 pairs of prescription safety spectacles were ordered; 43 pairs were received, checked and fitted; and 102 adjustments and repairs made to all types of safety spectacles.

There were 727,597 exposure hours from December 1, 1946 to and including December 31, 1946. This is a total of 1,773,045 exposure hours since the last tabulatable major injury. (October 15, 1946).

Experiences

300 Area

Minor Injuries	42
Sub-Major Injuries	0
Major Injuries	0
Days since last tabulatable major injury	1,095
Days since last Sub-Major Injury	48
Days without a minor injury	13
Safety Meetings conducted	62
Number in attendance	821
Safety suggestions received	28
Safety spectacles delivered	7
Safety spectacles serviced	32

A study has been made of the respiratory protective equipment needed for welders working in contaminated areas. Recommendations have been submitted to the H. I. group for procurement.

A check of acid protective equipment used by the Maintenance Department was made and found that some equipment is deteriorating and in need of replacement. Area Maintenance foreman has been advised to that effect.

An investigation is being made of safe method by which some dangerous compressed gases can be disposed of from small laboratory compressed gas cylinders.

A search for data on fire and toxic hazards of chemicals to be used by the new process group is under way with some progress being made to date. Information available on the Works is inadequate.

Construction of a new building has been started in the 300 Area with a number of new employes working there and in one or two cases these men did not have proper safety equipment before coming to the area. This was pointed out to the foreman at the time and this should be stressed with all new personnel and foremen to ascertain that gloves, goggles, hard hats, safety shoes, etc. are supplied to them when leaving Richland as they are not available in the area except on one day a week.

The 300 Area has completed three years without a lost time injury pending the outcome of Sub-Major Injury No. 72. There has been no program planned or any other activities started until we have been definitely assured that there is no permanent disability in this case.

Demonstration and instruction on the care and use of one-hour oxygen breathing apparatus was given to other members of the Safety Division during the month.

100-B Area

Minor Injuries	5
Sub-Major Injuries	0
Major Injuries	0
Days since last tabulatable major injury	819
Days since last Sub-Major Injury	353
Days without a minor injury	27
Safety Meetings conducted	12
Number in attendance	88
Safety suggestions received	0
Safety spectacles delivered	0
Safety spectacles serviced	2

A demonstration of the oxygen breathing apparatus was given to members of the Power Department in the 183 Building.

100-D Area

Minor Injuries	25
Sub-Major Injuries	0
Major Injuries	0
Days since last tabulatable major injury	523
Days since last sub-major injury	140
Days without a minor injury	17
Safety Meetings conducted	21
Number in attendance	290
Safety suggestions received	13
Safety spectacles delivered	8
Safety spectacles serviced	3

Service Department

100-F Area

Minor Injuries	20
Sub-Major Injuries	0
Major Injuries	0
Days since last tabulatable major injury	616
Days since last sub-major injury	39
Days without a minor injury	17
Safety Meetings conducted	39
Number in attendance	571
Safety suggestions received	29
Safety spectacles delivered	1
Safety spectacles serviced	1

200-E Area

Minor Injuries	37
Sub-Major Injuries	1
Major Injuries	0
Days since last tabulatable major injury	77
Days since last sub-major injury	5
Days without a minor injury	11
Safety Meetings conducted	42
Number in attendance	458
Safety suggestions received	18
Safety spectacles delivered	8
Safety spectacles serviced	25

Safety sign board was erected just north of area badge house. This board shows painted slogans and is to be changed about every six months.

200-W Area

Minor Injuries	51
Sub-Major Injuries	1
Major Injuries	0
Days since last tabulatable major injury	354
Days since last sub-major injury	20
Days without a minor injury	4
Safety Meetings conducted	66
Number in attendance	582
Safety suggestions received	15
Safety spectacles delivered	9
Safety spectacles serviced	35

700-1100 Areas

Minor Injuries	75
Sub-Major Injuries	1
Major Injuries	0
Days since last tabulatable major injury	151
Days since last sub-major injury	22
Days without a minor injury	6
Safety Meetings conducted	179
Number in attendance	3,938
Safety suggestions received	6
Safety spectacles delivered	10
Safety spectacles serviced	5

Plant Activities

A recommendation was made to the 100 Areas asking them to have their traffic control signs made standard.

The question of the short cut road between 100-D and 100-F areas was brought up. Transportation Department reported that it would be closed.

Increased parking facilities were recommended for employes working in the W-4 Building.

Recommended a fire detector system be installed in W-4 Building.

It has been arranged to publish in the "Lifeline" a short history of each near serious accident.

A survey has been made of the slippery condition of floors and steps in the 700 and 1100 Areas. A list of locations where a non-slip tread might be used is being prepared.

The Minor Construction Group has been placed on the Safety Division mailing list, in line with expansion in their department for the purpose of distributing to them as quickly as possible pertinent educational bulletin material. Their projects are being followed by the Safety Engineer.

Safety material for stunts and skits is being earmarked for use with the Maintenance Department safety derby.

Arrangements have been made with Binyon Optical Company in the Village for taking charge of prescriptions of safety spectacles for plant employes as noted in Safety Bulletin No. 5, revised October 23, 1946.

Following lectures were delivered during month at the Safety Educational Meeting:

1. First Aid treatment in regard to Bleeding.
2. First Aid Treatment in regard to Artificial Respiration.
3. Practical Demonstration in use of Chemox Oxygen Breathing type Gas Mask.

Four near serious accidents were investigated during the month and recommendations have been made to prevent recurrence.

Fire Protection

Fires

	Number of Fires		Estimated Damage	
	Nov.	Dec.	Nov.	Dec.
Village	10	10	$36.00	$25.50
Plant	4	2	-	-
Miscellaneous	-	1	-	-
Totals	14	13	$36.00	$25.50

No fires from uninsulated air ducts since dampers have been removed from room registers. Two damaging fires occurred from this cause during October.

Only one actual fire occurred during the Christmas season. The damage was slight.

Considerable difficulty was experienced in having the Christmas evergreens flame-proofed except one vendor. A more satisfactory setup is being considered for next year.

Special items on Safety and Fire Prevention were published in the "Villager" and "Lifeline" during this month.

18 new Chemox self-generating oxygen masks were ordered to be used in lieu of the present oxygen breathing apparatus. This change was made to insure ease and simplicity of use for the average employe.

An improvement was noted in the fire exit drills in the schools.

All civic, school and church groups cooperated in eliminating hazardous conditions during the holidays.

Additional first aid fire appliances are being secured to protect recently assigned Government motor equipment and contemplated new construction.

The fire prevention inspection of the homes this month consisted of posting "How to Operate Furnace" instruction cards in the basement of all conventional type homes and special inspection of the cold air return ducts in the conventional type houses.

An inspection of all buildings and hose houses was conducted in the plant areas, also commercial and public buildings in the Village of Richland.

Fire Extinguishers and Gas Masks

Inspected	2,270
Installed and relocated	42
Refilled	268
Repaired	4
Gas Masks	6

Fire Drills and Lectures

Outside	56
House Drills	133
Auxiliary Brigade	29
Safety Meetings	46

Safety & Fire Protection Force Breakdown

	100-B	100-D	100-F	200-E	200-W	300	Plant General	700-1100	Total
Supervisors	4	-	-	-	-	5	6	22	37
Inspectors	4	4	4	4	4		1	1	22
Firemen	13	-	-	-	-	12	-	52	77
Totals	21	4	4	4	4	17	7	75	136

GENERAL DIVISION

Laundering volumes were as follows:

Plant Laundry (Bldg. 2723)	November	December
Coveralls - Pieces	12,847	13,484
Towels - "	3,681	3,664
Miscellaneous "	21,619	23,756
Total Pieces	38,147	40,904
Total Dry Weight - Lbs.	55,880	60,325
700 Area Laundry (Bldg. 723)		
Flatwork - Pieces	27,544	34,814
Rough Dry - "	17,940	20,532
Finished - "	1,897	2,548
Total Pieces	47,381	57,894
Total Dry Weight - Lbs.	27,007	33,000

Effective in December, laundry service was provided for the Military Police Detachment Barracks. (Kitchen and bed linens) This additional work accounts for the increase in number of pieces and number of pounds for December over November.

General Division Force Breakdown

	100-B	100-D	100-F	200-E	200-W	300	Plant General	700-1100	Total
Supervisors	-	-	-	-	1	-	2	5	8
Laundry Operators	-	-	-	-	1	-	-	1	2
Janitors	2	5	5	6	9	7	-	38	72
Others	-	-	-	-	11	-	-	9	20
Totals	2	5	5	6	22	7	2	53	102

CLASSIFIED FILE

During the month of December steps have been taken toward a general revision in the file procedures. A review has been made of all steps of the present procedure and a new procedure is being drafted to reduce the amount of work required in receiving and issuing classified material. A bi-weekly list of documents, books, periodicals, etc. added to the library is now being prepared by the Central Files unit. The first period to be covered by this list was December 1, 1946 through December 13, 1946. Work towards expanding the technical library is progressing. To date several special library services have been contacted and catalogs have been received from most publishers of technical information. These catalogs are available in the library for the use of persons interested in obtaining books.

Files were checked for two persons prior to their termination or transfer.

Following is a breakdown of the volume of work handled during December as compared with November.

	November	December
Classified Documents Received (In Mail)	352	242
Unclassified Documents Received (Total)	2,195	3,110
Classified Documents Issued	2,503	2,987
Inter-Area Transfer (Classified)	4,951	4,329
Documents Routed (Classified)	4,818	3,474
Requests - File Documents (Classified)	1,616	1,624
Requests - Technical Library	177	274

Organization and Personnel

The number of personnel employed in the group has remained the same during December. Effort has been made towards more thorough training of the present personnel so that when space is available new people may be trained more quickly. With the present increase in demand from off-site for reproduction of Hanford Documents coupled with the increase in material being received from off-site for distribution, the need for more space is becoming essential.

Classified File Force Breakdown

	300	700	Total
Supervision	1	3*	4*
(Accounting Clerical)	3	9	12**
Totals	4	12	16*

*Includes one Area Supervisor on loan from Technical Department.

**Not included in Service Department force count.

Plant Division Force Breakdown

	100-B	100-D	100-F	200-E	200-W	300	Plant General	700-1100	Total
Supervisors	4	-	-	-	1	6	8	30	49
Firemen	13	-	-	-	-	12	-	52	77
Laundry Operators	-	-	-	-	1	-	-	1	2
Inspectors	4	4	4	4	4	-	1	1	22
Janitors	2	5	5	6	9	7	-	38	72
Others	-	-	-	-	11	-	-	9	20
Totals	23	9	9	10	26	25	9	131	242

Monthly	49
Weekly	193
Total	242

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MONTHLY INJURY ANALYSIS

Period - December 1 through December 31, 1946

Minor Injuries

	Misc. Burns	Abrasions	Contusions	Lacerations	Punctures	Splinters	Strains & Sprains	Foreign Body	Unclassified	TOTAL	
										December	Last Month
Production P	12	4	4	2	0	0	1	2	0	25	23
Production S	3	5	1	4	1	1	1	0	0	16	26
Technical	4	2	1	4	3	0	0	0	0	14	16
Power	1	1	1	1	0	1	2	2	3	12	6
Maintenance	12	17	12	23	3	3	4	2	13	89	69
Electrical	0	8	0	4	1	0	1	0	0	14	16
Instrument	3	5	0	8	0	0	0	0	0	16	10
Service	0	3	1	3	0	2	1	1	0	11	15
Transportation	0	8	1	8	1	0	1	1	1	21	14
Medical	2	7	2	10	2	2	2	0	0	27	16
Accounting	0	4	1	5	0	0	0	0	0	10	13
TOTAL	37	64	24	72	11	9	13	8	17	255	[redacted]

PROTECTION

GENERAL

A temporary vehicle gate was installed in the 100-F Area fence line approximately 100 yards east of the pump house. Sentry Tower No. 6 was moved to this location to serve as a gate house and will be manned from 8:00 A.M. to 4:00 P.M. Monday thru Friday.

PATROL

Ten special duty escorts were handled.

The 200-East and 200-West Areas handled 352 special escorts within the 200 Areas.

Requests handled totalled 877, mainly consisting of opening doors and gates for employees of other departments.

A total of 220 unusual incident reports was received, which consisted mainly of unlocked and open doors, windows and files, and traffic violations.

Nine employees were given emergency first aid treatment in area by patrol supervision during periods when doctors or nurses were not in the area.

Practice evacuations were held in the 100-B Area on December 11, 100-D Area on December 20, 100-F Area on December 19, 200-East Area on December 13 and December 14, and in the 200-West Area on December 20 and December 21.

Training

Advanced training at the Patrol Small Arms Range was continued, and qualifications in Army "L" course firing were as follows:

	November		December	
	No.	Percent	No.	Percent
Unqualified	33	9	32	8
Marksman	111	29	107	27
Sharpshooter	89	23	88	23
Expert	151	39	162	42
Totals	384	100	389	100

Upon completion of area competition for this period, awards were presented as follows:

High Team Average	273-3/5	200-East
High Area Average	248-43/55	Richland
High Individual Score	290	100-B

Service Department

Qualifications in the F. B. I. Course firing were as follows:

	November		December	
	No.	Percent	No.	Percent
Unqualified	29	50	55	47
Marksman	14	24	27	23
Sharpshooter	13	23	29	25
Expert	2	3	6	5
Totals	58	100	117	100

The Sub-Machine Course was not fired during the month of December.

Health talks were given on "Winter Room Temperature".

Richland Area

	November	December
Check on absentees	2	3
*Persons assisted	226	246
Doors and windows found open in commercial facilities	46	54
Lost children found	6	4
Ambulance runs	27	35
Lost dogs reported	4	6
Dog and cat complaints	26	40
Persons injured by dogs	9	5
Totals	346	393

*Includes: Escorts from Cashier Office and Bus Terminal to Bank; persons admitted to residence; transportation for nurses and technicians to Hospital on special night calls; delivery of messages to residents who have no telephone; and opening Trailer Parking Lot for individuals.

Traffic and Offense Statistics

These are presented in separate tables at the end of this departmental report. A comparison of Richland Offense Statistics with outside averages also is presented.

SECURITY

Security Education

Security Bulletin No. 3, entitled "Responsibility" was issued under the date of December 11, 1946. This bulletin discusses atomic publicity.

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Service Department

Security Bulletin No. 4, entitled "Plant Protection" was issued under the date of December 31, 1946. This bulletin covers the activity of the Patrol Section and the need for challenging a stranger's presence in a restricted area.

A total of 211 Security Meetings was held and attended by 3,377 employees throughout the entire plant and administration areas during the period of December 1, 1946, to December 31, 1946, inclusive.

The following is a statistical summary of persons cleared for classified information:

	November	December
Employees	87	168
Visitors	0	1
Authorization cards issued	12	124

Protection of Plant Facilities

A statistical summary of outstanding area badges is shown below (A, B and C denote type of clearance).

November

Area	A	B	C	Total
100-B	384	681	389	1454
100-D	647	595	410	1652
100-F	590	542	403	1535
200-E	743	720	349	1812*
200-W	776	782	355	1913
200-N	64	479	160	703
300	648	596	215	1459

* Includes 19 "A" badges at Riverland Yards.

December

Area	A	B	C	Total
100-B	370	719	393	1482
100-D	639	630	412	1681
100-F	578	575	408	1561
200-E	753	741	355	1849*
200-W	777	815	372	1964
200-N	72	533	130	735
300	706	628	213	1547

* Includes 20 "A" badges at Riverland Yards.

Temporary Badges

Area	Temporary Access Nov.	Dec.
100-B	7	9
100-D	14	12
100-F	12	20
200-E	10	15
200-W	12	15
200-N	1	11
300	24	25
Total	80	107

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Service Department

Plant Visitors

Name - Organization	Purpose of Visit	Access to Areas Classified	Access to Areas Unclassified
Schenectady Office Personnel			
H. W. Paige General Electric Company Schenectady, New York	Inspection of Installations	X	
D. C. Prince General Electric Company Schenectady, New York	Inspection and Consultation	X	
L. L. Wyman General Electric Company Schenectady, New York	Metallurgy and Security	X	
Other General Electric Personnel			
G. M. Clifton General Electric Company Seattle, Washington	Consultation		X
Allied Project Personnel			
A. Dahl Manhattan District Office Oak Ridge, Tennessee	Consultation		X
Outside Service Personnel			
J. M. Gorrell International Business Machines Spokane, Washington	Consultation		X
G. A. Griffin Morrison-Knudsen Company Benton City, Washington	Inspection	X	
H. S. Jennings Minneapolis - Honeywell Co. Seattle, Washington	Consultation		X
A. Jensen Jensen - Byrd Company Spokane, Washington	Company Business		X
J. W. Martin Central Sand & Gravel Co. Pasco, Washington	Company Business		X

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Service Department

Name - Organization	Purpose of Visit	Access to Areas Classified	Access to Areas Unclassified
Outside Service Personnel (Cont.)			
S. J. Nessel Midstate Amusement Company Walla Walla, Washington	Company Business		X
H. T. Newton Morrison-Knudsen Company Benton City, Washington	Inspection	X	
B. Saad Shoe Salon Spokane, Washington	Company Business		X
C. A. Smith Morrison-Knudsen Company Benton City, Washington	Inspection	X	
R. H. Wilson Westinghouse Company Spokane, Washington	X-Ray Consultation	X	
W. M. Wilson Westinghouse Company Spokane, Washington	X-Ray Consultation	X	

Protection Division Force Breakdown

	100-B	100-D	100-F	200-E	200-W	300	Plant General	700-1100	Total
Supervisors	5	7	5	9	6	6	2	31	71
Patrolmen	23	52	51	84	72	28	8	55	373
Others	-	-	-	-	-	-	-	4	4
Totals	28	59	56	93	78	34	10	90	448

PATROL DIVISION - RICHLAND OFFENSES

Classification of Offenses	Offenses Known or Reported to Patrol	Offenses Unfounded	Actual Offenses Nov.	Actual Offenses Dec.	Offenses Cleared By Arrest	Offenses Cleared By Other Action	Perpetrators Involved
Assault	0	0	2	0	0	0	0
Attempted Suicide	0	0	2	0	0	0	0
Burglary-Breaking and/or Entering	2	0	8	2 (a)	1	0	5
Larceny-Theft (except auto & bike):							
(a) - $50.00 and over value	2	1	0	1	0	0	(u)
(b) - Under $50.00 value	13	1	8	12 (b)	1	3	4
Auto Theft	2	0	1	2 (c)	3	0	2
Bicycle Theft	6	0	5	6 (d)	0	1	1
Destruction of Government Property	2	0	3	2 (e)	0	1	1
Destruction of Personal Property	5	0	1	5	0	0	(u)
Disorderly Conduct	3	0	0	3	1	0	1
Drunkenness	2	0	5	2	2	0	2
Missing Persons	0	0	1	0	0	0	0
Offenses against family & children	0	0	3	0	0	0	0
Prowlers	1	0	0	1	0	0	(u)
Rape	0	0	0	0	0	0	0
Sex Offenses	1	0	1	1	0	0	(u)
Vagrancy	0	0	0	0	0	0	0
Violation State Game Laws	0	0	0	0	0	0	0
Miscellaneous	1	0	1	1	0	0	(u)
Juveniles (other than reported above)							
Disorderly Conduct	5	0	7	5 (f)	0	5	17
	45	2	48	43	8	10	33

(a) - One of the offenses was perpetrated by three juveniles, of ages 12, 14 and 15 years.
(b) - Four of the offenses were perpetrated by three juveniles, of ages 11, 15 and 17 years. Juvenile of age 17 was the perpetrator in two of the offenses.
(c) - Three offenses were perpetrated by two juveniles, of ages 17 years.
(d) - One of the offenses was perpetrated by one juvenile, of age 11 years(same juvenile as age 11 cleared in (b).
(e) - One of the offenses was perpetrated by one juvenile, of age 8 years.
(f) - The five offenses were perpetrated by seventeen juveniles, of ages 5, 11 through 14 and 16 through 20 years.
(u) - Represents "unknown."

Value of property recovered for the month of December was $2,878.00 (includes four autos and seven bicycles).

PATROL DIVISION - TRAFFIC CONTROL STATISTICS

Motor Vehicle Accidents

	Total Number		Fatalities		Major Injuries		Minor Injuries	
	Nov.	Dec.	Nov.	Dec.	Nov.	Dec.	Nov.	Dec.
Plant	4	3	0	0	1	0	5	0
Richland	12	13	0	0	0	0	7	2
Totals	16	16	0	0	1	0	12	2

Accident Causes

	Negligent Driving		Failure to Yield Right-of-Way		Reckless & Drunken Driving		Miscellaneous Causes	
	Nov.	Dec.	Nov.	Dec.	Nov.	Dec.	Nov.	Dec.
Plant	3	3	0	0	0	0	2	1
Richland	7	6	2	5	1	1	3	3
Totals	10	9	2	5	1	1	5	4

Plant Warning Traffic Tickets Issued

	Speeding		"Stop" Sign		Parking		Improper License		Defective Equip.		Totals	
	Nov.	Dec.	Nov.	Dec.	Nov.	Dec.	Nov.	Dec.	Nov.	Dec.	Nov.	Dec.
Plant	2	4	0	0	0	0	0	0	5	4	7	8
Richland	18	21	9	18	181	122	3	3	51	72	262	236
Totals	20	25	9	18	181	122	3	3	56	76	269	244

Court Citation Traffic Tickets Issued

	Speeding		"Stop" Sign		Drunken Driving		Reckless Driving		Negligent Dr.		Other Violations		Totals	
	Nov.	Dec.	Nov.	Dec.	Nov.	Dec.	Nov.	Dec.	Nov.	Dec.	Nov.	Dec.	Nov.	Dec.
Plant	1	3	0	0	0	0	0	0	1	0	1	1	3	4
Richland	6	11	7	10	3	2	1	1	5	6	6	4	28	34
Totals	7	14	7	10	3	2	1	1	6	6	7	5	31	38

Traffic Volume

	November	December
Richland - Downtown Street (average car count - 24 hour period).....	9,231	10,944

PATROL DIVISION - COMPARISON CHART OF RICHLAND OFFENSES

Number of offenses known to Police per 10,000 inhabitants, in cities between 10,000 and 25,000 inhabitants:

	Wash., Oregon & Calif.		Richland		
Classification	Six Months (Jan.-June 1946)	One Month Average	Six Months (Jan.-June 1946)	Nov.	Dec.
Murder	.198	.033	0	0	0
Robbery	3.87	.645	0	0	0
Aggravated Assault	1.85	.308	0.66	1.33	0
Burglary	31.14	5.19	2.65	5.33	1.33
Larceny	131.31	21.89	40.98	8.66	12.66
Auto Theft	27.75	4.63	7.99	0.66	1.33

Number of offenses known to Police, per 10,000 inhabitants, regardless of whether offenses occurred in cities or rural districts:

	State of Washington		Richland		
Classification	Six Months (Jan.-June 1946)	One Month Average	Six Months (Jan.-June 1946)	Nov.	Dec.
Murder	.225	.038	0	0	0
Robbery	6.15	1.03	0	0	0
Aggravated Assault	1.41	.234	0.66	1.33	0
Burglary	35.59	5.93	2.65	5.33	1.33
Larceny	92.01	15.34	40.98	8.66	12.66
Auto Theft	34.89	5.82	7.99	0.66	1.33

The portion of offenses committed by persons under the age of 25 years, is shown by the following figures:

		Richland		
Classification	National Average (Jan.-June 1946)	Six Months (Jan.-June 1946)	Nov.	Dec.
Robbery	55.6	0	0	0
Burglary	62.2	25%	50%	50%
Larceny	47.0	25%	7.69%	26%
Auto Theft	76.8	40%	0	100%

Note: Statistics of juvenile offenses throughout the United States were taken from the Uniform Crime Report published by the Federal Bureau of Investigation, which states: "It should be remembered that the number of arrest records is doubtless incomplete in the lower groups because of the practice of some jurisdictions not to fingerprint youthful offenders."

In Richland every delinquent juvenile is entered in the records.

VILLAGE

GENERAL

Housing Crisis

The most significant development in the village during the month of December was the increasing acuteness in the housing situation. At the end of the month all but three houses were occupied or assigned for occupancy and 37 heads of families were on the waiting list. Details of this situation are set forth below in the sub-section on Housing.

Village Memoranda

Three new Village Memoranda were issued. Number 58 dealt with the necessity of acquiring correctly fire proofed Christmas trees. Number 59 set forth the regulations applicable to solicitors, peddlers and commercial agents. Number 60 clarified the questions as to which types of house alterations and additions to village dwellings by the tenants are permitted and which are prohibited. Village Memorandum Number 23 dealing with the conduct of business in village dwellings was reissued in revised form December 2, 1946.

Surveys and Recommendations

The Village Organization submitted detailed recommendations with respect to housing requirements and on the additional commercial facilities most urgently needed in the village. A survey was started to review the entire residential rental structure due to necessity for establishing rental rates for the new types of housing, namely the dormitory apartments and the hutment apartments, as well as adjusting rentals of prefabricated dwellings to provide for occupancy on an unfurnished basis.

Village Population

The total population as of December 31 was 13,816, an increase of 219 over the population as of November 30, 1946. Population groups are as follows:

Females over 18	4,395
Males over 18	4,219
Total	8,614
Children under 18	5,202
TOTAL POPULATION	13,816

Village Improvements

Work has been started on the conversion of Dormitory W-13 to ten light housekeeping units, each containing living room, dining alcove, one bedroom, bath and kitchen. This conversion is scheduled to be completed by the end of March. The experience developed in the operation of this new type unit will serve as a basis for decision on the remaining residential dormitories.

The limitations set out in Village Memorandum Number 52, issued November 18, with respect to unsightly outbuildings and the necessity for their removal have been implemented by the serving of notice on six tenants that their leases will be cancelled as of January 31, 1947, if undesirable structures in their yards are not removed by January 15, 1947.

The Dust Control Committee, previously termed the Landscape Committee, in a series of meetings in December, laid down the basic policies for its long range program. Project requests for the program have been submitted for approval, embodying plans for establishing windbreaks, planting of vacant areas, utilization of present nursery stock on village approaches and public areas and establishment of a new nursery. The Committee is working closely with the Engineering section with respect to planning on irrigation.

ORGANIZATION AND PERSONNEL

There was no change during December in the organization or personnel in the Village Organization.

Force Breakdown

Village Organization, 700-1100 Areas only:

Supervisors	10
Matrons	4

DIVISIONAL ACTIVITIES

Housing

Following is a report of the housing utilization as of December 31, 1946:

	Conventional	Prefab	Tract	Total
Houses occupied by family groups				
Operations	2157	1036	28	3221
Facilities	113	96	4	213
Government	176	118	25	319
Total Occupied Houses	2446	1250	*57	3753

* Occupancy figure includes 4 houses occupied by Bonneville Power in Priest Rapids and White Bluffs. The unoccupied figure includes some houses which are untenable.

Service Department

	Conventional	Prefab	Tract	Total
Houses utilized for special purposes	3	0	1	4
Houses Assigned - (leases written)	6	12	-	18
Houses Assigned - (awaiting tenants' move	42	69	1	112
Government Houses - Unassigned	-	-	**49	49
Government Houses Unassigned - Vacant	3	-	-	3
Operations Houses to be released by moves	(1)	(5)	(-)	(6)
TOTAL HOUSES	2500	1330	108	3938

** Government Property offering 14 Tract Houses for sale as salvage.

Housing Turnover During Month	Begin Month	Moved In	Moved Out	Month End	Difference
Conventional Type	2409	73	36	2446	Plus 37
Prefabricated	1214	93	57	1250	Plus 36
Tract	56	1	-	57	Plus 1
TOTALS	3679	167	93	3753	Plus 74

Due to the desire on the part of residents of prefabricated houses to use and acquire personal furniture, permission has been given to dispense with project owned furniture, when desired. The rental study referred to above will include recommendations on the new rental rate to apply to unfurnished prefabricated houses.

Work orders have been written to furnish an additional electric outlet in the basements of all "L" type houses, and to provide an additional light at the head of the basement stairs.

Dormitory Experience

Following is the Dormitory Statistics report for the month of December 1946:

Dormitories		Occupants	Vacancies	Total Beds
Men - Occupied	5	160	35	195
Men - Unoccupied	3	0	117	117
Women - Occupied	5	158	32	190
Women - Unoccupied	5	0	214	214

Women's Dormitories
Occupied by:

Community Organizations	3
Medical Department	1
Government Offices	1
G. E. Offices	1
Education	1
TOTAL DORMITORIES	*25

* Possible occupancy 18 dormitories: 8 men's; 10 women's.

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Future Housing Requirements

In order to provide for some alleviation of the housing situation within the near future, authorization has been obtained for the moving of 25 hutments from the Pasco Naval Air Stations. Planned to be placed on existing prefab sites in the south end of the village, these hutments will accommodate 50 families providing individual units with living room, dining room, two bedrooms, kitchenette and bath.

The study of the feasibility of renovating and moving into the village area certain outlying tract houses is still under way. Three tract houses located within the village are currently in process of renovation for use as permanent dwellings.

Tenant Service and Village Maintenance

Following is the experience on the processing of Work Orders during the month of December:

	Incomplete December 1	Issued During December	Incomplete January 1
Patrol Orders	1234	2908	1030
Work Orders	967	707	939

Tabulation of house renovations by types, for the month, is as follows:

Tract	A	B	D	E	F	G	H	L	Prefab	Total
0	4	9	0	0	5	0	4	0	42	64

During the month, project forces painted the interiors of 85 prefabricated houses and of one conventional type dwelling. Considerable interest has been shown by residents who desire to paint the interiors of their own dwellings and, since the third of December, 2070 gallons of Kemtone and 420 gallons of enamel paint have been issued.

COMMERCIAL FACILITIES

The following figures indicate trends in commercial activity as related to various basic items:

	November	December
Cafeteria Meal Customers	35,364	36,452
Percent of room-day occupancy Transient Quarters	86.00%	83.30%
Gallons of ice cream sold	3,013	4,716
Gallons of milk and cream sold	48,217	48,896
Theater customer count	43,904	51,978
Cases of soft drinks sold	4,476	4,221

	October	November
Gallons of gasoline sold	104,631	105,994

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Service Department

At the operators' expense, certain improvements were made in the premises of the commercial facilities. A doughnut machine was installed in the cafeteria; the sales area of the Shoe Repair Shop was revised to provide more display space and metal bicycle racks were installed at both theaters.

At project expense, salad displays and cabinets at the Cafeteria were in process of alteration to provide more effective refrigeration.

A project for revision of the equipment footings in the water softening room at the Commercial Laundry has been requested.

A meeting was held, December 13, 1946, with representatives of the Midstate Amusement Company to discuss future bookings and, in general, to review present operations.

The proposed rates to be charged by Dr. J. L. Frederickson, Veterinarian, were approved by the Area Engineer. The proposed rates previously had been checked with rates currently in effect throughout the region and had been found comparable.

A comparative check of restaurant prices in Richland, Kennewick, and Pasco was made during the month. Richland prices were found to be in line with those existing in the two adjacent communities.

Local food stores arranged with outside suppliers for fire proofed Christmas trees for sale to village residents in accordance with local regulations.

Organization Changes

Cleo Greuninger replaced B. D. Dabling as manager of the Richland Supply Company (hardware store).

V. W. Bybee replaced M. D. Fitzgerald as manager of the Richland Shoe Salon.

CONTRACTS AND NEGOTIATIONS

Recommendation was made to the Area Engineer that Max R. Walton, Operator of the State and County License Agency, be permitted to establish and operate a sales agency for Inland Airways, Inc. in order to promote and sell air transportation for that concern.

The contract of the Bus Depot is being amended to provide that the flat monthly rental of $90 be waived for the period of September through December 1946.

The operating contract of the Riding Academy is being amended to include use of the north 400 feet of Tract L-941, which will be used as a riding ring.

At the Government's request, the lease of the Civil Air Patrol for Tract House 0-1256 and adjacent tracts was amended to provide for a change of the rental provision to include rental on the use of land and buildings, utilities furnished, and equipment and furniture.

Inventory and Property

Annual inventory of the Transient Quarters and Cafeteria was completed during the month and a schedule was established to provide for an inventory of each facility during 1947. Work was continued on preparation and execution of inventories of commercial facilities and community organizations. As of the present, all facilities and organizations have executed property inventories except Teen Age Club, Village Players, Schools, and U. S. Engineers Club.

Requests for Establishment of Businesses in Village

An increasing number of individuals expressed a desire, during the month, to establish and operate businesses in the village. The interest manifested in this connection and the types of establishements desired are shown in the following list:

- Musical Instrument sales
- Candle sales
- Fuller brush sales
- Insurance
- Watch repair
- Chiropractic service
- Pick-up and delivery service
- Bible Sales
- Optical sales
- Shoe sales
- Sewing and alteration service
- Furniture sales
- Printing shop
- Florist shop
- Automotive repair shop
- Bakery
- Lunchroom
- Lapidary work
- Upholstery shop
- Radio repair

These individuals were told that their requests would be studied and that they would be informed when and if it was decided that their type of business would be established in the village.

Letters are being sent to residents of the village who have registered for the purpose of conducting a part-time business in their homes, requesting that they submit a statement outlining in detail the type of business which they are now conducting, services offered, and methods of operation, for review to determine if the business operation is in accordance with village regulations.

Written permission, instead of verbal permission, is now being given residents of the village to conduct part-time businesses or offer sales or services in their homes, if the activities are in accordance with village regulations. Written permission is also being granted individuals living outside the village of Richland and representing either themselves or a firm, who offer sales or services to tenants on an appointment basis only.

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COMMUNITY FACILITIES

Churches

Special pre-Christmas and Christmas Day services were conducted by the thirteen established churches.

Schools

The enrollment for School District No. 400 on December 27, 1946, is as follows:

Sacajawea Grade School	921	
Lewis & Clark Grade School	756	
Marcus Whitman Grade School	645	
Jefferson Grade School	335	
Total all Grade Schools		2657
Columbia High School		671
Nursery Schools		87
Total all Schools		3415

On December 27, 1946, the enrollment, not including the Nursery and Extended Day Care Schools, was 3328. This was an increase of 23 over the enrollment for the fall term as of September 3, 1946, and an increase during the month of 7 pupils.

On December 27, 1946, there were 73 children enrolled in the Richland Nursery School with an average attendance of 56. This is a decrease of six children during the month. On this day there were 14 children enrolled in the Extended Day Care program of the Nursery with an average attendance for the month of 11; a decrease of one child since the last month's report.

One additional hutment was authorized for erection at the Marcus Whitman Grade School to provide a classroom for an additional third grade. The two hutments at Lewis & Clark Grade School and one each at Sacajawea and Jefferson Grade Schools were completed December 4, 1946. This makes a total of sixteen classroom hutments completed and one under construction.

School Christmas holidays were observed from December 23 to 27.

During the month Columbia High School of Richland was approved as a member of the Northwest Association of High Schools. Such approval and subsequent listing gives nation-wide information to other high schools, colleges and universities regarding the type of school and curriculum of the Richland high school. This is of considerable assistance to pupils transferring from Richland to other communities.

Guidance and policy conferences were attended by the Superintendent, Supervisors and Principals during the month. These were held in Spokane and Seattle. The Chairman of the School Board also attended.

Other Community Activities

Distribution of 1946 Christmas Tuberculosis Seals was made by the local Boy Scout troops as representatives of the county organization.

An estimated 3,500 pounds of clothing and canned goods was collected in the "Christmas for Tiel" campaign. Shipping charges and toys were paid by donations from established Richland organizations.

The Junior Chamber of Commerce coordinated the various holiday activities and provided Christmas decorations for the business section. Activities included a turkey shoot (Sacajawea Rifle and Pistol Club), presentation of the Messiah (Richland Choral Society), school pageants, church worship services and socials, home lighting contest (Kiwanis), caroling, Kiddies Christmas parties (Junior Chamber of Commerce and Co-Ordinate Club), hospital patients gifts (Legion, Kiwanis, Camp Fire Girls, and Junior Chamber of Commerce), and the "Cross in the Sky" (Civil Air Patrol).

As a result of the successful Community Chest Campaign for 1947 operating funds, the balance on hand from the 1945 campaign was distributed as bonuses. The Youth Council and the Girl Scouts had previously been granted an additional $600 each. The Boy Scouts were given $295.35 and the Camp Fire Girls were given $196.91 in addition to their original 1946 budget request.

Facilities Personnel

The number of full-time paid personnel employed by village commercial and community facilities and organizations as of December 31, 1946, is listed as follows:

Commercial facilities	649
Churches	14
Schools	196
Community Organizations	16
Total	875

Major activities during the month included:

Dec. 2	Nuclear Energy School Dedication	Dormitory W-10
Dec. 2	Birthday of Nuclear Chain Reaction-J.C.Dinner	Recreation Hall
Dec. 4	Treble Clef Concert	Col. High School
Dec. 6	Richland-Riverview Basketball Game	Col. High School
Dec. 9	Boy Scout Roundup	Lewis & Clark School

[redacted]

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Service Department

Dec. 11	Community Forum (Kiwanis)	Columbia High School
Dec. 13	Thespians "Ever Since Eve" play	Columbia High School
Dec. 14	Richland-Toppenish Basketball Game	Columbia High School
Dec. 18	Messiah (Choral Society)	Columbia High School
Dec. 19	Christmas programs	All schools
Dec. 26	Jaycee Basketball League	Col. High and Lewis & Clark Gr. Schools
Dec. 27	Teen-Age Dance	Marcus Whitman Grade School
Dec. 29	Home Decoration Contest (Kiwanis Club)	Richland Village

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VILLAGE ENGINEERING

DECEMBER 1946

GENERAL

Correlation between work requests and the performance of such work for items of an unusual nature in the Village comprised the main function of the Village Engineer during the month. These contacts were carried on between the Village Organization (Service Department) and the various Works Engineering Departments.

ORGANIZATION AND PERSONNEL

At the present writing, the Village Engineer is the only person assigned to this work.

PERFORMANCE

Inspection trip made to prefabricated sites to inspect method of painting interiors. Agreement was reached with Maintenance representative and Village Organization representative to continue interior prefabricated painting in casein paint.

Work order issued for general aligning and painting of traffic warning posts throughout the Village.

Inspected proposed shower location in basement of Barber Shop - made recommendation that location be changed due to proximity of electrical outlets. Revised estimate now being prepared.

Made recommendation in writing to the Assistant Superintendent-Village that he request a study on humidification of Village houses, regardless of the system of heating contemplated.

A meeting of the Dust Control Committee was held on December 10, at which time the general planting program study prepared by the Engineering Section was reviewed and recommended for publication. A report of this meeting was forwarded to members of the Village Council.

Made inspection trip to Pasco with representatives of the Maintenance Department to look at tropical hutments which are to be moved to the Village. Made recommendation on size of hot water heaters required.

Inspected house at 915 Snow where a serious fire had occurred several months before, to determine reason for stalemate in the renovation of the house. It was revealed that failure to obtain the necessary clearances for the "no value" furniture in the house had resulted in making it impossible for the Maintenance forces to do their work. The furniture was declared of no value and removed from the house within two days after visit. Work is now progressing on the rehabilitation.

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Village Engineering

Made inspection with Area Maintenance Engineer and issued necessary work orders relative to mechanical equipment repair in the following locations: Hardware Store, Western Union, Shoe Salon, Shoe Repair Shop.

Made inspection of typical interior re-painting of a Village duplex house and found it very satisfactory. Recommendation made to Maintenance Department that woodwork be finished either in varnish or enamel, depending upon the choice indicated by the tenant. The Village Organization will indicate which is to be used when the Patrol Order goes to the Maintenance Department.

Reviewed the Paint Standards Study prepared by the Engineering Section with W. A. Jeffrey of Purchasing, and concurred with him that if put into force, the recommendations included in the Study would materially benefit our paint procurement picture. Suggested one change in the procedure, which was accepted.

Conducted a high-spot study on the replacement of hot water heaters and elements, and reported to Works Engineer on same. Detailed study by Electrical Department will follow.

Reviewed tract house study by the Engineering Section, which is in the process of completion, and made certain minor recommendations.

At the request of the Assistant Superintendent - Village, inspected the pathways leading through the women's dormitory area, and with the Road Engineer of the Transportation Department determined what work is necessary to make roads instead of paths in this area. Estimate has been forwarded to the Village Office.

Made a high-spot study of necessary revisions to the "E" type house kitchens in order to make it possible for regulation size electric ranges to be used. Passed on these recommendations to the Engineering Section for further study.

Special meeting of the Dust Control Committee was held on December 23 to review the irrigation plans now being prepared by the Engineering Section. Preliminary planting plans for the south approach to the Village were reviewed and approved at this time.

Made field trip with Design and Construction Superintendent and two members of his organization, along with the Assistant Superintendent-Village, in order to pass on certain information relating to the future construction program.

TRANSPORTATION DEPARTMENT

DECEMBER 1946

GENERAL

The scheduling of 1947 vacations for employees in the department was started December 11, 1946.

The departmental absentee percentage for the month of December (Period 11-24-46 to week ending 12-22-46) is 1.70%. There were 11,160 man days worked and 190 man days absence. The departmental percentage from January 1, 1946 (Period 1-1-46 to week ending 12-22-46) is 1.82%. There were 134,320 man days worked and 2,447 man days absence. The plant average is 2.18%. The departmental percentage was under the plant average for 40 weeks and over for 10 weeks. The low week percentage for the period is 0.71% and high is 4.04%.

It may be assumed that departmental functions continued on a normal basis except as otherwise noted under sectional activities.

ORGANIZATION AND PERSONNEL

The organization as shown on the chart attached is as of January 1, 1947. Effective December 1, 1946, the Assistant Superintendent was transferred to the Design and Construction Department. An Assistant Superintendent was employed and assumed duties on December 1, 1946. Effective December 1, 1946, the General Foreman (Acting Office Engineer) was upgraded to Chief Supervisor in charge of Traffic, Equipment Control, and Scheduling. With increased activities in Equipment Control and Scheduling a Work Order Clerk of the Mechanical Section was upgraded to Equipment Inspector and assigned to the Equipment Control Section. One Clerk was reassigned to the Mechanical Section. One Labor Foreman was transferred to the Maintenance Department and a Tractor Operator was upgraded to Labor Foreman. One Bus Driver was upgraded to Shift Foreman in the Automotive Section.

Employment Requisitions were issued during the month to increase the force by six in total number of employees; new hires are Laborers, all of whom are replacing Laborers temporarily assigned to the Minor Construction Section of the Maintenance Department.

The distribution of personnel in the department by areas, and Morrison-Knudsen, sub-contractors engaged in Railroad Track Maintenance, for December is shown in table appended. Not included in this table are clerical personnel assigned from the Accounting Department; employees in this category as of December 31, 1946, numbered twenty-five.

SECTIONAL ACTIVITIES

Railway and Automotive Division

1, Railway Operations:

Railway operations continued on a normal basis and train movements were effected as scheduled.

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Effective December 2, 1946, all General Orders issued prior to this date were annulled. Effective this date the following General Orders were issued:

General Order No. 1 - Prior Orders annulled

General Order No. 2 - Railroad Rules and General Instructions, Revised 1946 Edition effective

General Order No. 3 - Bulletin Book - Signature acknowledgement by Conductors and Locomotive Operators

General Order No. 4 - Speed Restrictions in operation of plant trains

General Order No. 5 - Brake procedure in handling cars to or from an area

The following indicates the volume of railroad operation activities during the month:

Carload Movements

Project				Mohawk Wrecking Co.	
Loads In	Empties In	Loads Out	Empties Out	Empties In	Loads Out
415	10	9	404	16	18

The volume represented by these movements is best reflected by the cars handled which were 1,416 for the month, including the Intra-Plant movement of Process cars.

(Note: Effective December 1, 1946, the method of reporting cars handled was revised to show actual movement of loads and empties, and reporting of cars switched to pick up or set out loads or empties was discontinued.)

2. Automotive Operations:

The Area bus system and the Village Local bus system operated during the month as scheduled. Miscellaneous automotive operation services including (a) Motor Pools, (b) Inter-area Shuttle Service, (c) Inter-area Freight, Mail and Express Service, (d) Towing and Wrecker Service, were rendered during the month with no change.

Off-the-Plant automobile trips (Company business and official visitors) totaled 62.

Comparative figures for the Plant bus trips are:

	Average Daily Trips	
	November	December
Passenger Buses - 100 B Area	4	4
Passenger Buses - 100 D Area	8	8

Passenger Buses - 100 F Area	8	8
Passenger Buses - 200 W Area	11	11
Passenger Buses - 200 E Area	10	10
Passenger Buses - 300 Area	6	6
Inter-Area passenger service (Stretchouts)	3	3
Inter-Area express service (Panel delivery)	1	1
Inter-Area mail service (Panel delivery)	1	1

The following tabulation of total monthly passenger counts, by shifts, for all areas indicates the extent of Area bus traffic:

Shift:	No. 1	No. 2	No. 3	Total
	16,880	28,984	28,069	73,933

Significant daily averages for Village bus operation are:

	November	December
Total passengers handled, including transfers	2,314	2,457
Total bus trips	87	87
Total bus miles operated	504	504
Revenue	$114.30	$120.65

Mechanical and Labor

1. Mechanical Operations:

Maintenance and repair facilities functioned with little change.

Work Order Control System continued with no changes. Following is a Work Order Summary for the mechanical operation.

	Work on Hand November 30		Work Completed December 31		Work on Hand December 31	
Areas	No. of Orders	Estimated Man Days	No. of Orders	Estimated Man Days	No. of Orders	Estimated Man Days
Mechanical:						
100,200,300	17	168.4	4	242.7	18	171.4
Riverland	48	376.0	4	266.6	50	360.5
700 & 1100	481	2304.0	449	2335.5	439	2250.0
Totals	546	2848.4	457	2844.8	507	2781.9

The following Repair and Service Statistics for Project equipment indicate the volume of work involved in these service inspections and other shop repair orders, and the distribution of work throughout various areas:

Preventive Maintenance Inspections (December)	100 B	100 D	100 F	200 W	200 E	300	700-1100	River-land	Port. Units	M.K.	Totals
Class "A"	-	-	-	-	-	-	77	-	-	-	77
Class "B"	40	70	64	102	77	-	839	-	557	-	1749
Units Lubricated	40	70	64	102	77	-	839	-	557	-	1749
Shop Repair Orders	39	88	103	133	154	8	2656	133	-	-	3314
Gasoline (Gallons)	3175	4161	4875	7111	6372	1252	53245	-	22976	2709	105876
Kerosene (Gallons)	-	-	5	-	-	-	-	-	2333	-	2338
Diesel Fuel (Gallons)	-	-	-	5	-	-	-	6387	6349	-	12741
Antifreeze (Quarts)	65	48	19	74	106	37	814	286	228	20	1697

Distribution of fuel continued during the month without change. Bulk fuel plant statistics (in gallons) for November are shown in the following table:

	Gasoline	Diesel Fuel	Kerosene
Stock at start of month	12,431	9,320	1,558
Received during month	119,910	23,400	3,900
	132,341	32,720	5,458
Delivered to Area Stations:			
General Electric	108,560	19,606	3,279
Government	7,283	1,264	-
	115,843	20,870	3,279
Stock at end of month	16,498	11,850	2,179

Equipment performance in general was satisfactory for the month.

The following items are of interest:

a. Effective December 2, 1946, the shift schedule for Roundhouse employees was changed from a special schedule to the standard plant shift schedule.

b. The installation of flange oilers (Swanson Manufacturing Co.) was started December 24, 1946, on two Baldwin locomotives.

c. At the request of the Area Engineer, the Repairs Division installed decals on the windshield of all automotive equipment reading as follows:

"To the Driver of This Vehicle:

Section 202 of Public Law 334, 79th Congress prohibits the use of this vehicle for unofficial use or transportation of personnel from their domicile to places of employment, or to Stores, Restaurants, Theaters, etc. Penalty for violations: 30 days suspension without pay, or summary removal from office."

2. Labor Operations:

a. Areas

1) General - It may be assumed that work in the areas continued on a routine basis with nothing to report unless otherwise noted.

2) 100 D Area - To stabilize driveways and parking areas around Building 181, one hundred and twenty truck loads of cinders were placed.

3) 200 West - A small pit was excavated within confines of the burning grounds. Trench for temporary steam and water line was excavated and back-filled between the 272 West and the 284 West Buildings.

Trench for steam, water and air line was excavated and back-filled at the 272 West Building.

Installed four chamber wells at the 241 Tank Farm.

Ten cars of ballast were loaded for track maintenance.

4) 200 East - Approximately seven thousand cubic yards of earth was excavated during the month on the new 241-B waste area.

5) 300 - A pit was excavated at the burning ground.

Approximately thirty-five cubic yards of concrete was mixed and placed on extension to the 3706 Building for the Minor Construction Division.

6) Labor volume statistics are as follow:

	Dec. Totals	100 B	100 D	100 F	200 W	200 E	300	700-1100	Totals
Cars Coal Unloaded	669	0	109	106	10	9	9	58	301
Cars Other Materials Unloaded	22	0	17	15	6	8	10	4	60

Work Order Summary is as follows:

Areas	Work on Hand November 30 No. of Orders	Work on Hand November 30 Estimated Man Days	Work Completed December 31 No. of Orders	Work Completed December 31 Estimated Man Days	Work on Hand December 31 No. of Orders	Work on Hand December 31 Estimated Man Days
Labor:						
100,200,300	60	938.5	196	1764.7	61	1764.1
700 & 1100	112	1624.5	245	2726.1	98	1747.2
Totals	172	2563.0	441	4490.8	159	3511.3

b. Road and Street Maintenance

1) Outer area roads and Village streets and sidewalks were maintained and repaired in the normal manner.

2) Maintenance work, other than routine, completed during the month is as follows:

a) Graded and graveled 400 feet of 18 foot roadway and parking compound at hutments 722-S and 722-T.
b) Cleaned out the down stream channels for ferry landings at Hanford, requiring the movement of approximately 1,000 cubic yards of gravel.
c) Repaired all paved roads in the 700 Area.
d) To conform with the Village planning program to standardize "Warning" posts along Village streets, "Warning" posts were removed, reset and realigned throughout the Village as recommended.

3) Several items of new work were completed during the month and are as follows:

a) Temporary sludge beds were constructed near the Richland burning grounds to relieve the congested condition at the sewage disposal plant. The sludge in these temporary beds will be used in the soil conservation program.
b) Thirty feet of standard sidewalk was constructed parallel to the parking compound on Macomb Place.
c) Area road striping program was eighty-five percent complete at month's end.

4) Road asphalt statistics are as follows:

	MC 1	MC 3	MC 5	H.R.M.
Stock at start of month	6800	33500	9350	0
Received during month	0	0	0	0
Total dispensed during month	0	0	700	0
Stock at end of month	6800	33500	8650	0

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c. R. R. Track Maintenance - Plant Forces

1) General - It may be assumed that track maintenance in the areas continued on a routine basis with nothing to report unless otherwise noted.

2) 100 Areas - In order to release 85 pound rail for main line maintenance, six hundred feet of 100 pound rail has been moved to 100-B Area.

The railroad maintenance tool house in 100-D Area has been moved to the 108-D track to improve accessibility.

Scrap rail has been assembled and piled for loading in 100-F Area.

3) 200 Areas - Three unused road crossings were removed, one crossing renewed and one new tractor crossing constructed during the month in the 200-W Area.

d. R. R. Track Maintenance - Sub-Contractor Forces

1) Work in this section for the month was of a normal routine nature; spot surfacing, placing ballast, and gauging various main tracks. The track forces have been reduced to an average of fifty trackmen.

e. Village Services

1) Extensive work continued during the month of burning weeds and general cleanup of public areas.

2) Coal delivery was resumed on a normal delivery schedule December 20, 1946.

3) Replanting of shrubbery at the Bank, Postoffice, Hospital and Greenway was completed.

4) General overhauling and repairing of all lawn mowers for the 1947 season was started during the month.

Traffic, Equipment Control and Scheduling

1. Traffic

Traffic Division acitivites and operating procedures continued during the period on a routine basis.

The following items are of interest:

a. As a result of emergency proposal submitted to the Southern Railway System on November 7, 1946, the carriers published on short notice rate of 82 cents per cwt., effective December 6, 1946, on elemental phosphorus from Sheffield, Alabama to Charleston, South Carolina. This will result in a saving to the Project of 10 cents per cwt., or $120.00 per car.

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On November 18, 1946, car CWSX 16310 containing 120,000 pounds of elemental phosphorus was shipped by the Tennessee Valley Authority, Sheffield, Alabama to Virginia-Carolina Chemical Corporation, Charleston, South Carolina. As freight charges on this shipment were for our account the Southern Railway System was requested to file with the Interstate Commerce Commission reparation claim in the amount of $120.00.

b. Advice has been received from the Burlington Railroad that our request for reparation of $1.03 per ton on soft coal, other than slack, and 94 cents per ton on slack coal on 1090 cars which moved from Kleenburn, Wyoming to Hanford from October 1 to November 26, 1946, has been placed on the docket of the North Pacific Coast Freight Bureau for consideration by the interested lines.

c. Advice has been received from the Milwaukee Railroad that our request for reparation of 12 cents per cwt. on eleven carloads of Ferric Sulphate which moved from Lockland, Ohio to Hanford from October 1 to October 14, 1946, has been referred to the Transcontinental Freight Bureau, Chicago, for recommendation.

d. Advice has been received from the Milwaukee Railroad that our request for reparation of 50 cents per cwt., on three carloads of Caustic Soda which moved from Pittsburg, California to Hanford from October 1 to November 17, 1946, has been docketed for consideration at the January meeting of the North Coast-California Lines.

e. On December 6, 1946, the Interstate Commerce Commission announced its decision in Ex-Parte Nos. 148-162, considered the most important railroad rate case to come before it in many years. The order authorized rail and water common carriers to increase their freight rates and charges on January 1, 1947, in amounts which will average over-all approximately 17.6 percent, and which it has been estimated will aggregate close to a billion dollars a year. The order also withdrew the time limits on the authorization of 10 percent increase in passenger fares so that the fares as increased February 10, 1942, will continue in effect and will not be required to be cancelled six months after the formal end of the war.

f. Effective December 13, 1946, the Interstate Commerce Commission in Ex-Parte No. 163 authorized the Railway Express Agency to increase less carload express rates as follows:

1) An increase of 20 cents per cwt. in first class rates, and an increase of 15 cents per cwt. in second class rates.

2) An increase in the graduate charges for shipments weighing less than 100 pounds, both first class and second class.

3) An increase of 20 cents per 100 pounds in less carload commodity rates.

4) An increase of 30 cents in all minimum charges and in all commodity rates where the charge is published as per package.

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5) An increase of 20 cents per $1,000.00 in money rates as published in the Money Classification and in commodity tariffs.

6) An increase of 30 cents in the graduate charges on money provided for in the Money Classification.

With the effective date of these increases, December 13, 1946, the Emergency Charge no longer applies on any traffic except returned empties.

g. The following is a summary of savings in freight charges through December 31, 1946, as a result of rate reductions secured from the carriers.

Commodity	Origin	Savings thru November 30	Savings for December	Total
Caustic Soda	Tacoma (H)	$ 7,785.95	$ 977.93	$ 8,763.88
	Tacoma	2,708.44	368.86	3,077.30
Soda Ash	Trona & West End, Cal.	4,878.30	636.30	5,514.60
Hydrated Lime	Evans, Wn.	437.89	54.68	492.57
Office Records	Hanford to Newbridge, Del.	3,334.50	1,371.50	4,706.00
Ferric Sulphate	E. Point, Ga., & Lockland, O.	678.72	1,272.84	1,951.56
Coal (Slack)	Kleenburn, Wyo.		10,055.71	
(Grate)			1,879.63	11,385.34
	Total	$19,823.80	$16,567.45	$36,391.25

(H) Purchased thru Henderson, Nevada, but supplied from Tacoma.

h. Statistics outlining the routine work of this division follow:

Office Business

	November	December
Household Goods Movements Arranged	42	18
Household Goods Movements Traced	6	27
Household Goods Storage Bills Approved	13	27
Automobile Shipments Arranged	2	1
Automobile Shipments Traced	3	4
Rail Bills Approved	861	328
Truck Bills Approved	206	268
Express Bills Approved	98	85
Household Goods Claims Filed	9	10
Household Goods Claims Collected - Number	6	6
Household Goods Claims Collected - Amount	$160.26	$323.90

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	November	December
Work Orders Issued - Household Goods	53	37
Furniture Dates to Expense Accounts	13	7
Insurance Riders Issued	90	46
Insurance Bills Approved	-	271
Freight Claims Filed	5	4
Freight Claims Collected - Number	1	7
Freight Claims Collected - Amount	$81.02	$198.91
Requests for Billing	2	-
Rail Reservations Made	54	36
Air Reservations Made	37	24
Ticket Refund Claims Filed - Number	-	5
Ticket Refund Claims Filed - No. of Tickets	-	5
Ticket Refund Claims Collected - Number	3	5
Ticket Refund Claims Collected - Amount	$92.98	$62.29
Freight Shipments Traced	5	5
Express Shipments Traced	-	1
Carload Shipments Received	689	415
Carload Shipments Outbound	10	9
Hotel Reservations Made	17	13
Expense Accounts Checked	28	34
Bills of Lading Converted - Freight Shipments	1	-
Bills of Lading Converted - Express Shipments	1	-
Government Bills of Lading Accomplished	58	57
Freight Bill Pre-Audit Savings	$211.97	$356.35
Rates, Routings, Schedules, Checked	992	596
Routing Instructions Issued	18	14

Household Effects

	November	December
Lots Shipped Via Van	6	9
Lots Pending	10	3
Automobiles Shipped	2	-
Household Lots Via Express	9	1
Household Lots Via L.C.L. Freight	-	1

Commodities Received - Carloads

	November	December
Aluminum Ingots	-	1
Ammonium Silicofluoride	1	1
Argon Gas	1	1
Caustic Soda	8	9
Cement	-	6
Caustic Potash	1	-
Chemicals	-	7
Chlorine	1	1
Coal	615	311
Ferric Sulphate	10	19
Ferrous Ammonium Sulphate	1	-
Helium Gas	1	-
Hydrogen Peroxide	1	-

	November	December
Hydrofluoric Acid	1	-
Lead	-	1
Lime	3	7
Lubricating Oil	1	-
Lumber	-	1
Merchandise	6	7
Machinery	-	1
Nitrate of Soda	1	1
Nitric Acid	12	13
Pacific Huts	-	3
Phosphoric Acid	4	2
Salt	2	3
Silicate of Soda	13	11
Soda Ash	3	3
Sodium Bichromate	-	3
Sulphuric Acid	3	2
Tin	-	1
Totals	689	415

2. Equipment Control

Purchase Requisitions were issued during the month to cover the exchange of twenty-four automotive units in the Reserve Pool and to increase this pool by four units. The increase in the pool is to supply units which have been requested and approved and consist of one backhoe, one dragline bucket, one steam cleaner, and one concrete vibrator.

During the month the Government Equipment Section delivered twelve units on outstanding requisitions.

Eleven units from the Reserve Pool were permanently assigned to departments and thirty-three units were still on temporary assignment to the Corps of Engineers for construction of the Richland Airport.

One ambulance was converted into a panel delivery truck and placed in the Reserve Pool

Units on inventory and in service are shown under the respective Plant departments to which they are assigned as shown in the Equipment Inventory appended.

The following tabulation indicates extent of usage of automotive equipment for the month of November 1946.

Code	Type	No. Units	Total Mileage
1-A	Sedans	277	397,055
1-B	Buses	94	134,418
1-C	Pickups	195	130,503

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1-D	Station Wagons	46	36;873
1-G	Weapon Carriers	31	8;917
68 (Series)	Trucks	203	106,826
	Total		814,593

3. Scheduling

On December 20, 1946, one thirty-seven passenger bus was loaned to the Corps of Engineers for a trip to Spokane with army personnel working on the Richland Airport.

Regular Sunday Area and Village bus service was scheduled for Christmas Day, December 25, 1946. Special bus services were scheduled for Village churches on Christmas Day.

Conducting examinations and drivers tests continued. The volume involved in examining applicants and issuing permits is indicated by the following tabulation:

Applicants:	Male	105	Number retested	10
	Female	6	Total tests given	121
	Total	111	Number rejected	3

Permits Issued:

Limited to driving with glasses	14
Unlimited	94
Total	108

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HANFORD ENGINEER WORKS
TRANSPORTATION DEPARTMENT
DISTRIBUTION OF PERSONNEL
December 31, 1946

MORRISON KNUDSEN CONTRACTORS
Benton City Camp

MONTHLY:

Office Manager	1
Track Foremen	6
Total	7

HOURLY:

Timekeeper	1
Stenographer	1
Chef	1
1st Cook	1
2nd Cook	1
Dishwashers	3
Bull Cooks	3
Truck Drivers	7
Watchman	1
Laborers	50
Total	74

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HANFORD ENGINEER WORKS
TRANSPORTATION DEPARTMENT
DISTRIBUTION OF PERSONNEL
December 31, 1946

DEPARTMENT PERSONNEL

	AREA									
	General	100 B	100 D	100 F	200 W	200 E	300	700-1100	River-land	Total
1. Supervision	6	1	2	2	2	2	1	42	3	61
2. Drivers	23	12	22	27	32	32	18	39	6	211
3. Mechanics	1	1	1	1	2	1	-	63	7	77
4. Trainmen	-	-	4	4	4	4	-	2	-	18
5. Laborers	-	3	4	4	4	4	4	66	-	89
6. Oilers	-	-	1	1	3	1	-	32	1	39
7. Tool and Stores Attendants	-	-	-	-	-	-	-	8	-	8
8. Crane Operators	-	1	1	1	3	2	-	2	-	10
9. Tractor Operators	-	1	2	2	2	2	1	4	-	14
10. Helpers	-	1	3	2	2	2	2	49	8	69
11. Trackmen	-	2	3	3	3	2	1	-	-	14
12. Weighmaster	-	-	-	-	-	-	-	-	1	1
13. Equipment Inspector	3	-	-	-	1	-	-	1	-	5
Totals	33	22	43	47	58	52	27	308	26	616

TRANSPORTATION DEPARTMENT
EQUIPMENT INVENTORY

December 1, 1946 through December 31, 1946

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	1-A - SEDANS	1-B - BUSES - 29	1-B - BUSES - 37	1-B - BUSES - SEMI	1-B - STRETCHOUT	1-C - PICKUPS	1-D - CARRYALLS	1-D - PANELS	1-D-- STATION WAGONS	1-E - JEEPS	1-G - WEAPON CARRIERS	5 - BATCH PLANTS	6 - ROAD SWEEPERS	6 - ROAD BROOMS	6 - TAR HEATERS	6 - PAINT SPRAYERS	10 - GRINDERS	10-A -FLAT CARS
Accounting	1	1				9	1											
Electrical	8					24	1	2			8							
Government	40	1			1	29	5	2		2	2							
Instrument	6					6		2										
Maintenance	8				1	38	1	1	2		10					1		
Medical-H.I.	13						4	1										
Power	8					15	1					1						
Protection	40					2	3		1		9							
"P" Dept.	3					5												
"S" Dept.	4					8	3											
Service	8	2				11	2	2										
Technical	10							1										
Transportation:																		
Automotive	4		78	1	3	2		2	1									18
Mechniaal	9	34				28	5	3	2		3	1	1	3	4		5	
Adm. Pool	91	1			1	4			1	1	1							
Medical Pool	13								1									
300 Pool	6					3			1									
Repair Pool	10					21		1	2	2	2							
Reserve Pool	18	4			5	4			2	4	7		1					
TOTALS	300	43	78	1	11	209	26	17	13	9	42	2	2	3	4	1	5	18

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	10-B - WELL BOTTOM CARS	10-C - DUMP CARS	10-D - GONDOLAS	10-E - MOTOR CARS	10-F - CABOOSE	10-G - PUSH CARS	10-H - TANK CARS	10-J - HOSPITAL CAR	13 - COMPRESSORS	16 - CONVEYORS	17 - CRAWLER CRANES	17-T - MOTOR CRANES	22 - EARTH AUGERS	30 - FINISHING MACHINES	33 - MOTOR GRADER	33-A - PULL GRADER	38 - LIFT LOADERS	39 - DIESEL LOCOMOTIVE	40 - TRANSIT MIX	40-A - CONCRETE MIXER
Accounting																				
Electrical													2							
Government							2	1												
Instrument																				
Maintenance									5											
Medical-H.I.																				
Power																				
Protection																				
"P" Dept.																				
"S" Dept.																				
Service																				
Technical																				
Transportation:																				
Automotive	11	5	2		2		6											8		
Mechanical				13		18			16	3	10	4	1	1	5	1				2
Adm. Pool																				
Medical Pool																				
300 Pool																				
Repair Pool																				
Reserve Pool									5		3	1		2		1	2		1	2
TOTAL	11	5	2	13	2	18	8	1	26	3	13	5	2	3	5	2	2	8	1	4

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	45 - VIBRATING SCREEN	49 - PUMPS	52 - ROLLERS	55 - SCRAPERS	59 - SPREADERS	63 - RUBBER TIRED TRACTORS	63 - CRAWLER TRACTORS	64 - SEMI-TRAILERS	68-A - DUMP TRUCKS	68-B - FLAT TRUCKS	68-C - TANK TRUCKS	68-D - FIRE TRUCKS	68-E - TRUCK TRACTORS	68-G - AMBULANCES	68-H - GARBAGE TRUCKS	68-J - WINCH TRUCKS	68-K - LINE TRUCKS	68-L - WRECKER TRUCKS
Accounting								4		4			4					
Electrical								5		4						1	3	
Government							1	4	2	7	4	10	4	3		2	1	
Instrument																		
Maintenance		16					1	4		18			2			7		
Medical-H.I.								1		1				14				
Power																		
Protection																		
"P" Dept.																		
"S" Dept.											1							
Service		1								1		25						
Technical														1				
Transportation																		
Automotive		2											1					
Mechanical	1	15	5	6	6	10	20	20	20	47	13	1	19		6	1		3
Adm. Pool										1								
Medical Pool																		
300 Pool																		
Repair Pool																		
Reserve Pool		11					5	12	6	8	2		9		1			2
TOTAL	1	45	5	6	6	10	27	50	28	91	20	36	39	18	7	11	4	5

	70 - VIBRATORS	71 - FARM WAGONS	73 - WELDERS	74 - LIGHT PLANTS	78 - FARM MACHINERY	80 - MISCELLANEOUS	ATTACHMENTS 8 - DRAGLINE BUCKETS	8 - CLAMSHELL BUCKETS	17-A - BACKHOE	17-B - SHOVELS	29 - ENGINE-POWER UNIT	47 - SNOW PLOW	63-A - DOZERS	63-B - P. C. U.	63-C - SIDEBOOMS	TOTALS
Accounting																24
Electrical			1	7												65
Government																123
Instrument																14
Maintenance			33													148
Medical-H. I.				2												36
Power				1												26
Protection				3												58
"P" Dept.																8
"S" Dept.																16
Service											1					53
Technical																12
Transportation																
Automotive												1				150
Mechanical		14	3	26	18		7	15	1	2			12	15	2	476
Adm. Pool																101
Medical Pool																14
300 Pool																10
Repair Pool																38
Reserve Pool	1		4	7	1	2	2	2		2			4	4		148
TOTAL	1	14	41	46	19	2	9	17	1	4	1	1	16	19	2	

Total Units 1450
Total Attachments 70
Grand Total 1520

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HEALTH INSTRUMENT SECTION

Organization

C. C. Gamertsfelder was absent throughout the month. His time was spent in assisting L. L. German in the setup of health instrumentation in the Knolls #2 Laboratory. F. P. Seymour was also on special assignment at the Los Alamos location for most of this period.

The Section was successful in retaining the services of Dr. R. E. Zirkle, University of Chicago, as consultant in Radiobiology. Dr. Zirkle enjoys an international reputation for his contributions to the types of biological problems that are to be investigated here.

Additions to the force, both engineers and inspectors, continued at an adequate pace. The composition and area distribution of the force at the end of the period was as follows:

H. I. SECTION FORCE REPORT
AS OF 12/31/46

	100-B	100-D	100-F	200-E	200-W	300	700	P.G.	Total
Supervisors	0	2	3	4	3	10	6	0	28
Engineers	0	2	4	5	4	16	0	0	31
Others	0	4	5	20	28	43	7	0	107
Total	0	8	12	29	35	69	13	0	166

General

Plans for formal H.I. training of H.I. Engineers and of Supervisors-in-training for other departments were completed, and the first course set to begin on January 13, 1947. * In the evening instruction courses, the Electronics course was completed, as was the Medical course. The Mathematics and Physics courses are to be continued in the second term, but new courses that had been planned have been withdrawn in the expectation that similar material can be offered in the College of Nuclear Engineering.

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* H.M.Parker to D.H.Lauder, (12/19/46), Doc. #7-5542 "Training Program for H.I. Engineers and for Supervisors-In-Training for Other Departments".

Estimates for the provision of about 77 test wells around the existing waste disposal facilities in the 200 Areas have been completed, and a suitable proposal recommended for execution. The purpose of these wells is to develop as much practical information as possible on the underground movement of radioactive wastes to establish the feasibility or otherwise of permanent disposal of second cycle wastes to ground. The cost of the test program is approximately 10% of that of a single additional tank farm.

In the past, the Technical Department has been extremely helpful to the H.I.Section in providing laboratory space in the Technical Building (3706) and previously in the Cold Semi-Works for control work not provided for in the original schedule. Revised plans for the utilization of the Technical Building now make it desirable to move the H.I. laboratories to other locations. This will be effected by the occupation of the U-Plant Control Laboratory and by the provision of two hutments in the 300 Area. Unfortunately, the U-Plant Laboratories have been previously contaminated by Plutonium, and may not be ideal for the critical low-level work on urines and water samples. The condition should be no worse than the present state in the Technical Building, but the move will not provide the special low-level facilities that may prove to be needed.

Plans have been made to obtain a two-million volt X-ray machine for use in instrument calibration. The equipment will speed up the calibration and reduce the handling of radium sources. One of the new hutments will be used for calibration work as the present facilities in Building 3745 are overcrowded under the present schedule.

Annual Summary

The principal exposures and potential exposures have been reported throughout the year according to the scheme of Special Hazards Bulletin #6. There have been 40 Class 1 incidents, and four in Class 2. Those occurring prior to September 1, 1946 have been previously summarized. * Of the more serious category, Class 2, the first (Incident #2) concerned the splashing of active waste over the hands and face of an employee, with a maximum exposure of 2 rep on the face, and 5 rep on the hands; Incident #3 involved a technical overexposure of only 160 mr and 110 mr on a single day on

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* H.M.Parker to M.H.Smith, (8/31/46)
"Special Hazards Incidents Investigations".

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two employees repairing a stack fan; Incident #4 showed a highly localized exposure of about 1.5 rep, and not more than 2.5 rep arising from a contaminated coverall. Incident #5 involved gross Plutonium contamination of the hand of a laboratorian. The last incident had no complications primarily as a result of the sound condition of the employee's skin. The other incidents represented exposures of a magnitude quite comparable with that received in one or two X-ray fluorographic exposures.

During the year, 1,077,300 pencils were read. These observations included 169 cases in which the significant reading was between 100 and 200 mr. Only four of these were confirmed by badge readings above 60 mr. Two were reported in Class 2, Incident #3, and the other two in Class 1, Incident #19. Ninety-nine cases showed a reading of over 200 mr, but none of these was confirmed by badge readings. There were also 22 substandard readings due to lost or damaged pencils. In all, one record in 2000 has therefore shown a potential high reading, but all except eight, or one in 60,000 records have been denied by associated badge readings. These eight cases all represented loss of the units, or immersion in water.

The number of film badges processed was 260,336. There included 119 readings between 100 and 300 mrep for a weekly total, and 3 over 600 mrep. These were all beta-ray exposures only, occasioned in the handling of Uranium or samples of activated material. There were in addition 149 defective cases, including lost packets, films exposed to light, films exposed to X-rays during marking, etc. About 80 of these were due to improper manipulation by H.I. personnel, by various mechanisms that have now been largely eliminated.

Other yearly totals of interest showed 672,872 items monitored in the Plant Laundry, and 538,094 recorded hand counts. Approximately one in 180 of such hand counts exceeded the warning limits, but the high results were repetitive among certain laboratory groups. Improvement in laboratory technique in such cases has been slow or non-existent. Of the 3000 high hand counts, there was no recorded attempt to reduce 130 cases, and decontamination was incompletely successful in 43 cases. Further development of decontamination techniques is planned for 1947. Six thousand seven hundred and sixty-six thyroid checks for accumulation of I^{131} have been recorded, with no significant positive result to date. Of the 1,757 urinalyses for Plutonium, no positive result of consequence has been confirmed. Spurious results due to extraneous contamination continue to be reported, and the technical standard of the work, which is a function of the technician's experience, has varied due to excessive personnel changes.

In all, it appears reasonably certain that there has been no significant general body exposure, and no serious ingestion or inhalation of active material. Hand exposure has not

always been maintained at the recommended levels. However, the deviations have not been of a gross character. It is also proper to point out that the H.I. policy represents a more pessimistic approach to hand injury than that accepted by many competent leaders of the field of radiation protection, by a factor of about two to five in the numerical standards.

Some other annual numerations are included in the body of this monthly report.

OPERATIONAL DIVISION

100 Areas

Salient Points

Personnel was again present in a discharge area when dummy slugs were discharged by water pressure alone. One horizontal rod thimble was borescoped. One horizontal rod was removed from a Pile during a shutdown, and had to be tied out due to a serious water leak. Considerable contamination was found in the air on top of a Pile, during the testing of the Vertical Safety Rods.

Work Permit Summary

	November	December	1946 Total
100-B	183	103	2,519
100-D	460	526	6,235
100-F	886	551	5,744
Total	1529	1180	14,498

Retention Basin Effluent

The activity of the water leaving the Retention Basins was as follows:

	100-D		100-F	
	Dec.	1946 Average	Dec.	1946 Average
Power level	250	~250	200	~ 200
Average beta dosage-rate (mrep/hr)	0.5	0.6	0.5	0.7
Average gamma " " (mr/hr)	1.3	1.4	1.4	1.7
Average total " " (mrep/hr)	1.8	2.0	1.9	2.4
Average integrated dose in 24 hrs. (mrep)	44	51	45	61
*Maximum integrated dose in 24 hrs. (mrep)	50	74	58	101

*The 105-B Pile operated for the first three months. The maximum integrated dose in 24 hours was 113 mrep.

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Pile Buildings

Surveys applicable to bowing measurements of process tubes were continued. The maximum reading on an open hole was 240 mrep/hr. The equipment used for the measurements became contaminated each time. A maximum of 50 mrep/hr at the surface was reported. The maximum dosage-rate on any tip-off used for discharge operations was 500 mrep/hr, and on the oil trough 400 mrep/hr. Returned casks and crates showed little alpha contamination.

The following readings were obtained, during strain tests on a tube in the 105-B Pile, and on subsequent removal of the tube in sections.

Swabs used to clean tube	150 mrep/hr contact.
Open tube	Less than 1 mrep/hr 4 inches
Maximum on a tube section	7.4 mr/hr at 10 feet

Considerable dust was blown into the air on the top of the 100-D Area Pile during air pressure tests of the Vertical Safety Rod thimbles when the gasket on the air release side failed. A spot air sample taken immediately afterwards gave a beta radiation activity of 6.5×10^{-6} µc/liter, presumably due to radioactive iron and manganese. Vertical Safety Rod #25 was removed in order to buff the tip. A reading of about 4 rep per hour was obtained over the open thimble, and 200 mr/hr 10 feet from the unshielded tip. Rod #37 was also buffed; the maximum reading here was only 50 mrep/hr on contact. Four couplings on the Third Safety Device Headers were broken in a radiation field of about 200 mr/hr. As the fifth Header coupling was broken, active gas diffused into the area and the reading increased to 2 rep per hour. Personnel was removed from the top of the Pile until the active gas was dissipated.

The transfer of dummy slugs from the 100-D storage basin to the burial trench continued. One bucket of slugs read 200 mr/hr at 10 feet, and was returned to the basin. The maximum working dosage-rate to which personnel was exposed was 40 mr/hr. The dosage-rate at the burial trench reached a maximum of 320 mr/hr at the trench edge, but was reduced to less than 5 mr/hr when the slugs were covered with dirt.

Several graphite samples which had been removed from the "B" hole and stored on the experimental level were shipped to the 300 Area. The unshielded samples read 1 rep per hour at 3 inches. The dosage-rate was reduced to 30 mr/hr at 5 inches when the samples were loaded in the truck and shielded with lead. The dosage-rate for hand exposure was 200 mrep/hr at 18 inches.

Fast neutron measurements in the 100-D Area were made on top of the Pile, the experimental level, and the far side minus 9-ft. level. The maximum reading of 16 mrem/hr was obtained on the top of the Pile atop the railing next to Vertical Safety Rod #10. A slow neutron measurement of 3 mrem/hr was found at instrument hole #2 on the far side minus 9-ft. level.

The #2 Horizontal Rod thimble in the 100-F Area Pile was borescoped because scratches were found on the top surface of the rod. A corrected beam reading of 1.2 roentgens per hour was obtained at the open thimble, and 15 roentgens per hour 1 inch from the rod tip. Later, a leak in the cooling water to the same rod was suspected and, on the next shutdown, the rod was pulled out for examination. The leak was confirmed, and the rod was tied out of the Pile. The open hole was shielded with 20 inches of paraffin, and 6 inches of lead, in addition to the thimble gate. After startup, the surrounding areas were checked for neutrons and no positive result was obtained. Before the shield was positioned, a gas sample was taken from the thimble. The sample jammed the counter and decayed with the half-life of radio-argon A^{41}, suggesting a possible leak in the thimble.

A Pile tube cap was removed at the discharge face and several dummy slugs were discharged by the water pressure still on the charge face header. The tube had been incorrectly identified on the discharge face. No unusual reading was obtained on the tube or slugs.

After the charge in one Pile tube was displaced with a complete dummy charge, the micromax for one of the discharge area H.M. Chambers showed a slight reading. Careful entrance into the discharge area was made, and one lead dummy slug and one aluminum dummy slug were located on the 20-ft. catwalk. The slugs were pushed into the basin by means of a 20-ft. pole. The dosage-rate at the end of the pole, 20 feet from the slugs, was 500 mr/hr. The tube had been discharged in the usual manner with the charging machine. These two incidents emphasized the need for continued development of controls governing the discharge procedure.

Considerable dust was blown out of the Vertical Safety Rod thimbles into the air on top of the 100-F Pile when a functioning test of the rods was made. A spot air sample taken on the balcony above the Pile showed air activity to the extent of 6.2×10^{-5} μc/liter, presumably due to radioactive iron and manganese. Filters from respirators of personnel present showed slight contamination on the intake side but none on the filtered side. The contaminants were tentatively identified as isotopes of iron and manganese.

Samples removed from the "B" experimental hole and placed in lead sample carriers read a maximum of 70 mr/hr at 4 inches from the shield. Rods used to retrieve the samples showed up to 135 mrep/hr on the surface, but only 25 mrep/hr when shielded with a rubber glove. A dosage-rate of 1 rep per hour was recorded two inches from the end of one of the steel plugs from the "B" hole.

Active gas persisted at the base of the Pile on the near side and at the "E" experimental hole. The maximum dosage-rates at the near side base of the Pile were 105 mrep/hr immediately following a shutdown, and 80 mrep/hr during normal operation.*

Twenty-four casks were prepared for shipment off the plant. The maximum reading on any cask was 34 mr/hr, and when crated 9 mr/hr.

The following table represents the average water activity for the month:

Location	Average μc/liter
Retention Basin Effluent	0.20
Storage Area Basin	0.03
River-50 ft. below effluent line	0.04
Stagnant Pond	0.07
Fish Laboratory Trough	0.13

Slow neutron surveys were made on the minus 9-ft. level far side, top of the Pile and the balcony overlooking the Pile. All results were less than 1 mrem/hr.

200 Areas - T and B Plants

Salient Points

Decontamination of a Lorain Motor crane was satisfactorily completed. A survey of a Canyon pipe trench was made in preparation for gasket replacements. A large hole, which partially uncovered a waste line, was discovered under a stairwell.

General Statistics

	November			December		
	T	B	Total	T	B	Total
Special Work Permits	173	592	765	293	503	796
Other routine and special surveys	410	457	867	479	439	918
Smear samples for alpha counts	704	557	1261	704	798	1502
Smear samples for beta counts	614	557	1171	601	798	1399
Air monitoring samples	396	328	724	431	265	696
Thyroid checks	240	221	461	234	223	462

	1946 Totals
Special Work Permits	9,308
Other routine and special surveys	11,075
Smear samples for alpha counts	19,156
Smear samples for beta counts	18,075
Air monitoring samples	9,762
Thyroid checks	6,766

*The increase at shutdown is due to the Pile breathing action.

Canyon Buildings

Readings in the R-15 stairwell at the B Plant persisted after sections of the concrete stairs were removed. Investigation of a hole where the air hammer, used to remove the concrete, had penetrated the floor revealed a large cavity under the floor. This hole was enlarged to accommodate a a Victoreen survey probe meter, and readings of 2 roentgens per hour were obtained about 6 feet below the floor. Waste lines from Section 15 pass this point at a depth of 6½ feet, and a reading of 3.2 roentgens per hour was recorded when waste was jetted through them. This indicated that the previously observed dosage-rate could arise from direct radiation from the inside of the line. Surveys around the outside of the stairwell showed no readings. *

In the B Plant, six sampling ports read above 50 mrep/hr at 4 inches. The maximum was 500 mrep/hr. Two cases in which unusually high readings occurred when samples were taken were both, apparently, due to sludgy contamination in the riser being transferred to the trombone. The discovery of four contaminated tools in use on a job necessitated tightening the controls for such cases.

The T Plant pipe trench was surveyed in preparation for regasketing all connectors. The contact exposure rates for connectors at Sections 6, 8 and 9 were greater than 10 rep per hour, while 6 feet from the trench at Section 9 a reading of 5 roentgens per hour at head level was obtained. The dosage-rates near connectors at Sections 3, 4, 5, 7, 10 and 11 ranged from 2 to 8 rep per hour. For connectors at Sections 17, 18, and 19, the maximum reading was 3 mrep/hr at 4 inches.

In the T Plant, seven sampling ports gave rates above 50 mrep/hr at 4 inches. The maximum was 200 mrep/hr.

Control Laboratory

Approximately 5 µg Pu was reported on sampling equipment in room 1 in the B Plant laboratory, and 13.4 µg Pu in room 7 on equipment, benches, floor and gloves. Waste cartons in room 1 read up to 600 mrep/hr on a Zeus, and those in room 7 up to 200 mrep/hr. Leather gloves in room 7 read 40 mrep/hr at contact. A tray assigned to the samplers read 1.3 rep per hour at 3 inches.

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* More alert interpretation by the H.I. engineers would have made it clear that the initial dosage-rate in the stairwell came from a remote source of penetrating radiation rather than from local contamination on the stairs.

MEDICAL DEPARTMENT

Concentration Buildings

The thermohm in the B Plant E-1 tank was removed and replaced. The thermohm showed much greater than 30 µg Pu, but it was wrapped and taped as it was removed and no contamination spread occurred. About 1 µg Pu was found inside the chained area in the F-10 room.

About 28 µg Pu was reported from T Plant cell surveys. Approximately 5 µg Pu was found on ladders in C and F Cells, and 4.5 µg on tanks in C and D Cells. Contaminated assault masks were reported on two occasions.

Waste Disposal

The vent to the B Plant 361 Dry Well was opened to check the liquid level. Survey readings over the open vent were 1.75 rep per hour, including 1 roentgen per hour of gamma radiation. Three test holes were made near the present B Plant waste lines, at the east end of the restricted area, at R-8, and at R-15. With from one to two feet of dirt still over the lines, the reading at R-8 was 125 mr/hr. The ground level reading over the R-8 hole was 4 mr/hr. No contamination was found in dirt samples from these holes.

The Lorain Motor crane in the T Plant was successfully decontaminated by the Maintenance Department personnel on all external parts by sandblasting. The procedure was expedited by the use of oxygen breathing apparatus which allowed the sandblasting to be done at close range. Readings on air samples taken in the dust cloud were:

2.5×10^{-6} µc/liter for f.p.
2×10^{-11} µg/cc for product.

200 Area Isolation Building

Air Monitoring

The maximum concentration found in a spot air sample was 5×10^{-10} µg Pu/cc in Cell 4. This was obtained when steam was being emitted from a floor drain near the sampler. Water was poured down the drain to stop the emission of steam, and further samples at this location read less than 10^{-11} µg Pu/cc. A Poppy survey around the floor drain and walls did not reveal any contamination. Two-hundred twenty-seven spot samples were taken, and 191 were less than 10^{-11} µg Pu/cc. Fifty-two Little Sucker air samples run continuously by shifts had, as the highest result, 10^{-11} µg Pu/cc in both Cells 3 and 4. Thirteen Big Sucker samples of the 903 exhaust system were taken, the highest result was 6×10^{-12} µg Pu/cc.

Surface Contamination

Three-hundred and twenty two non-regulated items were found contaminated in surveys made by "S" Department, Technical Department and H.I. personnel. Thirteen were greater than 20,000 d/m, and one was greater than 80,000 d/m. Two-hundred and seventy three were in the laboratories, and thirty eight in the Process Areas. There was no floor contamination reported.

Gross hand contamination of 50 to 100 micrograms of product occurred when an AT solution sample was spilled. About 20% of this contamination remained when the employee was brought to Kadlec Hospital for further decontamination under the direction of a physician. Decontamination was successful only because the person's skin was in very good condition and did not irritate easily. About 0.7 µg Pu remained when decontamination attempts were stopped for the night, and about 0.06 µg remained when decontamination efforts were abandoned the following afternoon. Urine and blood samples were positive but not great enough to cause alarm. Blood, seven hours after the incident, showed not more than 0.001 µg Pu, and a 24-hour urine sample showed 0.5 ± 0.2 d/m. This urine count was positive and was about 3 times the normal count on this individual. However, in view of the severe hand contamination, it was not certain that this small count was not introduced into the sample by external contamination.

The accident occurred at a stage in which there was no manipulative objection to the wearing of rubber gloves, which would have prevented this contamination. The incident was investigated, * and the resultant recommendations included such wearing of gloves as well as some design changes in the sampling equipment.

Gamma Radiation

PR container	(maximun)	65 mr/hr
Process Hood	(maximum)	15 mr/hr
S.C.	(maximum)	7 mr/hr

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* Special Hazards Incident Investigation #5, Class 2

MEDICAL DEPARTMENT

300 Area

General Statistics

Special Work Permits	97
Routine and Special Surveys	97
Smear samples for alpha counts	602
Smear samples for beta counts	513
Air monitoring samples	53

Metal Fabrication Plant

Five of 23 spot air samples were above the tolerance level of 1.5×10^{-4} µg U/cc. Samples over this limit were:

Location		Concentration µg U/cc
Press Building		
Oxide Burner		3.8×10^{-4}
"	"	1.9×10^{-4}
Machining Building		
Chip Recovery	1st sorting table	3.3×10^{-4}
"	2nd sorting table	3.2×10^{-4}
"	Biscuit press	6.7×10^{-4}

The maximum alpha contamination readings found on an instrument survey of the Operations lunch room were 1,200 d/m on a bench, and 800 d/m on a table.

A check of protective clothing revealed an apron reading 7 mrep/hr on contact, and a coverall reading 3 mrep/hr on contact. Tests made of the radiation transmission through coveralls indicated an insignificant reduction of about 7%.

The Billet Furnace in the Press Building was entered for inspection and repair. The reading on one of the saddles was 50 mrep/hr contact.

Retention Pond

The maximum measurements reported on samples taken by Site Survey were as follows:

Location	Alpha	Beta
Inlet water	340 d/m/liter	1.8×10^{-3} µc/liter
Inlet mud	380 d/m/kg	6.4 µc/kg
N.E.corner, water	100 d/m/liter	1×10^{-3} µc/liter

MEDICAL DEPARTMENT

Technical Building

Fourteen of twenty one product air samples read less than 10^{-11} µg Pu/cc. The maximum result was 8×10^{-11} µg Pu/cc, obtained in room 37. Two of nine Uranium air samples were above 1.5×10^{-4} µg U/cc. The maximum result of 7×10^{-4} was obtained in room 4A when a sample was ground.

Approximately 0.2 µg Pu was found on the floor in front of a refrigerator in room 57, and about 0.3 µg Pu on the pulser of a supposedly clean panel-board to be moved to the drafting room. About 16 µg Pu was found on a survey of room 59, with 5 µg reported on a hot plate, 2 µg on a bench top, and 5 µg on a sink. About 2 µg Pu was reported on the floor, 5 µg on the hood sink, and about 6 µg Pu on equipment in room 62. This room is being cleaned for the Chemical Development Division, and the excess equipment was boxed, sealed and stored in a warehouse. Some of it is contaminated and all boxes containing contaminated equipment were so identified. Approximately 12 µg Pu was found in room 64, including 7 µg on a door-sill and 2 µg on the floor, which was temporarily covered with paper. Contaminated items and equipment found were discarded. About 4.5 µg Pu located in 10 spots on the floor in room 66 were covered with paper.

Cold Semi-Works Building

The C-1 tank was dismantled for inspection purposes. Product contamination was found on the specific gravity pipe, the inside of the tank top, and on the Phillie gear support.

Laundry, Decontamination and Hand Counting

Items monitored in the Plant Laundry totaled 51,625 of which 37,714 were checked for both alpha and beta radiation. Included were 12,292 coveralls, 17,180 gloves and 13,526 overshoes.

A contaminated metal syringe was found in a washer as coveralls were removed. Its source was not determined. A survey of 41 articles, previously confiscated by Laundry personnel, revealed that two were contaminated. A campaign to reduce the number of items left in coverall pockets was instituted.

Of the 44 spot air samples taken, 27 were greater than 10^{-11} µg Pu/cc and 2 were greater than 10^{-10} µg Pu/cc. Of the 28 continuous Big Sucker air samples, 9 were greater than 10^{-11} µg Pu/cc and one was greater than 10^{-10} µg Pu/cc. The maximum results were quoted as 5×10^{-10} µg Pu/cc and 3×10^{-10} µg Pu/cc, respectively; however, these most probably represented Uranium contamination since they occurred while 300 Area clothes were being sorted.

The totals of alpha and beta counts were respectively, 21,721 and 25,024. About 0.4% of the alpha counts, and 0.6% of the beta counts were above the warning limit. There was no recorded attempt to reduce seven high alpha scores and three high beta scores. Where decontamination was attempted, it failed in two cases of alpha contamination to reduce it to below the conservative standards. All attempts at beta decontamination were successful.

Personnel Meters

Pencils	100-B 100-D	100-F	E&N 200	200-W	300	Total
Total Pencils read:	9,829	11,322	26,700	25,975	13,665	87,491
No.of single readings: (100 to 200 mr)	34	44	93	113	82	366
No.of paired readings: (100 to 200 mr)	1	0	0	0	1	2
No. of single readings: (over 200 mr)	73	92	215	202	88	670
No.of paired readings: (over 200 mr)	0	2	2	2	2	8
Paired readings lost:	0	0	0	0	0	0

Badges

	100-B	100-D	100-F	200-E	200-N	200-W	300	Total
Badges Processed:	2,365	3,855	3,924	3,656	838	3,574	2,975	21,187
No.of readings: (100-300 mrep)	0	1	2	31	0	1	67	102
No.of readings: (301 & over)	4	1	0	1	0	0	1	7
No.of lost readings:	1[a]	1[b]	1[c]	0	0	1[d]	0	4

a. Lost badge
b. Water-soaked
c. Packet lost in area
d. Exposed to light

Four of the 7 readings over 300 mrep were attributed to defective film.

CONTROL AND DEVELOPMENT DIVISION

Water Monitoring

Slight radioactive contamination was found in 7 different drinking water samples taken from 300 Area, Kennewick and Pasco. The 300 Area #1 well had alpha activity of 2.8 $\pm$ 2 dis/min/liter, and 2.4 $\pm$ 2 dis/min/liter, in two separate samples. The three Pasco and two Kennewick samples had beta

activity indicating from 5 x 10^{-5} µc/liter to 8 x 10^{-5} µc/liter. No other sample in the total of 107 drinking and test well samples had positive results.

The maximum activity observed in any of the 51 samples of the Columbia River water was 2.5 x 10^{-3} µc/liter in a sample taken at Hanford. The only positive result for alpha contamination was 3.2 ± 2 dis/min/liter in a sample from the River Pump House in the 100-D Area.

Atmospheric Monitoring

The integrons and C Chambers indicated average dosage-rates as follows:

Location	Integrons (mrep/24 hr)			C Chambers (mrep/24 hr)		
	Nov.	Dec.	1946	Nov.	Dec.	1946
100-B	0.4	0.4	0.6	0.4	0.4	0.3
100-D	0.6	0.3	0.5	0.5	0.5	0.4
100-F	0.5	0.3	0.5	0.4	0.5	0.4
200-W	0.6	0.7	0.6	0.6	0.5	0.5
200-E	0.7	1.1	1.5	0.7	0.9	0.8
Riverland	1.1	0.5	0.8	--	--	--
Hanford	0.2	0.5	0.5	--	--	--
300 Area	0.3	0.6	0.8	0.5	0.6	0.6
Richland	0.4	0.6	0.5	--	--	--
Benton City	0.5	1.0	0.5	--	--	--
Kennewick	0.2	0.3	0.3	--	--	--
Pasco	0.7	0.3	0.5	--	--	--
200-E Proposed Construction Area						
South border				--	2.9	--
Center of Area				--	1.8	--
North border				--	2.4	--

Film packets are kept at each of the above locations for a period of one week for use in confirming a high reading should one occur. The film used this way is not very sensitive but one film exposed in the 200 Area had a positive reading indicating 5.7 mrep per 24 hours, * during the period from December 4 to December 11, 1946. During the same period in the same location, the integron indicated 2 mrep per 24 hours, and the C Chamber 0.7 mrep per 24 hours.

The constant iodine monitor at Benton City recorded a maximum concentration of 10^{-7} µc/liter, and the average was about

Thirty eight rain samples were collected, and the maximum results were: 5.1×10^{-2} μc/liter inside the 200-E Area, 7.8×10^{-2} μc/liter inside the 200-West Area, 1.1×10^{-3} μc/liter at Hanford, and 2.7×10^{-3} μc/liter at Benton City.

Vegetation Contamination

Vegetation contamination has increased at most locations. Readings at Pasco, Kennewick, Richland and Benton City are all over the tolerance limit of 0.2 μc/kg. One sample obtained near the 200-E Area had 43.2 μc/kg. One sample from Kennewick had 2.7 μc/kg. Samples were also taken from the surrounding territory at greater distances and values up to 0.7 μc/kg were found at distances up to 100 miles (Coulee City) from the stacks, and positive readings between 0.04 and 0.09 μc/kg were obtained at 200 miles (Sandpoint). The average readings for the standard locations for the last two months were:

	μc I^{131} per kg		
Location	November	December	1946 Average
North of 200 Areas	0.21	0.40	0.35
Hanford	0.15	0.38	0.28
Near 200 Area	0.93	3.05	1.70
South of 200 Areas	0.32	0.76	0.26
Richland	0.21	0.46	0.39
Benton City	0.06	0.31	0.32
Kennewick	0.19	0.40	0.29
Pasco	0.30	0.25	--

Bio-Assay Laboratory

A total of 441 urine samples was collected, and 355 samples were counted. In addition, 50 blank runs and 52 spikes were also counted. None of the samples run during the month had as much as 0.6 dis/min. Second runs for individuals with previously obtained high samples were also negative.

Fish Laboratory

The monitor program was resumed on December 6, 1946, when 63,000 silver salmon eggs were placed in the troughs under an exposure scheme similar to that of the previous season. Mortality in troughs #1 and #2 has been 547, compared with 38 in the river control troughs. The mortality in other troughs has not yet differed significantly from that of the controls. This is a repetition of last year's experience which showed that the high temperature of the area effluent water was intolerable to fish.

Miscellaneous

The Site Survey group has made 12,430 control tests during the past year.

More tests are being conducted on the permeability of rubber gloves to Plutonium. Gloves are being washed in the 200-Area Laundry for various times, and will be returned for testing.

Some attempts are being made to determine whether the alpha contamination on air filter samples due to Plutonium or Uranium can be differentiated chemically. The first trials were inconclusive and more are being made.

T.T.A. extractions were made on washes of Plutonium-bearing soil with nitric acid. Results for this method are much higher (15 to 40 times) than were obtained by ordinary evaporation of the washes. Preliminary checks with spiked samples also indicate that the methods of counting used on the river and well water samples may give results which are also too low. Improved methods of analyses are being set up to eliminate losses due to self-absorption in the samples.

Tissues from a cow and fetus obtained from the Foster Ranch, north of Hanford, were analyzed for alpha and beta activity. Eleven tissues were checked in duplicate, and the maximum results were 5×10^{-3} μc/kg in placental bodies, and in lymph glands of the cow. Alpha activities were less than 200 dis/min per kg.

Algae collected from the Retention Basin in the 100-F Area had activities from 60 μc/kg to 200 μc/kg indicating concentration factors of 180 to 570. A piece of tumbleweed which had fallen into the basin had about 60 μc/kg, indicating that the concentration may be due entirely to adsorption by non-living plant cells rather than in the actively-living organisms. Three carrots were put in soil to which a solution of I^{131} was added. Two of the carrots were living and the third was dead at time of analysis. The outer skin of the first two carrots had 0.1 and 0.26 μc/kg, and the skin of the third had 0.53 μc/kg. The intermediate storage tissues had small amounts on the order of 0.03 and 0.05 μc/kg for all carrots. The heart or conducting tissues in the living carrots each had about 0.16 μc/kg, and the dead carrot had no measurable activity in the center portion.

Calibrations

A batch of 100 new-type Victoreen pencil meters is being tested, to determine whether they are suitable for Plant-wide use. First results seem to indicate that the meters will be acceptable.

The 200 KVP X-ray unit was returned to service. The X-ray tube, a filter condenser, and rectifier tube, were replaced, and the apparatus is now working satisfactorily. An additional

protection system including automatic door-locks and a blinker light is being installed to prevent employees from being in the X-ray room while the tube is in operation. The change is occasioned primarily by the intended use of these facilities in connection with training programs.

The routine calibrations were:

RADIUM CALIBRATIONS:

Type	Instrument	Number of Calibrations Last Month	This Month
Stationary:	Integron	478	448
	HM & GE Chamber	163	163
	Total	641 *	611 **
Portable:	Beckman Survey Meter	169	160
	Lauritsen electroscope	47	44
	Victoreen Survey meter	92	93
	GM Survey meter	45	38
	Miscellaneous	35	20
	Total	388	355
	Total for 1946	4,978	
Personnel Meters:	Pencils	6,740	6,062
	Badges and Rings	720	761
	Total	7,460	6,823
	Total Radium calibrations	8,489	7,789

X-RAY AND INTERMEDIATE ENERGY GAMMA AND BETA CALIBRATIONS:

Portable Instruments	33	23
Pencils	824	272
Miscellaneous film	1,034	629
Total	1,891	924

ALPHA CALIBRATION:

Portable Instruments	55	43
GRAND TOTAL	10,435	8,756
GRAND TOTAL FOR 1946	166,369	

* - 339 furnished by areas.
** - 317 furnished by areas.

PLANT MEDICAL DIVISION

Physical Examinations	November	December	Year to date
Pre-employment	144	147	1131
Annual	281	229	3062
Sub-contractor (food handlers, etc.)	15	12	359
Rechecks	67	65	1424
Interval Rechecks (Area)	913	917	11409
Terminations & Transfers	47	46	1171
Army & Government	48	28	458
Assist to Clinic, A & H Insurance, etc	0	0	64
Total	1515	1444	19078

Laboratory Examinations

Clinical Laboratory

Pre-employment, terminations, transfers	1244	1216	15181
Annual	2056	1702	21275
Rechecks (Area)	4336	4569	59056
First Aid	12	14	411
Plant Visitors	88	124	1167
Clinic	2270	2213	25934
Hospital	1647	1855	20781
Public Health (Including food handlers)	103	118	2128
Military	21	13	690
Total	11777	11824	146623

X-Ray

Pre-employment, terminations, transfers	213	212	2522
Annual	295	239	3272
First Aid	36	38	712
Clinic	201	216	2844
Hospital	132	154	1234
Public Health (Including food handlers)	17	11	420
Military	12	20	200
Tuberculosis Survey	0	0	1818
Total	906	890	13022

Electrocardiographs

Industrial	127	60	1318
Clinic	9	11	130
Hospital	8	7	117
Military	0	0	12
Total	144	78	1577

Allergy

Skin tests	20	11	126

[redacted] 3630

First Aid Treatments	November	December	Year to date
Occupational Treatments	265	304	3814
Occupational Retreatments	785	858	10626
Non-occupational (Welfare) Treatments	3105	3242	38035
Total	4155	4404	52475

Absenteeism Investigation Report			
Total number calls requested	52	70	657
Total number calls made	52	70	657
Number absent due to illness in family	1	3	46
Number not at home when call was made	3	5	59

General

During the month, the Health Topic, "The Comfort Zone in Your Home", was discussed throughout the plant. It pertained to the control of temperature and humidity in the home and its relation to prevention of respiratory infections.

One industrial physician was added to the staff during the month. Since he had been on the staff at Clinton Laboratories, he has had first-hand experience in special hazard problems.

There were no lost-time injuries during the past month, and no evidence of occupational disease.

VILLAGE MEDICAL DIVISION

Clinic Section	Men	Women	Children	November	December	Year to date
First Visits	214	210	141	980	565	8404
Retreatments	926	1495	675	2588	3096	33907
Total				3568	3661	42311

Clinic Visits			
Medical	568	542	6827
Pediatrics	439	530	5709
Surgical	525	449	7252
Gynecological	272	315	3477
Obstetric (new)	48	48	546
Obstetric (recheck)	432	441	5232
Venereal Disease	85	67	809
Ear, Nose & Throat	248	281	2894
Eye	179	177	2427
Visits handled by nurses(hypo., dressings)	370	354	3777
Night Clinic Visits	402	457	3361
Total	3568	3661	42311
Seen in Well-Baby Clinic	181	178	2283

Home Visits	November	December	Year to date
Doctors	170	214	1834
Nurses	63	94	708
Total	233	308	2542

Kadlec Hospital Section

Census

Admissions	282	337	3641
Discharges:			
Surgical	55	57	819
Medical	42	39	471
Obstetric & Gynecologic	68	62	794
Eye, Ear, Nose & Throat	58	52	606
Pediatrics:			
Children	25	69	470
Newborn	38	47	456
Total Discharges	286	326	3616
Patient Days	1897	2211	23279
Average Stay	6.6	6.7	6.4
Average Daily Census	63.2	71.2	67.2
Discharged against advice	1	1	13
One-day Cases	44	34	530

Operations

Transfusions	15	24	211
Eye, Ear, Nose & Throat	38	41	452
Dental	0	0	19
Casts	6	6	124
Minors	50	37	758
Majors	22	16	290
Deaths	2	6	32
Deliveries	39	45	456
Stillborn	0	0	5

Physiotherapy Treatments

Clinic	112	107	1079
Hospital	16	40	355
Army	9	10	150
Industrial:			
Plant	52	64	810
Personal	25	52	462
Total	214	273	2856

Pharmacy

Number of prescriptions filled	2056	2220	20244

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Patient Meals	November	December	Year to date
Regulars	2404	2721	26312
Lights	192	322	3285
Softs	937	1156	12739
Surgical Liquids	37	77	1228
Tonsils & Adenoids	191	200	1479
Specials	264	441	4528
Liquids	275	231	3562
Total	4306	5148	53133

Cafeteria Meals			
Noon	1262	1292	15923
Night	123	146	2296
Total	1385	1438	18219

Nursing Personnel		
First Aid Nurses	22	22
Clinic Nurses	12	11
Public Health Nurses	5	5
Hospital General Nurses	54	54
Aides & Orderlies	36	38
Total	129	130

General

There was an increase in out-patient clinic visits largely because of pediatric treatments due to the usual winter respiratory infections.

There was an increase in the number of hospital admissions, discharges and patient days compared to November, and also as compared to December, 1945. The daily hospital census was also increased.

PUBLIC HEALTH SECTION

Communicable Diseases Reported	November	December	Year to date
Amoebic Dysentery	0	0	1
Poliomyelitis	0	0	8
Whooping Cough	1	11	29
Meningococcic Meningitis	0	0	1
Diphtheria	0	0	0
Chickenpox	15	69	161
German Measles	4	7	33
Measles	2	2	114
Mumps	0	1	42
Scarlet Fever	10	5	45
Pinkeye	0	0	3
Influenza	9	0	127
Impetigo	2	0	36
Ringworm	2	2	35
Scabies	2	2	38
Vincent's Infection	2	0	58

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DECLASSIFIED

Communicable Diseases Reported (Continued)

	November	December	Year to date
Syphilis	1	0	19
Gonorrhea	5	0	29
Tuberculosis	0	0	10
Total	55	99	789

Immunizations

Smallpox	0	1	11472
Diphtheria	38	38	374
Whooping Cough	40	35	369
Schick Test	6	6	76
Tetanus	38	22	382
Typhoid	0	0	2
Total	122	102	12675

Administration

Newspaper Articles	10	4	38
Committee Meetings	0	4	10
Attendance	0	45	140
Staff Meetings	0	1	15
Lectures & Talks	1	3	34
Attendance	12	100	1175
Sanitation Inspections	123	132	1764

Bacteriological Laboratory

G. C. Smear	38	34	451
G. C. Culture	37	32	398
Fungus Culture	13	9	212
Vincent's Examinations	3	1	158
Trichomonas' Examinations	13	18	264
Sputum for T. B. Organisms	12	9	140
Bacterial Cultures	64	76	564
Examinations for Parasites	21	8	262
Throat Smear & Cultures	14	25	237
Blood Cultures	5	8	55
Stool Cultures	3	2	73
Eye Smears	2	2	41
Examinations for spermatozoa	0	0	9
Quantitative determination of blood alcohol	2	1	13
Type for pneumococcus	0	0	3
Treated Water Samples	83	89	1004
Untreated (raw water) Samples	93	90	1087
Milk Samples(Includes milk,cream,ice cream)	122	95	1032
Sewage Samples	8	8	108
Examinations for eosinophiles	3	4	103
Dark field examinations	0	1	13
Total	536	512	6227

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General

The chief communicable disease encountered this month was chickenpox, which is a relatively minor communicable disease. We are experiencing the same situation that is occurring over the entire State of Washington at the present time. There has also been a rise in whooping cough but with the immunization level established in the community, it is not felt that this will cause any serious trouble.

Due to the increase in the communicable disease case load, the visits made by the public health nurses were increased by approximately 33%. Calls made for morbidity also show a slight rise, which is to be expected at this time of the year. To date there has been no unusual outbreak of influenza, which was present last year.

Word was received from the State Health Department to the effect that they have scheduled their mobile x-ray unit to be in Richland next June, which will give us an opportunity to carry out an extensive x-ray survey for the residents of Richland. It is hoped that by enlisting the cooperation of the various service clubs, parent-teacher associations, Medical Department, etc., that we will be able to have 100% of the population of Richland x-rayed. Preliminary plans are now being made.

The V. D. Control Officer of the State of Washington was consulted during the month. He commended the V. D. control program which is being carried out here. A review of the cases was made and the facilities and treatment schedules offered were found to be acceptable.

A joint staff conference of the Pasco, Walla Walla, and Richland public health nurses was held at Kadlec Hospital. Miss Carolyn Bowen, Orthopedic Consultant of the State Department of Health, was guest speaker.

A program of strict compliance with the Federal Milk Code by the milk producers is being instituted insofar as relaxation of wartime controls will allow for the obtaining of equipment and materials. This will allow for the gradual elimination of dairy plants which complied under the emergency standards but have failed to make necessary changes as recommended by this department. As a result of the proceeding, two producers have been eliminated and two new dairies having the most modern buildings and equipment have been approved. Bacteria counts of both the raw product and the pasteurized milk have been very satisfactory.

Field studies relative to the 1947 mosquito control program have been made and recommendations are to be made at the January meeting of the committee. The present active phase of the program consists in trapping of beaver by the State Game Department, and burning and clearing of dead vegetation throughout the village by the labor department.

The food-handling establishments are approximately the same as last month insofar as sanitary conditions are concerned. All have indicated improvement or have been operating satisfactorily.

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The routine inspection of the schools has indicated improvement in all except one. Here the main difficulty has been one of insufficient personnel. As of the first of January, another janitor is to be added, which should improve this condition.

The bacteriological results indicate that the sewage disposal plant is operating satisfactorily.

DENTAL DIVISION	November	December	Year to date
Patients treated.....	1136	1218	17246

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MEDICAL DEPARTMENT PERSONNEL

December 31, 1946

AREAS	Physicians	Dentists	Nurses	Aides & Orderlies	H. I. Specialists	Technicians	Others
100-B			)			)	
			)			)	
100-D			4)		8	2)	
			)			)	
100-F			)		12	)	
200-E			3		29	)	
						2)	
200-W			3		35	)	
200-N							
300			1		70	1	
Plant General	7		7				
700-1100	12	8	73	38	13	18	31
Total	19	8	91	38	167	23	31

Grand Total - 377.

Note: This report includes persons on leave of absence.

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Medical Department

Annual Health Summary

It was felt that a summary of results of the year's activities would be of value to indicate trends and to allow comparison with the previous year.

It is gratifying that another year has passed without a single harmful radiation exposure occurring at the Hanford Engineer Works. This statement is based upon readings of hundreds of thousands of health instruments, and thousands of medical checks upon the health of our employees.

It must be emphasized that this result was achieved through the untiring efforts of every individual on the plant. There were incidents each month which could have caused trouble. These were carefully investigated to try to prevent their reoccurrence.

Evening instruction for H. I. Engineers and supervisors was very helpful in improving the general level of knowledge in the fundamentals of this specialty.

1,077,300 Personnel pencils were read and 260,336 films developed. 672,872 items were monitored in the plant laundry, and 538,094 hand counts were recorded. Approximately one in 180 of such hand counts exceeded the warning limits, but the high results were repetitive among certain laboratory groups. Improvement in laboratory technique in such cases has been slow. 6,760 Thyroid checks for radioactivity gave no abnormal results. 1,757 urinalyses for plutonium gave no results of consequence.

An active program of health education and preventive medicine was coordinated with early effective treatment of the sick to produce an enviable health record for our employees and the other residents of Richland.

The General Electric Group Disability plan offers hospital care in addition to the features of the Du Pont Disability plan. This has given added impetus to the program of early effective hospital treatment. Ninety-two percent of our employees subscribed to this plan and most of those who did not subscribe were covered by other prepayment plans.

In comparing results in 1946 with those of 1945, it must be kept in mind that the average population of Richland decreased by about 7%, while the population eligible for medical care decreased by a larger figure.

Physical examinations by the Plant Medical Section were down 35%, largely because the interval between area examinations could be lengthened due to satisfactory health protection measures.

Occupational injuries were down 31%, and occupational retreatments were decreased by 40%, indicating a very substantial improvement in the injury frequency rate and in the severity of injuries.

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Medical Department

In spite of a decrease in population, there was an increase of 12% in the number of medical out-patient treatments in the Village, indicating a greater use of medical facilities.

The average daily number of hospital patients was 67.2, which is 3% less than for 1945.

Major surgical operations were increased from 200 to 290, while minor operations changed slightly from 1467 to 1408.

456 Babies were delivered without a single maternal death. There were 14 infant deaths, 12 of which were due to immaturity. During the two and one-half years of operation at Kadlec Hospital, there have been 1077 babies delivered without a maternal death - a most enviable record for the Obstetrical Section.

The birth rate for Richland was 34.7 per 1000 population, while the five-year average for this State was 20.8, which is also about that for the U.S. The Richland birth rate is therefore 66% higher than the average rate.

The hospital death rate was 0.89% of the hospital discharges, which compares with rates up to 4% in good general hospitals.

The death rate for Richland was 3.5 per 1000 population, which compares with the State average of 10.7 per 1000 population.

From the above statistics, the conclusion may be drawn that the health of the residents of Richland compares very favorably with that in any other section of the country.

Mosquito control measures began to bear fruit, there being a marked reduction in pest and malarial mosquitoes.

A drive for chest x-rays resulted in 50% of all residents of Richland securing them. The goal is 100% x-rays next year, and "No Tuberculosis by 1970".

Immunizations were increased from 486 to 12,675. The increase was largely due to almost 100% vaccination for smallpox, necessitated by an epidemic of this disease in the State.

Sanitary conditions were maintained in a satisfactory state.

The incidence of communicable disease decreased from 2579 to 785, due to immune states being developed in a more stable community, to results of prophylactic innoculation, and to the influenza epidemic of 1945.

There were eight relatively mild cases of poliomyelitis, none of which have left any serious disability.

Hour dental appointments replaced half hour ones in many cases, and accounts for the smaller total number of patient visits. At the close of the year there are eight dentists working and assurance of continued satisfactory dental service.

DECLASSIFIED

Medical Department

Absenteeism for 1946 was 2.23%, as compared to 3.53% for 1945 - a reduction of 1.30%. Since absence for causes other than sickness remained practically constant for both years, the reduction was entirely due to a decrease in sickness absenteeism.

Economy was stressed. In spite of a change from a six to a five-day work week, the village medical program was carried on with eleven fewer employees at the end of 1946.

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DESIGN AND CONSTRUCTION DEPARTMENT

MONTHLY REPORT FOR DECEMBER, 1946

This is the initial report for the Design and Construction Department. As of December 1 this department consisted of a Superintendent, four Junior Engineers, five Draftsmen, a receptionist, messenger and secretary. In addition, one Project Engineer, two Senior Engineers, two Junior Engineers, one Draftsman, and one Section Supervisor were assigned from other departments. During the month the following additions were made: An Assistant Superintendent of Design and an Assistant Superintendent of Construction, one Senior Engineer, two Junior Engineers, three Draftsmen, and one stenographer, bringing the total number of employees in the department to twenty-four in addition to the seven assigned employees.

PROJECTS

241 Tank Farm

Design Section

Specifications and drawings were released for the 241-BX tank farm.

Construction Section

On December 16 invitations to bid were forwarded to the following prospective bidders for construction of tank farm 241-BX complete with one diversion box, one catch tank, and certain process piping:

J. A. Terteling & Sons	Boise, Idaho
Sam Bergeson	Tacoma, Washington
Guy F. Atkinson Co.	Portland, Oregon
Morrison-Knudsen Co., Inc.	Seattle, Washington
W. C. Smith, Inc.	Portland, Oregon

On December 19 the Bergeson Co. returned data supplied them and declined their opportunity to bid.

On December 26 invitation to bid on the tank farm was extended the James Construction Co. of Seattle upon request of the Area Engineer.

REDOX

Design Section

Design of facilities for the 1/150 scale Redox Plant was carried on keeping in mind a later application to the 1/10 scale plant. This design is approximately 40% completed.

HOUSING

Design Section

A meeting was held and after considerable discussion it was decided that study should be given to possible location of housing units to meet present needs. Personnel were assigned to this project and study was commenced.

W-4 ADDITION

Design Section

The facilities needed for the immediate expansion of the Design and Construction Department were given considerable study and design was started on such facilities.

300 AREA OFFICE BUILDING

Design Section

After discussion with the Superintendent of the Technical Department preliminary estimates for a new office building in the 300 Area were made. Men were assigned to start the design of such a building.

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ACCOUNTING DEPARTMENT

DECEMBER 1946

GENERAL

Activities of the Accounting Department during the month included the following in addition to regular scheduled work:

(a) Large amount of work preparatory for transition from du Pont to General Electric vacation and absence allowance plans.

(b) Discussions with Government representatives relative to property records and reimbursement routines.

Statistics

General	December	Total to Date
H.E.W. Instructions Letters issued	3 ✓	24
Office Letters issued	2 ✓	10
Organization Announcements issued	5 ✓	25

Employees and Payrolls	Total	Monthly Payroll	Weekly Payroll
Employees on payroll at beginning of month	4385	781	3604
Additions and transfers in	135	20	115
Removals and transfers out	(45)	(2)	(43)
Transfers from Weekly to Monthly Payroll	-	10	(10)
Employees on payroll at month end	4475	809	3666
Gross amount of payroll	$ 1,512,584	$ 328,255	$ 1,184,329
Average salary rate per hour	$ 1.760	$ 2.327	$ 1.629
Average salary rate previous month	1.759	2.315	1.635

Employee Plans	November	December
U. S. Savings Bonds		
Number participating at beginning of month	1942	1939
New authorizations and transfers in	59	57
Voluntary cancellations	(54)	(33)
Removals and transfers out	(8)	(7)
Number participating at end of month	1939	1956
% participating	44.2%	43.7%
Bonds issued - maturity value	$ 111,175	$ 111,000
- number	3029	2980
Refunds issued	57	36
Revisions in authorizations	17	34
Group Life Insurance		
Number participating at beginning of month	2888	2941
New participants and transfers in	79	29
Cancellations	(12)	(6)
Removals and transfers out	(14)	(10)
Number participating at end of month	2941	2954
% of eligible employees' participation	80.2%	80.3%

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Accounting Department

	November	December
Group Disability Insurance - Personal		
Number participating at beginning of month	3662	3653
New participants and transfers in	17	19
Cancellations	(2)	(2)
Removals and transfers out	(24)	(31)
Number participating at end of month	3653	3639
% of eligible employees' participation	95.9%	94.7%
Group Disability Insurance - Dependents		
Number participants at beginning of month	2490	2516
Additions and transfers in	36	19
Cancellations	(2)	(9)
Removals and transfers out	(8)	(10)
Number participating at end of month	2516	2516
Group Disability Insurance - Claims		
Number of claims paid by insurance company:		
Employee Benefits		
Weekly Sickness and Accident	60	66
Daily Hospital Expense Benefits	67	65
Special Hospital Services	60	62
Surgical Operation Benefits	40	40
Dependent Benefits Paid		
Daily Hospital Expense Benefits	129	84
Special Hospital Services	129	79
Amount of claims paid by insurance company:		
Employee Benefits	$ 6,459.91	$ 5,930.09
Dependent Benefits	4,504.33	2,899.25
Total	$ 10,964.24	$ 8,829.64

General Accounting		
Number of Accounts Payable Vouchers Entered		
G. E.	1744	2640
Du Pont	487	336
Total	2231	2976
Amount of Cash Disbursements (Accounts Payable)		
G. E.	$ 919,397.93	$ 724,121.31
Du Pont	84,831.91	1,073,405.36*
Total	$ 1,004,229.84	$ 1,797,526.67

*Includes $1,000,000.00 returned to Government by du Pont as a reduction of advance.

Number of checks issued		
G. E.	1140	1323
Du Pont	340	194
Total	1480	1517

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Accounting Department

	November	December
Public Vouchers submitted to Area Engineer-G.E.		
Amount of 1034 Public Vouchers not reimbursed at beginning of month	$ 848,862.88	$ 510,281.83
Amount of 1034 Public Vouchers submitted during month	1,198,148.03	976,004.57
Total	$ 2,047,010.91	$ 1,486,286.40
Amount of 1034 Public Vouchers reimbursed during month	1,536,729.08	1,000,143.59
Amount of 1034 Public Vouchers not reimbursed at end of month	$ 510,281.83	$ 486,142.81
Number not reimbursed at beginning of month	42	28
Number submitted during month	52	65
Total	94	93
Number reimbursed during month	66	55
Number not reimbursed at end of month	28	38
Amounts for which 1034 Public Vouchers have not been submitted to Area Engineer-G.E.		
1035 Pre-Audit Vouchers Issued and Outstanding	$ 814,194.40	$ 2,250,102.89
1035 Pre-Audit Vouchers not issued	1,814,977.88	1,427,878.59
Total (unbilled items)	$ 2,629,172.28	$ 3,677,981.48
Number of Pre-Audit Vouchers Issued and Outstanding	48	118
Public Vouchers submitted to Area Engineer-du Pont		
Amount of 1034 Public Vouchers not reimbursed at beginning of month	$ 206,323.11	$ 257,240.12
Amount of 1034 Public Vouchers submitted during month	581,492.15	80,880.83
Total	$ 787,815.26	$ 338,120.95
Amount of 1034 Public Vouchers reimbursed during month	530,575.14	271,197.69
Amount of 1034 Public Vouchers not reimbursed at end of month	$ 257,240.12	$ 66,923.26
Number not reimbursed at beginning of month	64	56
Number submitted during month	72	31
Total	136	87
Number reimbursed during month	80	56
Number not reimbursed at end of month	56	31
Amounts for which 1034 Public Vouchers have not been submitted to Area Engineer-du Pont		
1035 Pre-Audit Vouchers Issued and Outstanding	$ 3,633.45	$ 72,811.67
1035 Pre-Audit Vouchers Not Issued	80,715.14	40,763.67
Total (unbilled items)	$ 84,348.59	$ 113,575.34
Number of Pre-Audit Vouchers Issued and Outstanding	3	38

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Accounting Department

	November	December
Cash Receipts - General Electric		
Accounts Receivable		
U. S. Government	$ 1,536,729.08	$ 1,000,143.59
Rent	47,081.14	46,440.35
Hospital	29,611.42	29,227.30
Telephone	2,700.88	2,922.44
Miscellaneous	1,251.33	503.49
Advance of U.S.Government Funds	-	400,000.00
Employees Sales	1,650.95	1,108.20
Bus Fares	6,730.60	7,706.00
All Other	3,068.25	5,571.79
Total	$ 1,628,823.65	$ 1,493,623.16
Cash Receipts - Du Pont		
Accounts Receivable		
U. S. Government	$ 530,575.14	$ 297,585.36
Hospital	3,632.12	2,586.60
Rent	260.50	80.50
Telephone	48.82	37.47
Miscellaneous	2,072.75	766.83
All Other	32,842.76	1,990.52
Total	$ 569,432.09	$ 303,047.28
Property Inventory Transfers		
Number received	345	264
Number of items affected	959	585
Inventories		
Essential Materials	$ 1,452,747.23	$ 1,443,218.94
Excess Materials	654,440.81	807,709.92
Memo Employee Sales	5,995.85	6,022.60
Precious Metals	40,602.97	40,602.97
Returnable Containers	11,794.27	11,862.47
Spare Parts	1,440,520.41	1,447,402.87
Special Process Material	477,231.00	499,265.20
Stores for Cash Sales to Employees	11,489.57	10,754.38
Stores - General	983,577.14	1,033,886.17
Inventory Disbursements		
Essential Materials	$ 340,699.79	$ 395,904.31
Excess Materials	9,989.35	95,663.64
Memo Employee Sales	1,446.79	685.79
Precious Metals	-0-	-0-
Returnable Containers	765.20	1,140.50
Spare Parts	8,162.69	4,255.22
Special Process Material	-0-	-0-
Stores for Cash Sales to Employees	1,658.04	1,074.23
Stores - General	91,120.05	91,799.98

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Accounting Department

	November	December
Stores		
Number of items added to stores stock	331	356
Number of items deleted from stores stock	60	2
Items in stores stock at month end	41,630	41,984
Receiving Reports issued	2,554	2,574
Shipments on hand not checked	85	26
Material Exception Reports issued	81	68
Material Exception Reports cleared	78	71
Material Exception Reports open at month end	24	21
Certificates of Inspection issued	5	6
Certificates of Inspection cleared	7	3
Certificates of Inspection open at month end	25	28
Store Orders filled	6,713	7,505
Emergency Store Orders filled	1	1
Returnable Containers received	315	401
Returnable Containers shipped	212	137
Returnable Containers on hand at month end	3,831	4,095
Returnable Containers on hand over six months	1,361	1,566
Returnable Container Return Orders received	10	10
Returnable Container Return Orders closed	13	5
Returnable Container Return Orders on hand at month end	210	215
Shipping Orders received	32	33
Shipping Orders closed	27	23
Shipping Orders on hand at month end	13	23
Purchasing		
Requisitions received	2,231	2,094
Requisitions placed	2,087	2,034
Requisitions on hand at month end	632	692
HW Orders placed	1,286	1,170
OHEW Orders placed	117	138
MO Orders placed	108	88
OGT Orders placed	6	10
Alterations issued	64	223
Requests to expedite received	107	81
Scrap Sales completed	0	0
Value of scrap sold	0	0
Miscellaneous Clerical		
Office Machines repaired in shop	105	108
Office Machines service calls	124	130
Lines working as Class A Telephones	164	150
Lines working as Class C Telephones	230	247
Lines working as Class C Party Telephones	10	10
Total Official Telephones	404	407
Lines working as Class B 2 Single Telephones	74	74
Lines working as Class B 1 Single Telephones	163	165
Lines working as Class B Party Telephones	1,128	1,132
Total Residence Telephones	1,365	1,371

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Accounting Department

	November	December
Miscellaneous Clerical (continued)		
Vacant lines	31	22
Items of First Class Mail received	16,602	26,741
Items of Parcel Post received	579	561
Items of Registered Mail received	70	61
Items of Insured Mail received	57	55
Items of Special Delivery Mail received	28	36
Amount of money used on postage meter machine	$ 521.46	$ 64.35
Stamps used	-	$545.16
Multilith Orders received	196	146
Multilith Orders completed	253	133
Balance of multilith orders on hand at month end	12	25
Mimeograph orders received	1396	1679
Mimeograph orders completed	1402	1679
Mimeograph orders on hand at month end	0	0
Ditto orders received	2,702	2,656
Ditto orders closed	2,702	2,656
Ditto orders on hand at month end	0	0
Accounting Department		
Number of employees on roll at month end	619	631
Terminations	18	19
New hires	15	31
% of termination	2.89	3.07
% of absenteeism	3.37	3.25
Major injuries	0	0
Minor injuries	13	10

ORGANIZATION AND PERSONNEL

Effective December 31, 1946, the following were classified as exempt in view of their supervisory duties and were transferred from the weekly to the monthly payroll:

Supervisor - Stenography
Supervisor - Telephone Exchange

SECTIONAL ACTIVITIES

Assigned, Field & Miscellaneous Clerical

The traffic load in the Telephone Exchange, as recorded by traffic peg counts, has increased 10% in November over October and 7% in December over November.

The supply of office furniture and equipment was practically depleted at month end. Expected relief from Government surplus stocks failed to materialize as the equipment received during the month was in such poor condition that most of it had to be sent to the salvage and excess yard upon receipt. Office furniture and equipment is on the Treasury Procurement Schedule mandatory list and, under terms of the prime contract, must be purchased by the Government. At the present time the Government in turn is restricted from buying new equipment if it is available in Government Surplus Stocks.

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Accounting Department

The Government transferred $3,499.20 worth of stamps to us as of December 3. Use of the postage meter machine was discontinued on December 4 and will not be operated until the stamps have been used by the Mail Room.

At the request of the "P" Department, a recap of metal receipts, shipments off the plant and deliveries from the 300 Area to the 100 Areas was made from the beginning of plant operations through November 30, 1946.

Cost

Start-up of the central work order control cost system was postponed until February 1 when it is expected that suitable office space will be available.

Cost functions were normal for the month of December.

Stores

Arrangements were completed to transfer warehousing of furniture used in the Village to the Housing Section of the Service Department. This transfer involved the interchanging of material stored in Warehouse 6 and the MS Warehouse across from Patrol headquarters in order to locate the furniture near the Housing Office and to permit full utilization by Stores of Warehouse 6,a much larger building than the MS Warehouse.

Construction of a heated, well-lighted inner office in the Southwest corner of the Receiving Section was completed during the month. This affords checkers relief from the cold which generally prevails on the Receiving platform as the doors must be left open to unload material received and to load direct charge materials received for delivery to the plant Areas.

Purchasing

The backlog of requisitions on hand December 31 increased approximately 10% over requisitions on hand November 30.

Even though it was of relative short duration, the coal strike and a growing demand for building materials has counteracted indications that the market was returning to normal and retained steel in light gauges, electrical equipment, cast iron pipe and most other building materials on the list of items that are difficult to procure for this works.

Additional gains were made during the month toward attainment of a six months minimum stock for essential materials except where limited by storage capacity.

Accounting Department

BILLING TO U.S. GOVERNMENT

As a result of the transfer of all contracts entered into by the Manhattan Engineer District to the Atomic Energy Commission as of January 1, 1947, and the resulting changes in Government routines, we were requested to temporarily withhold billing to the Government on Form 1034 Vouchers. Therefore no billing has been issued since December 23. Vouchers on Form 1035 are continuing to be presented to Government Audit Section and, after being audited, are returned and held by us. As of December 31, 1946, the backlog on hand amounted to $429,181.84. Revised Public Voucher form is now being printed and it should be possible to submit vouchers for reimbursement beginning January 13, 1947.

Under the new routine, we will now receive reimbursement from the U.S. Treasury Department, Disbursing Officer, Portland, Oregon, rather than from the Finance Office, U.S. Army, Vancouver, Washington.

VACATION AND ABSENCE POLICIES

During the month of December instructions were prepared informing supervision of Company policy with respect to vacations and payments for absences.

These instructions were reviewed with superintendents on two occasions and final instructions were issued on December 31, 1946.

SUPERIOR AIRLINES SUB-CONTRACT

Details necessary to support billing as required by the Government have now been received from Superior Airlines with one minor exception, and the necessary insurance policies are now on file in order that we may complete certification as to insurance coverage.

It is therefore expected that billing up to December 15, 1946, will be completed in January 1947 and subsequent invoices from Superior Airlines will be handled currently.

PROPERTY RECORDS

A third inventory check of Class B Property was completed in all Areas except 300, which will be completed in January. Results were satisfactory.

DU PONT ACTIVITIES

Nine employees of the General Accounting Section are still assigned to work on du Pont "Clean-up" activities. Seven are preparing records for shipment and two are acting in the capacity of a final audit group. This is in addition to work performed by the Section in handling payments for du Pont account and related accounting work.

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Accounting Department

Payrolls for the three remaining du Pont employees at Hanford Engineer Works were transferred to the du Pont Company as of December 31, 1946.

PAYROLL DIVISIONS

Effective with the week ended December 29, 1946, a new record of "earnings and taxes" card was instituted to enable payroll divisions to accumulate Federal Old Age Benefit tax and Company pension deductions which is in addition to the accumulation of gross earnings and Federal income tax.

Federal Withholding Tax (W-2) Forms and Social Security reports were prepared for du Pont employees covering payrolls prior to September 1, 1946, and reports were reconciled with payroll earnings and deduction records.

As a result of approval granted by the National Wage Stabilization Board to increase the rate for laborers of the Morrison-Knudsen Company, retroactive to July 8, 1946, 143 retroactive wage adjustment checks were prepared in the gross amount of $8,477.04.

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