OP-59 Revised

IN-04334

[redacted]

HW-7-3171-Del

PROJECT 9536

727741

Route List

1.
2.
3.
4.
5.

[redacted]

File

Date January 8, 1946

Subject Monthly Report

To R. M. Evans

From D. A. Miller

Copy No. [redacted] 1

R

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HANFORD ENGINEER WORKS

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HW 7-3171-Del [redacted]

- The Area Engineer

[redacted]

WITH DELETIONS

January 8, 1946

This Document consists of 92 Pages No. 1 [redacted]

HANFORD ENGINEER WORKS

MONTHLY REPORT

DECEMBER 1945

Classification Cancelled (Change to Declassified with Deletions

By Authority of LG-PR-2

C A Bauman 6/13/90

By D Cleavenger 6/19/90

TL BURNSIDE 6/19/90

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GENERAL SUMMARY

The three 100 Areas operated at a time efficiency of 78.3% during December. Operating power levels were maintained at 225, 250 and 225 except for a short period when D and F operated at 275 and 250 respectively to compensate partially for outage on B unit which was down from December 11 through month end for repairs. Major repair work involved the replacement of ten vertical safety rod thimbles in B unit which had failed due to corrosion. The entire problem was completed without unusual incident or injury to personnel.

Seventy charges were started through the 200 Area Canyon Buildings and seventy-seven charges were delivered from the Isolation Building. In view of unfavorable weather conditions for dispersion of stack gases during the winter months the production rate was slowed on December 15 to allow a 60-day decay period of the active gases in the metal prior to dissolving.

Work was started on installation of waste solution tie-lines between 241 T and 241 U and from 241 B to 241 C. Completion of this work will provide additional capacity for accumulation of waste.

The total plant force increased by 18 to 4659. Increases were confined to the weekly salary rolls in the Electrical, Medical, and S Departments. Turnover was 2.38%. Absenteeism was high during the month as a result of the rather severe influenza epidemic. As of month end the situation was much improved.

Occupancy in Richland Village increased by 37 family units.

Interest in safety showed further improvement and the plant completed the third consecutive month without a time losing injury.

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STAFF

MANAGER	B. H. MACKEY
ASSISTANT MANAGER	D. A. MILLER
PRODUCTION SUPERINTENDENT	M. H. SMITH
TECHNICAL SUPERINTENDENT	L. SQUIRES
GENERAL SUPERINTENDENT	T. N. STAPLETON
WORKS ENGINEER	ROSS HARE
P DEPARTMENT SUPERINTENDENT	C. N. GROSS
S DEPARTMENT SUPERINTENDENT	W. C. KAY
POWER SUPERINTENDENT	F. M. ACKER
MAINTENANCE SUPERINTENDENT	A. J. SCHWERTFEGER
ELECTRICAL SUPERINTENDENT	H. A. CARLBERG
INSTRUMENT SUPERINTENDENT	W. P. OVERBECK
SERVICE SUPERINTENDENT	W. T. CLOUD
TRANSPORTATION SUPERINTENDENT	R. T. COOKE
MEDICAL SUPERINTENDENT	W. D. NORWOOD
CHIEF ACCOUNTANT	S. D. EWING

12/25/45

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FORCE REPORT

DEPARTMENT	NON-EXEMPT		EXEMPT		TOTAL	
	11/25/45	12/25/45	11/25/45	12/25/45	11/25/45	12/25/45
Management	-	-	5	5	5	5
P	223	223	60	60	283	283
S	242	255	69	68	311	323
Technical	190	188	84	85	274	273
Power	423	424	93	88	516	512
Maintenance	442	440	94	92	536	532
Electrical	165	171	37	37	202	208
Instrument	117	117	34	32	151	149
Protection	427	427	74	72	501	499
Service	187	189	62	61	249	250
Transportation	544	542	63	63	607	605
Medical	258	267	97	96	355	363
Accounting	631	637	20	20	651	657
TOTAL	3849	3880	792	779	4641	4659

12/25/45

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PERSONNEL DISTRIBUTION

	100-B Area	100-D Area	100-F Area	200-E Area	200-W Area	300 Area	Plant General	700-1100 Area	TOTALS
P DEPARTMENT									
Supervisors	14	15	15	-	-	12	-	4	60
Operators	34	32	43	-	-	114	-	-	223
Total	48	47	58	-	-	126	-	4	283
S DEPARTMENT									
Supervisors	-	-	-	21	28	-	3	3	55
Operators	-	-	-	99	149	-	7	-	255
Others	-	-	-	1	7	-	5	-	13
Total	-	-	-	121	184	-	15	3	323
TECHNICAL DEPARTMENT									
Supervisors	2	1	1	6	11	7	-	5	33
Chemists, Engineers & Physicists	8	11	7	14	26	40	-	8	114
Analytical Personnel	9	8	9	25	38	24	-	-	113
Others	-	-	-	5	6	2	-	-	13
Total	19	20	17	50	81	73	-	13	273
POWER DEPARTMENT									
Supervisors	23	24	20	5	7	-	3	6	88
Operators	90	103	101	24	34	10	-	29	391
Others	5	6	7	1	7	4	-	3	33
Total	118	133	128	30	48	14	3	38	512
MAINTENANCE DEPARTMENT									
Supervisors	7	7	15	9	15	4	-	16	73
Engineers	1	-	-	-	5	-	-	13	19
Mechanics	34	27	61	44	72	30	-	123	391
Others	2	3	2	5	9	4	-	24	49
Total	44	37	78	58	101	38	-	176	532

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	100-B Area	100-D Area	100-F Area	200-E Area	200-W Area	300 Area	Plant General	700-1100 Area	TOTALS
ELECTRICAL DEPARTMENT									
Supervisors	2	5	2	3	5	1	9	4	31
Electricians	15	15	15	15	15	7	50	23	155
Others	1	4	1	1	3	-	10	2	22
Total	18	24	18	19	23	8	69	29	208
INSTRUMENT DEPARTMENT									
Supervisors	3	3	4	4	3	4	-	3	24
Engineers	-	1	-	-	-	2	-	5	8
Mechanics	17	17	17	15	15	16	-	6	103
Others	-	-	-	-	-	7	-	7	14
Total	20	21	21	19	18	29	-	21	149
PROTECTION DEPARTMENT									
Supervisors	7	7	7	9	7	5	1	29	72
Patrolmen	54	55	51	88	66	25	9	49	397
Others	4	4	4	2	4	-	-	12	30
Total	65	66	62	99	77	30	10	90	499
SERVICE DEPARTMENT									
Supervisors	4	-	-	-	1	5	5	39	54
Firemen	13	-	-	-	-	9	-	51	73
Laundry Operators	-	-	-	-	1	-	-	1	2
Inspectors	4	4	4	4	4	1	1	1	23
Janitors	4	5	5	5	9	8	-	31	67
Others	-	-	-	-	8	1	4	18	31
Total	25	9	9	9	23	24	10	141	250
TRANSPORTATION DEPARTMENT									
Supervisors	1	1	1	-	1	1	7	51	63
Drivers (Based on Areas Served)	25	26	27	30	40	20	30	39	237
Mechanics	1	1	1	1	2	-	9	48	63
Trainmen	4	3	3	2	2	3	3	3	23
Laborers	-	-	1	-	2	-	1	49	53
Others	7	5	4	3	10	3	5	129	166
Total	38	36	37	36	57	27	55	319	605

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	100-B Area	100-D Area	100-F Area	200-E Area	200-W Area	300 Area	Plant General	700-1100 Area	TOTALS
MEDICAL DEPARTMENT									
Physicians	-	-	-	-	-	-	2	17	19
Dentists	-	-	-	-	-	-	-	4	4
Nurses	←	5	→	3	3	1	7	75	94
H.I. Specialists	7	7	8	36	30	30	22	2	142
Technicians	1	1	1	1	1	1	-	19	25
Others	-	-	-	-	-	-	-	79	79
Total	8	13	9	40	34	32	31	196	363
ACCOUNTING DEPARTMENT									
Supervisors	-	-	-	-	-	-	-	20	20
Clerks	9	9	9	10	18	12	-	251	318
Telephone & Teletype Operators	-	-	-	4	4	-	-	32	40
Others	1	1	1	4	9	10	-	253	279
Total	10	10	10	18	31	22	-	556	657
MANAGEMENT	-	-	-	-	-	-	-	5	5
GRAND TOTALS	413	416	447	499	677	423	193	1591	4659

12/25/45

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EXEMPT PERSONNEL ARRIVALS AND DEPARTURES - DECEMBER 1945

ARRIVALS

Name	Department	Physical Arrival	Origin
W. W. Pleasant	Power	Dec. 13	Indiana Ordnance Works
B. T. Strongman, M.D.	Medical	" 4	Indiana Ordnance Works

DEPARTURES

Name	Department	Physical Departure	Reason
E. R. Read	S	Nov. 30	Completion of Assignment
L. C. Evans	"	Dec. 4	Trans. - Wilmington
G. Leader	Technical	Nov. 26	Completion of Assignment
W. M. Coons	"	" 30	Trans.-Ammonia, Exp.Sta., Wilmington
R. H. Beaton	"	Dec. 14	Completion of Assignment
L. Marshall	"	" 21	Completion of Assignment
J. Marshall	"	" 21	Completion of Assignment
F. L. Hunt	Power	Nov. 26	Trans.-Engr., Wilmington
E. O. Brown	"	" 30	Completion of Assignment
R. D. Frank	"	" 30	Trans.-Engr., Wilmington
J. R. Misenheimer	"	Dec. 7	Completion of Assignment
T. P. Vardell	"	" 11	Trans.-Rayon, Old Hickory, Tenn.
J. A. Kelley	"	" 12	Completion of Assignment
H. F. Ross	"	" 17	Trans.-Rayon, Buffalo, N.Y.
J. S. McMahon	Maintenance	" 7	Trans.-Engr., Wilmington
R. R. Harris	"	" 20	Trans.-Rayon, Old Hickory, Tenn.
W. D. Smutz	"	" 21	Trans.-Wilmington
C. W. Botsford	Instrument	" 11	Trans.-Engr., Deepwater, N.J.
J. F. Coughlin	"	" 14	Trans.-Pigments, Edgemoor, Del.
F. T. Sykes	Protection	" 12	Completion of Assignment
T. O. Brewer	"	" 18	Completion of Assignment
J. G. Wert, R.N.	Medical	Nov. 30	Resignation
A. Gardner, D.D.S.	"	Dec. 3	Resignation
A. D. Wert, M.D.	"	" 7	Completion of Assignment

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	DB	DC	DD	DE
DW	1,126	78	22,014	1,524
DX	-	-	77,771	1,484
DY	1,126	78	99,785	3,008
DZ	2,085	137	20,195	1,276
EA	24,827	98	444,272	1,753
EB	5,348	21	213,332	830
EC	-	-	9,514	38
ED	27,216	107	639,566	2,512
EE	22,565	89	430,516	1,689
EF	-	22	-	472
EG	-	17	-	426
EH	-	1	-	51
EI	-	3	-	36
EJ	-	26	-	467
EK	-	-	-	374
EL	-	-	-	50
EM	-	-	-	32
EN	-	5	-	-
EO	-	52	-	-
EP	-	1	-	-
EQ	-	4	-	-
ER	11,008	43.2	139,035	545.2
ES	6,400	25.1	138,786	544.7*
ET	3,072	12.1	111,629	437.4
EU	20,480	80.4	389,450	1,527.3
EV	11,711	46.0	74,246	291.5
EW	6,676	26.2	73,636	289.8
EX	3,360	13.2	45,735	179.2
EY	21,747	85.4	193,717	760.5
EZ	11,760	46.2	74,704	293.2
FA	11,865	46.6	82,639	324.4
FB	-	-	-	-
FC	23,625	92.8	157,343	617.6
FD	12,713	49.9	72,345	284.0
FE	13,776	54.1	81,799	321.1
FF	-	-	-	-
FG	26,489	104.0	154,144	605.1

	DF	DG	DH	DI
FH	2,514	180	1,561	109
FI	920	57	1,107	69
FJ	-	55	-	65
FK	7,773	30	6,857	27
FL	21,999	86	23,965	94
FM	26,993	107	26,993	107
FN	-	8	-	8
FO	-	27	-	27
FP	65,492	257	64,821	254
FQ	65,426	257	65,150	256
FR	66,182	262	65,894	259
FS	197,100	776	195,865	769
FT	40,029	157.1	37,311	146.4
FU	-	23.8	-	12.6
FV	-	501.0	-	605.0

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	DJ	DK
FW	3,039	82,496
FX	7,309	88,392
FY	6,621	69,185
FZ	16,969	240,073
GA	13,562	57,868
GB	5,325	61,453
GC	2,602	40,701
GD	21,489	160,022

	DL	DM	DN	DO	DP
GE	9,250,000	10,625,000	-	19,875,000	118,870,000
GF	8,205,000	8,982,000	-	17,187,000	110,755,000
GG	742,000	687,000	-	1,429,000	7,329,000
GH	10,050,000	10,496,000	-	20,546,000	104,742,000
GI	-	715,000	-	715,000	4,275,000
GJ	10,050,000	9,781,000	-	19,831,000	100,467,000
GK	2,655,000	2,504,000	-	5,159,000	-
GL	-	-	-	4,362,000	-
GM	-	-	-	19,096,000	97,659,000

* Corrected to agree with audit total.

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F DEPARTMENT

DECEMBER 1945

PILE SUMMARY

	Pile B	Pile D	Pile F
Time Operated (%)	44.7	95.3	95.6
*Power Level (MW)	0	275	250
*Inlet Water Temperature (°C)	6.0	6.6	7.6
*Outlet Water Temperature (Maximum °C, 10 tubes, 0.240 zone)	Down	49.6	45.9
Number of "Scrams"	0	2	0
Number of Purges	0	0	0
Helium Consumption (cu. ft.)	113,132	23,195	34,540
Metal Discharged (tons	45.2	26.3	13.2
Inhours Gained (this month)	6	17	25
*Inhours poisoned	337	212**	229
*Inhours in Rods	63	74	50

*Month-end figures.

**The change in this figure from the 196 reported last month is due to a change in the method of calculation, not to a change in poisoning.

During the month the first major repair job was made on an active Pile when ten vertical safety rod thimbles were removed and replaced. To partially compensate for the extended outage on B Pile, the levels at D and F were raised on December 19 to 275 MW and 250 MW, respectively.

100-B AREA

Pile Building

The Pile was operated at a level of 225 MW from November 26 to December 11 with the exception of one regular metal discharge on December 4-5 and a shutdown of approximately 5 hours on December 6. To take care of the extended shutdown of 33 hours on December 4-5, two temporary poison tubes were loaded (tube 3781 on December 4, and tube 1081 on December 5). This temporary poison was removed from the Pile on December 6. From December 11 through the end of the month, the Pile was down for extensive repairs to the vertical rod thimbles.

During the outage of December 4, three tubes (2373, 2385 and 3160) containing high concentration material were discharged and four slugs from tube 3160 were found to have blisters. Defective vertical rod thimble No. 15 was boroscoped, and the south high tank was tested into the A-D riser system. A total of eleven 48-mesh screens were replaced with 30-mesh screens after this test. The strengths of poison columns 3179 and 1579 were increased by 23 ih during the shutdown.

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P Department

As a result of the borescope examination of vertical rod thimble No. 15, in which the bottom of the thimble was found to be separated from the tube wall by corrosion, the Pile was shut down on December 11 to borescope three additional vertical rod thimbles, one horizontal rod thimble, and the proportional counter tube No. 0453. Also, an attempt was to be made to remove the No. 15 thimble. Ten full poison columns were charged to hold the Pile for the extended shutdown. Slugs from three of the tubes (1889, 2487 and 3188) containing high concentration material were collected and held for inspection by the Technical Department.

Inspection of two vertical rod thimbles (28 and 38) revealed that each was badly corroded just above the bottom. No. 28 had a large section corroded away, while No. 38 had two holes approximately 1/4 inch in diameter in the side wall. No. 7 horizontal rod thimble proved to be only slightly corroded, at a point approximately 5 feet in from the open end. The PC tube (0453) gave evidence of slight corrosion on the Pile side of the steel dummies in the front face.

In view of these findings, it was decided to extend the shutdown further and borescope the remaining vertical and horizontal rod thimbles, except the verticals known to be leaking (34 to 38 inclusive). By December 18, all vertical thimbles had been borescoped, ten of which were found in such condition that replacement was necessary. Notes on their condition are included in the Technical Department section of this report.

Completion of the borescoping of the horizontal rod thimbles indicated that all were slightly corroded. No. 2 was corroded more than the others, but not seriously. The thimble of "A" rod showed wear and abrasion in the form of scratches on the top and sides, as well as some corrosion on the bottom end. The cause for the wear and scratches is not clear, since the rod itself shows no similar markings.

Removal of thimble No. 15 necessarily progressed very slowly between December 11 and December 17, during which time cutting tools, pulling mandrels, and special shields were developed and perfected in mock-ups. On December 16, the biological shield plug, rod guide, and thimble were pulled into a shield on top of the Pile. The thimble was cut off from the remaining length in the Pile (but held by dogs in another shield), and the whole assembly lifted away. On December 17, a 14-inch section of the thimble was pulled up into a shield and cut off in a satisfactory manner. However, this method was very slow and radiation measurements indicated that 20-inch sections could be cut off, lifted from the shield and placed in 3-foot sections of 6-inch standard pipe provided with long handles for transportation to the burial ground. Since this method proved satisfactory, the remainder of the thimble except the bottom five feet was removed in this manner. The last 5-foot section was removed and inserted in a thin gage metal tube and transported to the burial ground, maintaining a distance of 10 feet from the tube as hazard protection.

On December 19, plans were made to remove the remaining nine defective thimbles. The method used was to draw the thimble and guide out of the unit, cut off and shield the guide and upper 70 inches of the thimble, and

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then remove the remainder of the tube in four nine-foot sections. A transport container of thin gage metal was used to prevent the dusting-out of active scale during removal to the burial ground. Most of the work was done maintaining distances of ten to fifteen feet, and this offered adequate radiation protection to personnel. By December 25 all ten thimbles had been removed from the unit and nine had been replaced. The upper parts of the tubes which were corroded to the rod guides, were burned off with a torch on an extension handle, and the guides were replaced in the new thimbles.

Between December 19 and 25, 32 tons of high concentration metal were removed from the unit in a separation discharge. Preliminary under-water binocular inspection indicated no blistered pieces; however, three tubes discharged and held for inspection by the Technical Department (1875, 3574, 2685) yielded four blistered slugs from tube 3574. Tube 3671 required more than usual pressure to discharge. Among the slugs from this tube was one heavily gouged slug and one swollen slug. The tube was charged with lead dummies, pending further investigation of the condition of the swollen slug and of the aluminum tube itself.

During the shutdown, the remaining 48-mesh screens in the 4-inch cross-headers were replaced with 30-mesh. The empty tube 0176, which had been defective and unusable since the original startup, was pulled with the tube puller in order that corrosion observations could be made on a tube which had been air-filled. The tube puller failed halfway through this operation. However, the radiation was such that the puller could be removed and the remainder of the tube pushed from the front and sawed off on the rear face with a long-handle saw. The cause of the original tube damage was found to be the steel washer at the graphite end of the front gun barrel. The inside diameter of this steel washer was increased by filing, after which a replacement tube was installed successfully. Only the steel dummies were loaded into this tube, due to uncertainty as to usability.

100-D AREA

Pile Building

The Pile operated at the 250 MW level from November 26 to December 19, at which time the level was raised to 275 MW. Operation was continuous except for scheduled shutdowns on December 6 and December 13, and two accidental shutdowns occurring on December 5 and December 22.

The Pile was accidentally shut down for 0.6 hours on December 5 by an electric power supply disturbance.

A scheduled shutdown of 17.1 hours was made on December 6 to discharge metal. A functional test of the north high tank was made through C riser into the B-C riser system. No 4-inch screens were plugged due to the high tank test; however, ten of the 48-mesh screens on C riser were replaced with 30-mesh.

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A thorough inspection of the downcomer showed the support bolts to be in good condition, but disclosed a small crack in the downcomer on the storage basin side at the junction between the horizontal and vertical sections of the baffle. This crack extended horizontally for approximately 1-1/2 inches and vertically for the same distance. A patch was welded over the crack, similar to the repair made previously.

On December 13 the Pile was down 16.0 hours to discharge metal and to borescope No. 15 and No. 24 vertical safety rod thimbles. Both thimbles were found in good condition, with evidence of only slight corrosion.

An unscheduled shutdown of 0.3 hours occurred on December 22, due to improper use of the disconnect switch on the emergency gasoline driven alternator during a routine check.

All slugs discharged during the month were examined for blisters, but none were found.

Retention Basin

On November 27, the south side of the Retention Basin was returned to service and the inlet gate to the north side of the basin was closed in order to make a leakage test. The level in the north side of the basin had dropped 60 inches (30 GPM) by December 21, at which time it was returned to service.

100-F AREA

Pile Building

The F Pile operated at 225 MW until December 19, at which time the power was raised to 250 MW. The only interruptions were scheduled shutdowns on November 29 and December 14.

A scheduled shutdown of 15.3 hours was made on November 29 to discharge metal. End-cap data applied at the Metal Fabrication Building was obtained from 5% of all material discharged, as a part of the blistered slug study. Also during this outage the check valves on the supply lines from the east high tank to C and D risers were functionally tested by lowering process water supply pressure below high tank pressure. Three screens were found to be plugged and were replaced.

On December 14, a 16.0 hour outage was taken to borescope the thimbles of horizontal rod No. 7 and vertical rods Nos. 15 and 24. All thimbles appeared to be in good condition except for some evidence of slight corrosion throughout the length of the vertical thimbles, at the inner end of the horizontal thimble, and along a two-foot section of the horizontal thimble at the Pile-shield interface. During this outage, the six remaining 48-mesh header screens were replaced with 30-mesh.

All processed slugs held in the storage basin now have been inspected, and end-cap marking data obtained.

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P Department

Retention Basin

Poor weather conditions have prevented further repairs to the west section, which was taken out of service in October.

Fish Laboratory

All of the chinook salmon eggs received last month, including those brought in to re-establish the lots in troughs 1, 2, 5 and 6 are now hatched out. Those which were incubated in the warmest water (troughs 1, 2, 5, 6, 7 and 8) were the first to hatch; those in river water and chilled area effluent water were the last to hatch. All of the egg lots hatched satisfactorily, with the possible exception of those in troughs 7 and 8 where the percentage of deformed fish was slightly higher than usual. The young fish or "fry" are now developing in an apparently normal manner. However, a mortality of about ten per cent was experienced in troughs 1 and 2 between December 15 and 13. Mortality in these lots is now again near normal, but the swimming action of the "fry" is not as strong as would normally be expected. Otherwise, the fish appear healthy.

The steelhead trout have been growing satisfactorily, and mortality has been practically nil during the past month. The growth of the fish being held in undiluted area effluent water (troughs 1, 2, 3 and 4) has improved considerably. In other lots the growth has been roughly proportional to the temperature of the water.

On November 30, five steelhead trout which had been held in river water were subjected to a concentration of 10 ppm Calol in undiluted area effluent water (trough No. 1) for a period of eleven hours. These fish soon became weak and, with continued exposure, became increasingly distressed. Nine hours after the start of the test the fish began to die, and by the twelfth hour four of the five were dead. The fifth fish, although obviously distressed while the oil was being added to the water, did not die until two weeks later. This fish refused food after being subjected to the oil.

300 AREA — METAL FABRICATION

General

Production Test 313-73-M, covering the machining and canning of a smaller diameter slug (1.353" + 0.001, − 0.002) was completed in December. A total of 15,266 were canned in this program, which was started in November. Canning yield was improved over "A" piece performance by 4 to 5 per cent. These new slugs are being designated MZ's.

Extrusion, Outgassing and Machining

Extrusion, machining and combined yields were as follows:

	November	December	To Date 1945
Extrusion	89.8%	91.9%	91.2%
Machining	75.5	75.7	73.3
Combined	67.8	69.6	66.8

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P Department

Extrusion ran seven shifts during the month. A new production record of 347 rods extruded in one shift was made.

Construction work on the uranium chip briquetting process was begun on December 17, in the Metal Fabrication Building (313).

Canning Operations

Metal slug-types canned, and yields obtained, were as follows:

	% Canned		% Yield	
	December	To Date 1945	December	To Date 1945
New Machined Pieces — A's	37.0	72.4	83.3	80.8
New Machined Pieces — MZ's	40.5	4.8	86.3	86.0
Recovered Pieces — Z's	22.5	19.8	85.0	84.6
Recovered Pieces — X's	0.0	3.0	0.0	84.3
Total	100.0	100.0	85.1	81.9

Sixty-two bismuth slugs were canned this month. Approximately 5,200 rejected aluminum cans were melted for use as pure aluminum in the canning baths. This practice has been suspended, until the supply of cans becomes less critical. Rejected aluminum caps are being used for this purpose.

Canning rejects, by cause, were:

	% of Total Canned		
	November	December	To Date 1945
Non-seating	4.3	3.2	4.4
Wrinkled Cans	2.7	2.6	3.1
Marred Surface	5.1	4.4	2.9
Al-Si on outside of can	0.2	0.4	0.4
Air Pockets	0.2	0.1	0.4
Frost Test Rejects	3.1	1.4	2.0
Bad Welds	0.5	0.4	0.5
Warp	0.2	0.4	1.0
Miscellaneous Causes	2.0	2.0	3.4*
Total	18.3	14.9	18.1*

*Increased by 882 high-penetration slugs rejected in October, but not taken into reject accounting until this month.

Recovery Operation

Statistics:

	% Recovered		Average Weight-Lbs.	
	December	To Date 1945	December	To Date 1945
Z Pieces	63.5	82.4	7.817	7.841
X Pieces	29.4	13.8	7.729	7.705
Rejects	7.1	3.8	—	—
Total	100.0	100.0		

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P Department

The large percentage of rejected slugs was due to the recovery of 2,822 Z and 184 X slugs, or 59.2% of the number of slugs reclaimed. This also accounts for the drop in average weight of Z slugs.

Inspection and Testing

Autoclave rejects were as follows:

	November	December	To Date 1945
New Machined — A's	0.06/M	0.00/M	0.19/M
Recovered — Z's	0.00	0.21	0.04
New Machined —MZ's	None Autoclaved	0.18	0.15
Recovered — X's	0.00	None Autoclaved	0.12
Total	0.04/M	0.13/M	0.16/M

The "as received" quality of cans, caps and sleeves was as follows:

	% Usable		
	November	December	To Date 1945
Aluminum Cans	74.9	65.0	75.7
Aluminum Caps	90.7	89.8	88.2
Steel Sleeves	59.0	77.0	67.5

Cans received on December 14 currently are being inspected. 91.5% of these cans are usable, and 70.7% meet specifications.

300 AREA — TEST PILE

This unit operated seven 8-hour days, making 118 routine metal tests. One special test was run for the Technical Department (Production Test No. 305-8-P).

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S DEPARTMENT

DECEMBER 1945

PRODUCTION SUMMARY

Seventy charges were started in the Canyon Buildings during the month and seventy-seven were processed through the Concentration Buildings. Seventy-seven were delivered by the Isolation Building, and four charges remained in process there at the end of the month. The average purity of the final product was 98.7%.

In view of the unfavorable weather conditions for dispersion of stack gases during the winter months, the production rate was slowed on December 15 to allow for longer decay of the active gases in the metal prior to dissolving. This was effected by extending the cycle time to 24 hours per batch (from 18 – 20 hours).

The average yields, decontamination factors and waste losses for the month are shown in the following tables:

T & B Plant Performance Data (11/26 – 12/25, Inclusive)

	T Plant	B Plant	Combined
Number of charges started	36	34	70
Number of charges completed	38	39	77
For completed charges:			
Percentage of starting product in waste			
This month	6.7 (a)	6.8	6.8
Last month	6.9 (b)	7.2	7.0
Cumulative to date	7.0 (c)	6.8	6.9
Percentage of starting product recovered			
This month	94.6	92.9	93.7
Last month	95.5	91.2	93.5
Cumulative to date	95.7	94.6	95.2
Percentage of starting product accounted for			
This month	101.3	99.7	100.5
Last month	102.4	98.4	100.5
Cumulative to date	102.7	101.4	102.1
Decontamination Factor (Log)			
This month	7.16	7.20	7.18
Last month	7.15	7.33	7.23
Cumulative to date	7.22	7.25	7.24

(a), (b), (c): Includes waste from processing recycle. The recycle wastes are estimated as: (a) 0.19%, (b) 0.20%, and (c) 0.29%.

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Isolation Building Performance Data (11/26 – 12/25, Inclusive)

	% of Incoming Product				
	Prepared for Shipment	Recycled	Control Samples	Losses	Material Balance
Average for December	98.7	3.5	0.08	0.35	102.6
Average for November	98.3	3.9	0.14	–	102.3
Average to Date	97.4	4.1	0.15	0.07	101.7

PRODUCTION PERFORMANCE

T and B Plants

As a result of Health Instrument Section data showing a rapid increase during the month in the quantity of radio-active iodine on vegetation in certain districts 40 to 100 miles from the Separation Plants, the production rate was decreased to permit the age of metal for dissolving to increase to 60 days (from 35 days). This increase in the cooling period will lower the quantity of iodine in the stack discharge by about a factor of eight, which is expected to halt the increasing ground contamination before possibly injurious concentrations are reached.

The T Plant has started processing accumulated stocks of metal of unusually high enrichment. Prior to dissolving this metal, all available product produced at an enrichment of 200 gms/ton was recovered from the "permanent" dissolver heels by means of additional nitric acid treatments. The B Plant continues to operate on current stocks of standard enrichment material.

On charge T5-12-B15 a 10.5% waste loss in the Cell A by-product precipitate was successfully recovered and the product recycled to subsequent batches.

The B Concentration Building processed 10 charges on a production test designed to decrease the waste losses in the D cell by-product precipitate by reducing the quantity of lanthanum carrier. The test was terminated when a slight decrease in decontamination became apparent with no observable benefit to waste losses. The quantity of carrier has accordingly been raised to the original condition.

The T Concentration Building demonstrated on a production test that the digestion times after the lanthanum fluoride strikes in E Cell can be reduced by one-half hour without adverse effects on waste losses.

Isolation Building

The overall performance of the Isolation Building is reflected in a slight yield improvement, and a reduction in the percent of product returned as recycle to the Concentration Building.

On charge B5-12-D8 a waste loss of 27.2% was sustained when the charge was transferred from the concentration still to the still receiver prior to concentration, and partially overflowed the still receiver into the contaminated waste sump. In view of the extreme product hazard to personnel in attempting recovery, short of an extended period of plant shutdown for design and fabrication of special facilities, the waste was discarded. The arrangement of a catch tank above the still receiver to prevent recurrence [redacted]

of this loss is being designed.

Mechanical Performance

The skimmer of the E-2 centrifuge of the T Concentration Building seized in the bushing during the month. The condition was corrected by lifting the skimmer post and dressing down the shaft at the point it turns in the bushing.

A trial changing of Waste Storage Area diversion box jumpers was made at an inactive U Plant diversion box on December 3. The activity readings of the T Plant diversion box reported last month were used to control the work conditions. No difficulty was encountered in engaging or disengaging the impact wrench or connector. Personnel were "exposed to radiation" for 14 minutes at distances where it is expected a safe working time of one hour will be permissible.

A second leak of cooling water from piping or vessel jacket has been discovered in the T Canyon. The volume of water is one-third that of the previously reported leak at 13-1 tank, and the volume from both sources remains low enough that corrective action is not yet necessary.

The bowl of the 17-2 centrifuge of B Canyon was found to be jammed by bent dip tubes at the end of the cake removal operation on the 13th. There was no immediate apparent cause for this condition, though the machine has undoubtedly been run in reverse at low speeds during its operating life. Six dip tubes were replaced and the unused plow, which was slightly bent, was replaced by an alternate skimmer. The centrifuge bowl was undamaged, and the machine has operated without difficulty since being returned to service.

WASTE DISPOSAL

First decontamination cycle waste began cascading into tank 109 of the T Waste Storage Area on December 10. Tank 109 is the last of the series of three in that cascade system.

Because of limitations in the quantity of product which may be processed in a single charge, a comparatively large volume of waste is produced from a ton of metal if the metal is of the high enrichment that will constitute the raw material for T Plant until mid-March. The status of the waste areas in terms of reserve capacity is accordingly shown in the following table in terms of batches instead of metric tons of metal to process, as has been customary.

Bldg. 241 Tanks	Type Waste	% Full T	% Full B	Reserve Capacity in Batches to Process T	B	U(Empty)	C(Empty)	Total
X-101-2-3	Metal	83.5	70.8	44.3	78.5	269	269	
X-104-5-6	Metal			—	—	269	269	1347
X-201-2-3-4	Metal			37	37	37	37	
X-107-8-9	1st Cycle	79.7	61.7	80	129	338	338	
X-110-111-112	1st Cycle			—	—	338	338	1561
X-104-5-6	2nd Cycle			454	454	—	—	
X-110-111-112	2nd Cycle	58.5	44.7	188	251	—	—	1450

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SPECIAL HAZARDS

The contamination of Cell F in the T Concentration Building, which has presented the most troublesome product hazard problem, has been materially improved by intensive cleaning, minor modifications to the ventilation of individual vessels, and development of improved procedures.

Fences around the fan house at the process stack have been relocated so that entrance to the instrument and lubrication stations in the fan house can be made without exposure of personnel to high level radiation from the fans. Recording instruments at the fans have been installed, both to reduce the exposure of personnel in the course of routine monitoring and to provide a continuous record of fan activity.

No unusual effects have been evident from operation on a production test at B Plant with one stack fan. The special hazard problems arising from stack gas dispersal and their effect on production have been covered above in connection with production performance.

Dry wells in the Waste Storage Areas gave normal readings when monitored at both the 25 and 150 foot levels.

The work on the 17-2 centrifuge in B Plant presented more of a product hazard than is normally encountered in Canyon work, where exposure to radiation is usually the controlling factor. To perform the work without spread of contamination, an area thirty feet on either side of the cell was roped off, carpeted with paper, and treated as a special danger zone into which no personnel could enter without full protective clothing, and from which no tools, ladders, hand rails, or equipment could be removed unless decontaminated or sealed in kraft paper coverings. As a result of these precautions, the final Health Instrument check showed no spread of product to the Canyon deck.

Six spots of product contamination were discovered during a routine survey of Cell 3 in the Isolation Building on December 14. A thorough check of the building revealed no specific cause for the contamination, which was immediately cleaned up.

A marked improvement has been noted in the cleanliness of sample cans returned by the customer to the Isolation Building. Considerable recleaning has none-the-less been necessary to reduce contamination to a level which will permit approved modifications of sample cans to be performed on a lathe which has been set up under a special ventilating hood in Cell 5.

METEOROLOGICAL SECTION

The B and T Plants were issued 169 forecasts for dissolver operation, and the Electrical Department was advised of four high wind conditions.

Conditions during the latter half of the month were generally unfavorable to dissolver operation, and caused several short processing delays for lack of dissolved metal solution.

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S Department

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

Maximum hourly average wind velocity at 200 feet	40 mph
Minimum hourly average wind velocity at 200 feet	0 mph
Maximum hourly average wind velocity at 50 feet	32 mph
Minimum hourly average wind velocity at 50 feet	0 mph
Prevailing wind direction at 200 feet	NW
Maximum soil temperature	55.0°F
Minimum soil temperature	17.0°F
Maximum air temperature	56.2°F
Minimum Air temperature	13.0°F
Number of days precipitation and/or fog occurred	15
Number of days of precipitation	14
Number of days of fog	10
Greatest duration of precipitation	17 hrs. (12/20-12/21)
Greatest duration of fog	17 hrs. (12/19)
Number of thunderstorms	0

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TECHNICAL DEPARTMENT

DECEMBER 1945

100 AREAS

Physics

During the 33-hour shutdown of B Pile on December 4-5, two additional full columns of poison slugs were charged to compensate the greater xenon decay during this longer shutdown. The effectiveness of these columns, which were charged 16 lattice units from the center, as measured at return to power with 2 1/2 rods in the pile, was found to be about 25 inhours instead of the 50 inhours expected from pile poisoning experience. However, it is believed that the lower observed effectiveness results from the smaller number of horizontal rods in the pile at the time of measurement; the effectiveness would be more nearly the expected value with more rods in. A more quantitative analysis is being attempted.

The shutdown of B Pile for an indefinite period beginning December 11 for thimble repairs and inspection required the addition of ten columns of poison slugs on the basis of the above mentioned individual column effectiveness. It was estimated that this additional poison would permit 5 1/2 vertical rods to be withdrawn from the pile simultaneously even with loss of water and all of the xenon.

Memoranda describing the results of analysis of reactivity gains associated with the metal alone for the B and D Piles were prepared. An empirical curve relating exposure with gain was established. Good agreement between observed and computed rates of gain was obtained for both piles; the agreement in the case of D Pile, for daily rates of gain from 0.9 to 2.7 inhours and for four different dates beginning March 15, was within 2 percent.

Graphite Monitoring - Production Test 105-1-P

The loss in stored energy produced by annealing was measured by the Sykes method for comparison with the results of the heat of combustion method. Graphite exposed 407 MW-days/C.T. in the B Pile test hole at 68 °C was annealed at 180 °C for 117 hours. The stored energy, as measured by the Sykes method, was reduced by 54.6 cal/gm. As measured by the heat of combustion method, the reduction was 46.9 ± 1.66 cal/gm. This agreement is considered satisfactory because (1) differences of 10-12% in stored energy content have been observed in samples of apparently identical exposure; (2) the standard deviation of ± 1.66 cal/gm on the heat of combustion data leaves a fairly high probability of finding values outside this range; and (3) the Sykes figure, being higher, is the safer one for monitoring purposes.

The decrease in the thermal conductivity of graphite up to an exposure of 640 MW-days/C.T. has been represented by a function which contains two exponential terms, namely:

$$(K_o/K) - 1 = 18.3(1 - \exp(-0.0029E)) + 9.1(1 - \exp(-0.015E))$$

where K_o is initial thermal conductivity and K is the conductivity after an exposure of E MW-days/C.T. A single exponential term no longer gives a satisfactory fit to the data. The appearance of the second exponential term suggests that the dislocations responsible for the loss in thermal conductivity

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possess an activation energy spectrum similar to that observed in the case of stored energy. As additional regions of this spectrum assume prominence as a result of increasing exposure, additional exponential terms may be expected to appear. The ultimate saturation value of the quantity $(K_0/K)-1$ is therefore likely to differ somewhat from the value 27.4 which is obtained as the sum of the coefficients of the equation above.

An interim report on this production test, describing the theory of energy storage, was issued on November 9, 1945.

Study of the graphite relaxation times of the B Pile, as indicated by centrally located couples and reactivity analyses, showed that the best value for the graphite period is now 60 minutes, and that the period is still increasing at the rate of about 2 minutes/month. These results are in good agreement with those obtained earlier for the D Pile.

Poisoning Effectiveness of Thorium - Production Test 305-8-P

Tests in the 300 Area Test Pile showed that a full column of thorium slugs should absorb 34.4 ± 5 inhours at the center of a 100 Area pile. This information was obtained in preparation for a special irradiation of thorium at the request of the Metallurgical Laboratory.

Measurement of Metal Temperature by Reactivity Changes (Reactivity Coefficient Trends) - Production Test 105-26-P

This test, which was started in January in an attempt to measure the effect of slug film on pile reactivity, developed into a determination of the time trends taken by the reactivity coefficients. The overall coefficient was shown to increase from an initial value of about 0.07 to a seemingly stable value near 0.2 inhours/MW by the first of June; the metal coefficient changed in the same time from -0.28 to -0.24 inhours/MW. The reasons for these trends are not thoroughly understood; some of the change results from increased flattening of the neutron distribution. A closing report was issued.

Experimental Hole Plugs - Production Test 105-40-P

A test of a cold-rolled steel plug with an 18-8 stainless steel tip was begun in the B test hole at B Pile on December 6 to determine shielding requirements for the projected all-stainless plugs. No increase in radiation leakage outside the hole was found. The plug will be removed next month for measurements of intensity and rate of decay.

Miscellaneous

Additional underwater radiation measurements on blistered slugs have confirmed that blistering occurs predominantly near the position of maximum activity. A total of 95 blistered slugs plus 4 oversized but unblistered slugs have given a distribution which is expressed below in terms of the number of slugs falling in each interval of 0.20 intensity units, where 1.00 is an "average maximum intensity" equal to the average of the four highest readings from a given tube, group of tubes, or representative sample of the batch:

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Relative Intensity	Number of Blistered Slugs
0.40-0.60	5
0.60-0.80	22
0.80-1.03	72

Calculations showed that replacement of the present aluminum vertical rod thimbles by stainless thimbles of the same dimensions would consume 790 inhours of reactivity.

It was calculated that substitution of MZ slugs (machined to 1.353 inches diameter) for A slugs (machined to 1.359 inches diameter) would lead, in the case of substitution of all slugs in a pile, to a reactivity loss of 55 inhours; a similar substitution of Z slugs (recovered slugs of 1.348 inches diameter) would produce a loss of 89 inhours.

The prediction, based on analyses of long-term gains, that the parent of the poison Sm^{149} has a half-life less than 3 days, has been verified by the identification at Clinton Laboratories of the parent as 47-hour Pl^{149}.

Shielding requirements, and procedures for withdrawing vertical thimbles and for borescoping horizontal thimbles, were developed in cooperation with the P and Maintenance Departments.

A survey of the availability of irradiated graphite for C^{14} extraction showed that a total of approximately 390 lbs. of graphite could be obtained from the A and D Test Holes of the three piles.

The thermal neutron flux in a bismuth column was calculated to be 3.2 times greater than the flux in an adjacent heavy metal column, by means of polonium assays on exposed bismuth.

A portable spectroscopic detector for helium leakage has been developed.

A modified shadowing correction for the 9-column poison configuration of the D Pile was derived; the new correction increases the nominal poisoning effectiveness of the present poison pattern from 180 to 196 inhours.

A memorandum summarizing the physics aspects of the D Pile startup was prepared and issued.

Water, Corrosion and Engineering

Process Water Control and Pressure Drop Studies

The iron content in the process water averaged 0.011, 0.009 and 0.013 ppm at B, D and F, respectively. The rates of pressure drop increase for these areas were 0.43, 0.18 and 0.28 psi/day, respectively. Colloidal mobility measurements made with the slit ultramicroscope on samples of water from F were lower than the first part of this report period than they were the latter part. This would indicate that the rate of pressure drop increase would be greater earlier in the month than later. However, this was not the case.

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Corrosion

Penetration rates for slugs discharged from corrosion tubes are summarized as follows:

Area	Tube	Discharge Date	Days Exposure	Penetration Rate - in./mo. Average	Maximum
F	2376	11-8-45	257	0.00003	0.00005
F	2478	11-8-45	257	0.00003	0.00005
D	2492	11-12-45	332	0.00004	0.00006

Four blistered slugs were found from Tube 2376, five blistered slugs from Tube 2478, and no blistered slugs from Tube 2492. Canning dates of the blistered slugs were December 23, and 24, 1944.

Slugs discharged from four pressure drop tubes at F on November 21 were isolated and examined for blisters. Two such slugs were found from Tube 2475 and four from Tube 2575. None were found in Tubes 2375 and 2473. Canning dates of the blistered slugs were December 26, 1944.

Slugs from six high concentration tubes at B have been isolated and examined for blisters. Four blistered slugs were found from Tube 3160 with canning dates prior to November 3, 1944. Four blistered slugs were found from Tube 3574 with canning dates from February 13 to March 13, 1945. Slugs from Tubes 2373, 2385, 2685 and 1875 were not blistered.

Attempts were made to strip a portion of the can from two blistered slugs at B, using a specially designed long-handled chisel. This stripping operation was found to be considerably more difficult for slugs which had been in the unit than for unexposed process slugs. While no large area of base metal was exposed by stripping the blistered slugs, it could be seen that the surface of the base metal had about the same irregularities as the can surface. One blistered slug was sent to the 200 Area for special processing to dissolve the can from the slug. Examination of this slug showed that the can was very cleanly dissolved from the slug and the blisters were very clearly defined on the surface of the stripped slug. A lathe for sectioning a blistered slug under water has been developed.

Safety and Control Rod Thimbles

Gas leak tests had indicated that several of the vertical rod thimbles at B were leaking. Thimble No. 15 had shown a relatively large leak and this thimble was examined with a borescope on December 4. Definite signs of corrosion and large amounts of scale were found on the wall for nearly the entire length of the thimble. The bottom 2 feet of the thimble were covered with a thick, dense, smooth but irregular, light colored material. The lower end of the thimble was found to have corroded where the cap is welded to the thimble wall, and the cap had dropped about two feet farther down the hole in the graphite.

Two thimbles at B which were suspected of being in poor condition, and one which was suspected of being in relatively good condition, were then examined with the borescope. These examinations revealed that the two leaking thimbles

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did have some holes in the thimble walls while the other was in good condition. Two thimbles examined with the borescope at each of the other two areas were found to be in good condition.

The remaining vertical thimbles at B which were not known to be leaking were then examined with the borescope. A total of ten thimbles, which were either known to leak or were found to be in poor condition by the borescope examination, were replaced. A creamy slurry was found in the bottom of one thimble. Samples of this slurry and of the dry scale found near the bottom of another thimble were analyzed and these analyses indicated the presence of Al, Fe, NO_3^- and NO_2^-. The thimbles which were found by examination to be in poor condition all showed large amounts of scale in the lower portion of the thimble.

All of the horizontal rod thimbles were examined with the borescope at B and one of the horizontal thimbles at F. The A-rod thimble at B showed signs of much wear on the sides and top. The other horizontal thimbles were in fairly good condition.

All of the vertical rod thimbles at D and F will be examined with the borescope in the near future.

200 AREAS

Canyon Buildings

Dissolver Performance (B and T)

The dissolving time cycle for the 4-5-L Dissolver in T Canyon showed a gradual increase, indicating depletion of the metal heel. To build up the heel to the normal amount of metal, the weight of 60% nitric acid charged to this dissolver was reduced from 5400 to 5100 lbs. per batch beginning with Run T5-11-Fd-42. In B Canyon the weights of the acid charged to the 4-5-R and 4-5-L Dissolvers are 5000 lbs. and 4900 lbs., respectively.

Stack Gas Problems (B and T)

Trial operation with one stack fan in the B Plant was continued during the month in connection with Production Test SE-221-B-PA-3. To compensate for the reduced dilution of the stack gases with the single fan, the stack gas dilution factor required in the dissolving step was increased in this area from 500/1 to 1000/1. The Health Instrument group has reported no increase in activity measurements around the area traceable to the use of the single fan. Ionization chambers with recorders remotely located have been installed adjacent to each of the fans in B Plant. After proper adjustment of the instruments, the initial readings showed 3×10^{-10} amperes near the idle No. 1 fan and 43×10^{-10} amperes for the No. 2 fan, which is in operation. Appreciable decay of the activity in the idle fan is indicated. Further data are being obtained.

H. I. has been monitoring the deposition of iodine activity on vegetation in and adjacent to the reservation. During the latter part of November, these measurements showed a sharp increase in the iodine concentration. This probably reflects less favorable weather conditions existing during that period,

as well as the use of insufficient metal cooling time. To combat this problem, at least for the winter months, production schedules are being adjusted to permit only the use of metal that has cooled for at least 60 days.

Coating Removal from Single Slug (T)

At the request of the 100-300 Area Technical Division, a Production Test (SE-221-T-PA-7) was carried out which involved the removal of the aluminum jacket from a single irradiated slug which exhibited blistering. The coating removal was accomplished by lowering the test slug in a special container into T Plant dissolver, where the coating was removed in the usual way during the processing of a normal plant batch. The slug was removed prior to the metal dissolving operation, and returned to the 100 Area for inspection. Removal of the aluminum jacket in this manner accomplished the desired purpose of permitting detailed inspection of the underlying metal surface.

Concentration Building

Reduction of Weight of La Used in By-Product Step (B)

To minimize the lanthanum fluoride by-product waste losses (D-4-BP) and to decrease simultaneously the consumption of lanthanum ammonium nitrate, a series of test runs were carried out at B Plant. In these, five runs were made with 5 lbs. of La and five runs with 4 lbs. The normal weight is 6 lbs. By-product waste losses were not decreased appreciably, and both the lanthanum fluoride by-product decontamination factor and the over-all decontamination factor were decreased slightly. In view of these results, the work was abandoned and the use of the standard 6-lb. La charge was resumed.

Reduction of Lanthanum Fluoride Product Digestion Time (T)

During Run 15-12-F-1, a number of samples were taken and assayed to determine the feasibility of time-savings to be gained in the plant by decreasing the lanthanum fluoride product digestion time. The test data obtained showed that the product is still as much as 25% unreduced at the end of the 1-hour oxalic acid digestion period. Shortening of the reduction period is therefore not desirable. Reduction and carrying appeared to be complete, however, immediately after the first strike HF and La addition.

On the basis of these results, three runs were made reducing the digestion time after the second strike from 60 to 30 minutes. No effect on the waste losses was noted. A second set of three runs was made shortening by 30 minutes the digestion time after both La strikes, again without adverse effect on waste losses. Further shortening of the digestion time will be recommended in view of the favorable results of these tests. This work will be initiated through a production test, in view of the 30-minute minimum digestion time specified in the Operating Standards.

The advantages to be gained through the shorter digestion period are: (1) Greater flexibility as regards the over-all time cycle for Cell E, and (2) decreased corrosion through shorter time of contact of the process solution (containing 0.5N HF) with the equipment.

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Bismuth Phosphate By-Product (A-4-BP) Losses (T)

Erratic bismuth phosphate by-product waste losses were encountered during the month. Most of these abnormal losses were in the range of 0.5 to 1%. In Run T5-12-B-15, however, the waste loss (A-4-BP) was 10.5%. Circumstantial evidence indicates incomplete oxidation in this run. There was no heel left in the A-1 Precipitator and no indication of crud in the 17-4-P product solution delivered from the Canyon Building. A check of Cells C and A operation revealed no deviation from standard procedure. This high waste loss was successfully reworked, the final loss being only 0.12%.

In an effort to prevent a recurrence of these high waste losses, the acid normality used for oxidation prior to the by-product precipitation is being decreased from 7.5N to 6.5N.

Isolation Building

Product Content of Recycles

The amount of product recycled to the Concentration Building decreased during the past month and is currently less than 10 units per batch for both B and T Plant material. On the basis of the over-all information to date, little correlation can be found with fluctuations in the amount of peroxide used for the use of KOH in removing lanthanum fluoride product cakes.

Elimination of Second Peroxide Cycle

Elimination of the second peroxide precipitation would be desirable from the standpoint of process simplification and lessened possibility of combination of two or more batches. This matter was discussed with customer's representatives, who agreed that a one-cycle process which would result in a minimum product purity of 95% would probably be satisfactory. It was agreed, however, that no process change of this nature would be made before operation in the customer's new equipment was established on a routine basis. It is also planned to conduct a thorough preliminary investigation of the feasibility of the idea before instituting such a test; this work would be carried out in conjunction with the customer.

An investigation of the product purity likely to be obtained in a one-cycle process is now under way. Results to date are fairly encouraging and indicate that the ultimate success of the one-cycle procedure may hinge on the volume of peroxide precipitate. Additional data are being obtained.

Waste Losses - Run B5-12-D8

In this run the product solution in the still was jetted to the still receiver (SR-1) before evaporation. This resulted in about 73 units being lost through the sump tank to the dry well. Following a study of possible recovery methods, it was agreed no attempt should be made for recovery of product from the sump tank material because of the health hazard likely to be encountered in returning the large volume of solution to the Concentration Building in equipment not specifically designed for that purpose. To design, fabricate, and install suitable equipment for recovery would involve unjustified production delays.

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Process Chemistry

Reduced Phosphoric Acid Usage in the Canyon Buildings

The most important single item, excluding metal, in the cost of essential materials is the phosphoric acid used in the Canyon Buildings. Moreover, procurement of this chemical has been critical for some time. Laboratory experiments at full product levels were carried out to determine the feasibility of using reduced amounts of phosphoric acid in the extraction step and both decontamination cycles. Results of this work indicated that by the use of a combined rather than a direct strike in the extraction step, minimum waste losses (around 0.2%) can be obtained even with a reduction of the phosphoric acid concentration used from 0.8 to 0.6 M. Likewise, reduction in the phosphoric acid concentration used in the product precipitation steps in both decontamination cycles from 0.6 M to 0.4 M had no effect on the waste losses obtained. These results confirmed earlier laboratory work done at Clinton Laboratories. A production test providing for plant scale development work along these lines is being submitted.

Corrosion 25-12 Cb Stainless Steel in HF Solutions

Experiments made by the 100-300 Area Technical Division have shown that the deposition of a protective film on 25-12 stainless steel through the action of fused potassium dichromate might be useful in retarding HF corrosion. Accordingly, specimens so treated were immersed in process solutions containing various concentrations of HF. It was found, however, that in process solutions the film offered no measurable degree of protection against HF attack even in concentrations of HF as low as 0.5 N. Accordingly, work along this line was discontinued.

Isolation of 95^{241}

A sufficient quantity of 95^{241} was isolated for mass assignment studies in the spectrograph. Initial measurements showed that further separation from the La impurity is essential. The work is being continued.

300 AREA

Extrusion and Machining

The status of production tests in progress during December is as follows:

314-24-M - "UM Material - High Sn, etc." - All billets on this test have been extruded with normal results. Samples have been collected for routine analyses.

314-32-M - "Cast Dogs" - A preliminary investigation of cast material indicated that its low gas content and low warp would allow the material to be machined and canned in the "as received" condition. Machining and canning of approximately one-thousand slugs is being started December 28.

314-33-M - "Reduced Diameter Rods" - 1245 billets were extruded as small diameter (1.420 inch) rods; slugs from these rods are now being canned.

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314-34-M - "Machining Scrap Study" - No success has been had thus far in producing broken instead of ribbon form chips on the machining cut-off operation. Emphasis is now on oxide-free ribbon form chips.

314-35-M - "BT Material" - A test has been authorized to check the pile characteristics of BT Material in the October and November billet shipments.

Removal of the old quench tank and straightening equipment resulted in improved ease of operations with the new rod handling equipment. With the exception of the crook in the leading 3 inches of the rod, rod straightness was good during the month. The feasibility of removing the crook in the rod by hand on the run out conveyor was demonstrated in a trial. The crook is not removed by the Medart Straightner and results in increased rod waste.

The charging sequence for the billet preheating furnace recommended previously still allows temperature fluctuations in Zone 6. With 130-pound billets no serious effects occur in extrusion, but with 150-200 pound billets it has been found necessary to raise the temperature in Zones 1 and 2 to insure that the temperature of the billets is sufficiently high for extrusion.

A Technical Department representative visited Ames, Chambers Works, and the Metal Hydrides plant to discuss technical standards, controls, and equipment specifications for briquetting machining scrap, in order to guide design, installation, and operation of the facilities being transferred to H.E.W.

Canning

Small Diameter Slugs

Plant records indicate that during the past year the yield of Class 1-1-1 slugs from Type "Z" (1.348-inch minimum diameter) recovered metal pieces has averaged approximately 5% higher than the yield from "A" new material. A previous study indicated that the probable reason for increased yield from "Z" material was their slightly smaller diameter. To determine whether slugs machined initially to the average "Z" diameter would consistently increase the yield of 1-1-1 output, Production Test No. 313-73-M was run.

In this test, approximately 15,000 slugs machined to a diameter of 1.353" (+ 0.001, - 0.002) were canned with a net increase in yield of approximately 5% over that of a comparable number of "A" pieces canned in October. The principal improvements were with respect to non-seats and wrinkled cans, while the quality of the small diameter ("MZ") pieces with respect to frost test was slightly inferior to that of the "A" material. On the basis of these results, MZ dimensions are shortly to be adopted as standard for machining prior to canning.

Excessive Penetration of Can Walls

Spot-checking of regular output for excessive penetration of the sidewall (such that less than 0.010 inches of can wall remains at any point) has heretofore been carried out on a sampling basis far below the statistically determined requirements. This has been necessary because of the large number of pieces required for representative sampling. It has been customary to reject an entire

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shift's production if two or more samples out of eight chosen at random from that shift's output show indication of excessive penetration in the mechanical stripping test. On this basis, four shifts' output have been rejected during the past two months.

To determine the actual incidence of excessive penetration among production pieces so rejected, two entire rejected lots were mechanically stripped and the percentage of rejectable pieces was computed. These were 7.1% of 336 pieces canned October 3, and 4.8% of 439 pieces canned October 20. This is generally accepted as too large a percentage to ignore, inasmuch as only one excessively penetrated piece could be responsible for shutting down a pile. On the other hand, it is economically undesirable to reject more than 90% of good material because of the presence of less than 10% unsatisfactory material, especially when it is recognized that present sampling procedures are inadequate for detecting the presence of excessive penetration. It is thus indicated that a device for nondestructively separating excessively penetrated material from satisfactory material is required.

An attempt is being made to develop such a device, with some promise of success. Meanwhile, the wasteful procedure of rejecting a shift's output on the basis of two bad out of eight tested is being continued.

Internal Flaws in Machined Slugs

Continued investigation of blistered slugs in the 100 Areas has given some evidence to support the theory that internal discontinuities in the slugs may be a factor contributing to the distortion of the pieces during long exposure. It has thus appeared desirable to investigate the feasibility of applying more rigid standards of metal solidity to machined pieces prior to canning. Preliminary studies have involved the examination and classification of slugs after pickle, according to the degree of unsoundness exhibited. Indications so far are that about 30% show visible indication of pits, pipes, inclusions, etc., and 8-10% show flaws sufficient to cause surface depressions. About 2% are rejected according to present standards.

Some work has been done in evaluating an electronic device designed to pick out concealed flaws within the bodies of slugs. Individual slugs have been

weighed since December 21. Weights have been found to vary from 7.70 lbs. to 8.00 lbs., with the majority grouped around the average of 7.91 lbs. Though the lightest pieces have invariably been found to contain gross flaws, there does not seem to be close correlation between light weight and the presence of voids. That is, numerous small inclusions or voids may be present and the weight still remain normal. Several pieces found to contain rather obvious discontinuities had average weights (7.88 to 7.93). These same pieces were indicated by an electronic flaw-detector to be porous, which suggests that the latter device may prove to be more valuable as a means of segregating unsound material than simple weight determinations.

Al-Si Bath Composition

Continued study of Al-Si bath composition changes indicate that partial bailing and replacement of the bath, or periodic addition of high Si, is necessary to maintain the Si content within the desired range. Periodic additions of standardized metal does not give enough enrichment to overcome the Si loss during use. The silicon loss appears to result from a combination of selective surface oxidation and silicon enrichment on the slug surface.

Although the thermal method of composition control usually gives Si content within an accuracy of 0.1%, occasional larger discrepancies are encountered and are the subject of further study.

A study of Al-Si baths contaminated with known amounts of tin revealed that, even with the maximum tin content allowable, no serious error is introduced in the thermal analysis of bath composition.

Contrary to general opinion, the observation was made in the studies above that the two shifts producing the most wrinkled cans were those in which the average silicon content of the baths were lowest.

Autoclave Failures

The two autoclave failures reported during the month were sectioned and carefully examined to determine cause. One was definitely not an autoclave failure. The surface imperfection was caused by an iron chip or shaving which had been pressed into the can from the outside and then enclosed by folding or ironing of the flash. The iron corroded during the test and caused a slight swelling and staining of the surface. No break-through to the bonding layer had occurred, and there was no defect other than that mentioned. About 0.010 inches of sound can remained under the ship. The other instance was an actual autoclave failure caused by mechanical penetration from the inside during canning. A coarse, hard granule was found in the accumulated debris at the failure point, and the can wall was markedly thinned in one spot. Other areas were free of penetration.

Surface Defects in Cans

Brown stained areas on some autoclaved slugs appeared to be distributed in the same general fashion as small black pits or stringers of pits in original cans. To check the possible relationship, a number of cans and slugs were wrapped in photographic paper saturated with dilute HNO_3, and the paper then "developed"

in a $K_4Fe(CN)_6$ solution. Unmistakable iron colorations appeared at most points on the papers corresponding to the locations of the dark pits in the unused cans. The brown stained areas on the autoclaved slugs gave no iron reaction, however, whereas some other unstained areas on the same slugs did give positive iron tests. Sectioning of cans in pitted areas revealed the presence of no abnormal inclusions except those in the surface pits. It appears, therefore, that their source is improper care in cleaning of extrusion dies and blanks. The source of the brown stained areas on autoclaved slugs remains unknown.

Anodized Aluminum Thimbles

To determine the possible value of anodic treatment of aluminum thimbles to prevent corrosion, several aluminum cans were anodized internally at 12 V (drop across cell) in 10% H_2SO_4, 10% oxalic acid at 25-30 °C for 1 hour. The resulting coat was "sealed" by boiling for 30 minutes in 2% $K_2Cr_2O_7$ solution. The treated surface proved far more resistant to all media to which it was exposed than is untreated aluminum. The coating is very hard and adherent, and cannot be removed by deformation of the base metal.

LABORATORIES

Analytical Summary

The following tabulation indicates the source of 17,365 control and special samples (31,615 determinations) on which analyses were completed. A comparison is made with the previous month:

	November	December
Routine Control, 200 Areas	1,980	1,950
Routine Control, 300 Area	435	340
Water Control, 100, 700 Areas	14,375	13,255
Process Reagents, 200 Areas	925	940
Essential Materials	180	180
Special Samples	990	1,700
Total	18,885	17,365

Separations Process Control

Comparative data were taken on only a few samples of process starting solution (sample 8-1-MR) in the study of the hexone extraction versus the LaF_3 precipitation methods for product assay. On the 12 samples tested, the average difference was 1.3% which compares to a previous value of 0.7%. The comparison of these two methods is being continued.

A new type of bayonet sampler was developed by the Separations Control Laboratories, and a working model was made and tested. The new design makes use of a stainless steel handle and a removable pipette fabricated from plastic. The usual bayonet sampler is made from Saran and is objectionable in that it is difficult to decontaminate and in the cleaning process is likely to become distorted. The new design employing stainless steel eliminates these objections. The removable pipette tips are reasonably low in cost and when they become contaminated can be discarded.

Since the new design of sampler is easy to clean, the hazard of the job is lessened. Routine tests of the new sampler were satisfactory both as to use with the plant sampling equipment and in the laboratory. A supply of this new type is being secured and they will be routinely used in the near future.

Isolation Process Control

Seventy samples of the first precipitation solution (sample P-1) in the Isolation Building were routinely analyzed by the radiochemical and chemical titration procedures. The results by the latter method were 2.9% lower than those by the former. This unexplained difference is in line with that previously observed between these two methods, and continues under study.

The titration unit for use with the chemical titration of product in the Isolation Building solutions (samples P-1 and AT) has been completely re-designed. The new unit incorporates a vacuum tube voltmeter which replaces the conventional pH meter normally used to follow the "breaks" of the titration. The voltmeter was fabricated by the Instrument Department and to date has operated satisfactorily. The advantages of this type of meter include: Low initial cost with a minimum of upkeep; small size, which saves space when mounted in the unit; and a continuous, direct-reading dial. Recently the unit was put into routine operation in the control laboratory and has been acceptable in this type of work. The redesigned unit enables the operator to work safely and more efficiently, and contributes greatly in attaining the desired precision for this determination.

The installation of new sink and drying equipment in the Isolation Control Laboratory for cleaning contaminated laboratory apparatus has greatly improved the safety and efficiency of this work. The previous cleaning set-up was inadequate in size and in ventilation. The new installation removes these objections, and is located in a place in the laboratory which is free from traffic. The hazard of spreading contamination to other areas of the laboratory is minimized, and the new installation offers better protection to the personnel who clean contaminated apparatus. Similar installations are underway for the Separations Control Laboratories.

Methods Improvement

In studies involving the use of the mass spectrograph as an analytical laboratory instrument, a technique for mass analysis of plutonium nitrate solutions has been developed. To date only a few runs have been made and the data are very preliminary, but they show good promise for continuing the development of this technique. Of five runs attempted, only two gave results which could be considered valid. These results are as follows:

	% Isotope Abundance	
Mass No.	Run 1	Run 2
238	0.03%	0.03%
239	96.7	96.2
240	3.27	3.75

The results are calculated on the basis of the number of alpha particles observed for a given mass, and a knowledge of the half-life of the particular isotope.

The technique used at present is as follows: the ions emitted from a sample are collected on a sensitized plate which is allowed to remain in contact with an alpha sensitive plate for a given length of time. Both plates are then developed and the position and sharpness of the image at the 239 mass line is observed on the collector plate. If this image is sharp, the position on the alpha plate is marked. The dispersion of the image is determined from a previously prepared dispersion curve. By means of a microscope of 950 magnifications, the tracks produced in the emulsion of the alpha plate are counted for a given section of the plate. The section which is thus scanned is 5 mm. wide and of a length (calculated from the dispersion factor) to cover three mass units on either side of the 239 line.

In this technique, the number of tracks at each mass line position is dependent on: (a) The rate of emission of alpha particles from each isotope, (b) the concentration of plutonium deposited on the collector plate by the instrument, and (c) the period of time the two plates are allowed to remain in contact. The critical factor is the amount of ions deposited on the collector plate. This is controlled by the amount of sample activated in the instrument. If the number of ions emitted from the sample is greater than the instrument can resolve, an overlapping of mass lines on the plate results and they cannot be accurately identified. If too few ions are emitted, the two plates must remain in contact for an excessively long time.

An attempt was made to verify the mass of element 95 by the above technique but the results were not valid. The presence of La in the sample as analyzed made it impossible to resolve the 95 mass lines. An attempt is being made to verify the mass of fission product ruthenium by the technique described above. In this case, however, a mechanical scanner and a beta counter is being used.

The optical spectrograph has been aptly applied for the direct testing of surface impurities and inclusions in aluminum cans. A conventional AC arc with a graphite counter electrode is used. The discharge covers a relatively large area of the can and is capable only of identifying the foreign constituents if they are grossly different in composition from the surrounding surface. This technique has been applied recently to identify iron and magnesium in the surface imperfections. These imperfections are so small that visual observation is almost impossible and requires microscopic checking of the suspected area. Conventional wet chemical methods to check these suspected areas are almost impossible because of the very small size of the imperfections. The spectrograph is of definite aid in this work.

A special tube for collection of pile helium leakage was constructed at the request of the 100-300 Area Technical Division. This tube is part of a special apparatus designed for the purpose of measuring the helium content of air samples. The end measurement is to be evaluated by viewing the discharge spectrum of a helium-air sample by means of a portable spectroscope. By calibrating the apparatus with known mixtures of air and helium, it is hoped that the method will give semi-quantitative results.

Additional information regarding the precision of the chemical titration method for product assay was obtained during the month. Twenty titrations were made of a plutonium nitrate solution of high purity and the resulting data indicated a precision of ± 1.3% for duplicate determinations. This value is in good agreement with that obtained from the routine titration values of regular plant samples of final product solution (sample AT) from the Isolation Building.

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Statistical Study

Routine statistical surveys were made of the data from metal fabrication and testing. A study of the data from the analysis of cast rods for gas content indicated that a cast rod prior to outgassing contained less gas than an extruded rod after outgassing. The data also indicated that outgassing a cast rod did not significantly lower the existing gas content. Special analyses were made of the test data arising from the study to establish a true relationship between standard and vacuum methane proportional counters.

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POWER DEPARTMENT

DECEMBER 1945

100 AREAS

On November 27 the vent condenser of the deaerating heater in the 100-B Power House was removed from service because of leaky tubes. Fifty-nine tubes were replaced, and the condenser was returned to service on November 28. It is noteworthy that this is the first of the vent condensers to fail since the start of operations; as it was due to corrosion of the arsenical copper tubes, further failures are anticipated in all 100 Areas.

On December 10 the emergency turbo-generator in 100-F Area failed to respond properly during a scheduled test, due to binding of packing in the solenoid-operated valve. The packing was changed and subsequent tests indicated the trouble to have been corrected.

On December 13 the emergency turbo-generator in 100-D Area failed to start on a scheduled test. The failure was due to an ineffectual contact on the electrical starting equipment.

Since tests of a single impeller in No. 13 pump of the B River Pump House showed no overall advantage, the second impeller was returned to service.

During the last ten days of the current month, filter run time was decreased approximately 25% in the 100-F Filter Plant, because of higher than normal iron content in the process water.

200 AREAS

Due to motor trouble, the ventilating fan which supplies air to the Concentration Building in T Plant was out of service for five and one-half hours on December 8.

300 AREA

Power operations were normal.

700-1100 AREAS

The automatic altitude valve of No. 1 High Tank, which serves the Village water supply, has been out of service since December 5 awaiting delivery of special repair parts. Manual control intermittently is necessary during the period this valve is out of service.

The outside contractor was delayed in his removal of sludge from the digestor of the Sewage Disposal Plant. Since the rate of removal has been less than anticipated, it was necessary to discharge sludge into the plant's drying beds.

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POWER DEPARTMENT STATISTICS

(November 26 through December 25, 1945, Inclusive)

	Unit	100 Areas		
		100-B	100-D	100-F
River Pump House (Building 181)				
River Stage	Ft. above sea level	(max.385.4 (min.384.6 (ave.385.0	378.1 377.2 377.8	364.4 363.8 364.1
River Temperature	Ave. °F	45.9	46.9	45.3
Water Pumped to Reservoir	gpm ave. rate	31,410	43,079	41,368
Water Pumped to Refrigeration Plant (condenser water)	gpm ave. rate	—	—	* 2,406
Reservoir (Building 182)				
Water Pumped to Filter Plant	gpm ave. rate	25,633	35,808	35,520
Water Pumped to Export System	gpm ave. rate	2,394	2,924	838
Water Pumped to Condenser System	gpm ave. rate	3,383	4,347	3,577
Chlorine Added at No. 1 Inlet	lb.	—	—	—
Flow to Export System while pumping	gpm ave.	6,156	6,156	6,156
Filter Plant (Building 183)				
Filtered Water to Power House	gpm ave. rate	294	349	317
Filtered Water to Process	gpm ave. rate	22,269	31,797	31,722
Filtered Water to Fire and Sanitary	gpm ave. rate	97	159	186
Chlorine Used in Water Treatment	lb.	7,674	14,288	9,402
	ppm ave.	0.83	1.10	0.84
Lime Used in Water Treatment	lb.	65,430	86,500	71,719
	ppm ave.	7.1	6.7	6.4
Ferrifloc Used in Water Treatment	lb.	234,752	277,800	310,537
	ppm ave.	25.4	21.5	27.7
Carbon Used in Water Treatment	lb.	—	—	—
	ppm ave.	—	—	—
Raw Water Analysis	pH ave.	8.06	8.15	8.0
Finished Water Analysis	pH ave.	7.32	7.39	7.27
Alkalinity - M. O. Raw	ppm ave.	63.	54.	58.
Alkalinity - M. O. Finished	ppm ave.	59.	47.	48.
Residual Chlorine - Settled	ppm ave.	0.44	0.27	0.35
Residual Chlorine - Finished	ppm ave.	0.14	0.14	0.09
Iron - Raw	ppm ave.	0.025	0.02	0.027
Iron - N. Clearwell	ppm ave.	0.009	0.01	0.011
Iron - S. Clearwell	ppm ave.	0.009	0.01	0.013
Chlorides - Filtered Water	ppm ave.	1.4	1.00	0.99
Hardness - Finished Water	ppm ave.	69.	73.	65.
Turbidity - Raw Water	ppm ave.	2.6	3.0	4.75
Turbidity of Filtered Water	ppm ave.	0.0	0.0	0.0

*Dilution water for Area Effluent Flume - Requested by P Department.

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	Unit		100 Areas		
			100-B	100-D	100-F
Power House (Building 184)					
Steam Generated - Total	M lb.		95,480	123,650	106,056
Steam Generated - Ave. Rate	lb./hr.		132,611	171,736	147,300
225# Steam to Plant (est.)	M lb.		78,740	99,612	86,218
15# Steam to Plant (est.)	M lb.		2,418	5,490	3,879
Coal Consumed (est.)	Tons		7,000	9,512	7,464
Coal in Storage (est.)	Tons		18,033	24,700	14,698
Deaerator Building (Building 185)					
Water Flow (ave.)	gpm		22,019	31,547	31,472
Chemicals Consumed:					
Dichromate	lb.		16,500	25,400	24,500
Sodium Silicate	lb.		221,480	275,300	384,200
Chemical Analysis:					
pH	pH		7.65	7.67	7.65
Dichromate	ppm		2.0	2.11	2.0
Silica	ppm		8.3	12.3	9.9
Dissolved Iron	ppm		0.008	0.01	0.016
Process Pump Room (Building 190)					
Total Water Pumped	gpm ave.		21,719	31,429	31,404
Water Temperature	ave. °F.		47.6	48.3	48.4
Average Normal Flow	gpm		29,625	32,438	31,648
Valve Pit (Building 105)					
Chemicals Consumed:					
Lime	lb.		—	—	—
Hydrogen Peroxide	lb.		—	—	—
Oxalic Acid	lb.		—	—	—
Solids	lb.		—	—	—
Chemical Analysis:					
A, B, C & D Headers					
Standard Limits					
pH 7.5 - 7.8		(max.	7.75	7.70	7.75
		(min.	7.55	7.60	7.60
		(ave.	7.65	7.65	7.67
SiO_2	ppm	(max.	10.0	10.0	12.0
		(min.	5.0	5.5	8.0
		(ave.	8.1	7.5	10.2
$Na_2Cr_2O_7 \cdot 2H_2O$ 1.8-2.2	ppm	(max.	2.2	2.2	2.2
		(min.	1.8	1.8	1.8
		(ave.	2.02	2.0	2.0
Iron	ppm	(max.	0.03	0.02	0.04
		(min.	0.005	0.005	0.005
		(ave.	0.011	0.011	0.019
Free Chlorine as Cl_2	ppm ave.		0.13	0.14	0.15

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	Unit	200 Areas	
		200-E	200-W
Reservoir (Building 282)			
Raw Water Pumped	gpm ave. rate	2,871	3,285
Filter Plant (Building 283)			
Filtered Water Pumped	gpm ave. rate	534	410
Chlorine Consumed	lb.	251	200
Alum Consumed	lb.	2,700	2,882
Chlorine Residual - Sanitary Water	ppm	0.46	0.55
Power House (Building 284)			
Steam Generated - Total	M lb.	27,325	29,506
Steam Generated - Ave. Rate	lb./hr.	37,951	40,980
Coal Consumed (Est.)	tons	1,720	1,810
Coal in Storage (Est.)	tons	6,552	10,647

		300, 700, 1100 Areas		
		300	700	1100
Power House (Buildings 384 and 784)				
Steam Generated - Total	M lb.	13,089	21,712	
Steam Generated - Ave. Rate	lb./hr.	18,179	30,156	
Coal Consumed - Total (Est.)	tons	1,140	1,791	
Coal in Storage (Est.)	tons	1,806	3,398	
Sanitary and Fire System (1100)				
Well Water Pumped - Total	gal.			43,853,000
Well Water Per Day	gal.			1,462,000
Well Water	gpm ave. rate			1,015
Chlorine Residual	ppm			0.2
Sewage Treatment Plant (1100 Area)				
Total Treated	gal.			40,300,000
Treated Per Day	gal.			1,340,000
Ave. Rate	gpm			933

Note: Only water and steam flows metered are (1) water to Filter Plants, (2) water to Piles, and (3) steam from boilers. Other figures are best estimates.

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MAINTENANCE DEPARTMENT

DECEMBER 1945

GENERAL

The amount of work on hand increased 8.4% during the month, principally due to recently approved project work. The force dropped approximately 1%.

Work Order summary:

	Work on Hand Nov. 25		Work Completed in Dec.		Work on Hand Dec. 25	
Area	No. of Orders	Estimated Man Days	No. of Orders	Estimated Man Days	No. of Orders	Estimated Man Days
100-B	105	340	284	1135	182	977
100-D	68	291	322	686	65	337
100-F	28	157	255	652	23	80
100 Shops	101	724	175	731	102	814
200-E	211	597	629	1292	291	769
200-W	278	1077	982	1890	328	1229
300	131	379	266	240	121	367
700-1100	642	2507	875	3411	466	1991
Totals	1564	6072	3788	10037	1578	6584

100 AREAS

During a shutdown of the B Pile Building on December 4, preparatory work was done to permit the Technical Department to borescope two of the vertical safety rod thimbles. This work involved removal of the rods and erection of scaffolding. Similar work was done for inspection of two vertical rod thimbles in each of the other piles (D and F). To handle the "hot" tips of these rods, lead shields were made and tested before work was begun. In addition, preparatory work was done for the borescoping of one horizontal rod thimble in B and F piles.

On December 11 similar service was rendered for borescoping the balance of the vertical rod thimbles in the 100-B unit. After this inspection, the Maintenance Department was requested to remove and replace 10 of the 29. Lead shields, special rigging, an expanding mandrel puller, and an air-driven rotating cutter were developed for this work. The first section was cut off and removed on December 16.

In conjunction with the Technical, Medical (H.I.), and P Departments, the procedure for thimble removal was revised to permit cutting with a hack saw and removal of 9' sections in light sheet-iron shields. This revised procedure was first used on December 18, and greatly expedited the work. Nine of the 10 aluminum thimbles had been removed and replaced by December 25.

During the shutdown of the B Pile Building, one horizontal water tube (No. 0176) was pulled and removed with the automatic equipment provided for this purpose. Also, all of the 4 inch 48-mesh screens were replaced with 30-mesh.

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Vibration developed in the No. 1 motor-driven fan in the Gas Purification Building of 100-D Area. To eliminate this condition, 4 stud bolts were placed through the walls of the support to increase rigidity.

In the 100-D Process Pump House, No. 7 process water pump was overhauled as per schedule. Units were aligned and minor repairs made. In the 100-F Process Pump House, the outboard bearing on No. 1 pump turbine failed due to rough surface on the thrust collar. A new bearing and thrust collar were installed. Also No. 7 and No. 8 process pumps were realigned after the Electrical Department had installed new end bells on motors.

In the 100-D Refrigeration Plant, it was necessary to plug several condenser tubes in both the No. 1 and No. 3 units because of leakage. Both of these compressor units were dismantled and given a thorough cleaning. It was necessary to realign the motor of No. 1 unit. Scheduled overhauls were made on No. 1 booster pump and No. 2 refrigeration unit. Minor work was done on the oil seal and main bearings of this unit.

The vent condenser of the Deaerating heater in 100-B Power House was overhauled and leaky copper tubes were replaced. A scheduled overhaul of the electric-driven compressor was made. New piston rings and new valve feathers were installed. The unit was cleaned and reassembled.

In the 100-B Reservoir Pump House, one emergency water pump was overhauled as per schedule. Unit was found to be in good condition.

The second impeller on No. 13 Pomona Pump in the 100-B River Pump House was replaced. This returned the unit to its original operating condition.

In the 100-D Area, an inspection of outside steam line poles was made by removing backfill down to a depth of 24". A soft pulpy condition was found showing a penetration of from 3/4" to 1". At this time there will be no replacements, but condition of these poles will be followed closely.

200 AREAS

In the B Canyon Building, all discs on steam valves in the gang valve assemblies were replaced with hard fiber. The Schedule 40 steel pipe on steam supply lines to gang valve assemblies in T Canyon Building is being replaced with Schedule 80, as there has been some evidence of corrosion apparently caused by condensate being trapped in the horizontal runs.

In the B Canyon Building, all dip tubes in 17-2 centrifuge were replaced; these had been damaged by contact with the bowl. The concrete floor trench in front of Section 13 main panel board was chipped out and new concrete installed, as necessitated by contamination from gang valve discharge.

Five Philadelphia Gear Units, complete with agitators, were assembled and run on test in the Central Shops of 200-E Area. There is now on hand one tested spare unit for each of the five critical services in the Canyon and Concentration Buildings.

Minor repairs were made to the auxiliary Troy steam engine on the exhaust system in the Isolation Building, in the course of which the main bearings were scraped and refitted.

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In the 200-W Power House, stoker clutches are being fitted with lubrication fittings to facilitate lubrication of anti-friction bearings and thereby reduce failures.

300 AREA

Routine overhauls were made on 12 furnaces in the Metal Fabrication Building. New pedestals were installed in two furnaces. In addition, 13 new crucibles and 3 new stainless steel rings were installed. The steel cover on one furnace was renewed.

Minor alterations and adjustments were made to the rod cooling rack and quench tanks in the Press Building.

700-1100 AREAS

The Canteen in the Cafeteria has been relocated into one of the original serving lines, to facilitate use as a short order counter. This involved the relocation of equipment and the installation of a new ventilation hood over the hot plate.

Repairs were made to 165 furnaces in Village houses. There were a considerable number of burned out grates, and coal gas explosions have caused broken furnace doors and blown-out smoke pipes. Forty-six broken kitchen sinks were replaced during the month.

Water and sewer lines were disconnected from 140 prefabs in preparation for removing them from the project. Winterizing was completed in 175 houses.

Shingle tabs were nailed down on 127 houses, and repairs were made to 200 roofs on which shingles have not been renailed. This work is being held up due to inclement weather.

The alteration of Dormitory W-17 for use as a Youth Center has been completed.

A parking lot has been provided at the Bus Terminal for pay-day parking.

The Johnson right-angle drive was replaced on No. 4 well pump; a worn sleeve bearing had caused the shaft to vibrate. The Power Department plans to lubricate this bearing weekly in an effort to prevent recurrence.

The work of installing boilers and heating equipment at the Government Garage is approximately 65% complete, and is being finished as rapidly as possible. The work of setting boilers and installing piping at the 3000 Area M.P. Barracks is approximately 55% complete.

PROJECT ENGINEERING

Projects - Work Completed in December

Proj. No.	Title	Estimated Cost
C-14	Discharge Equipment Parts I, II, and III-105 Building	$ 14,000
C-18	Process Water Tank Caulking 190 B & D	2,640

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Proj. No.	Title	Estimated Cost
C-34	Centrifuge Sprays Cell F 224 TUB	8,650
C-53	Revisions to Cell #1 231 Building	11,700
C-57	Access Openings and Piping Alterations - Hospital	3,500
C-60	Remove Economizers and Install Dry Wells, Dormitories	2,550
C-64	Heating and Rewiring Richland Electric Appliance Shop - Building 82-X	1,300
	Total	$ 41,340

Projects Authorized and Under Construction

Project No.	Title	Percent Complete	Date Authorized	Estimated Cost
100 Areas				
C-15	Steam Control Valves for Turbine Driven Fans-105 and 115 Buildings	53	April 11	$ 3,200
C-21	Additional Freon Receiver-York Units Building 189-D	90	May 1	1,950
C-22	Motorization of Retention Basin Inlet Gate Valves	93	April 25	4,350
C-29	Third Safety Device-Valve Replacement-105-B, D and F Buildings	40	June 25	7,500
C-35	Sound Warning System-105,115,107-B, D, and F Buildings	96	June 23	5,820
C-41	Dismantling T.C. Electrical Storage Building 100-B Area	50	June 15	700
C-44	Fire Protection for 100 Area T.C. Warehouses	95	July 23	7,300
C-45	Revisions to Fire Protection Facilities-100 B, D and F Areas	90	June 23	4,800
C-46	"Y" Strainer Replacements-105 B,D, and F Buildings	80	June 29	1,800
C-54	Installation of Strainers in High Tank Water Lines to 105 B, D and F Buildings	0	Sept. 20	11,100
C-75	Improved Cab Periscope 105-B	0	Dec. 17	1,650
C-76	Pneumatic Charging Machines-105-B, D and F Buildings	0	Dec. 17	3,300
	Total			$ 53,970
200 Areas				
C-31	Additional Centrifuge Cell F-224 TUB Buildings	98	June 30	17,900
C-43	Alterations to Fire Protection System 200 E and W Areas	97	June 23	3,200
C-55	Sampler Clean-up Sink and Dryer-222 T, U, and B Buildings	60	Sept. 28	9,900

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Maintenance Department

Project No.	Title	Percent Complete	Date Authorized	Estimated Cost
200 Areas (continued)				
C-59	230 KV Line By-Pass for 251 Sub-Station	25	Oct. 12	6,400
C-65	Alterations to 300 Sample Cans and Cases	73	Nov. 7	3,750
C-67	Dismantle T.C. Extra Machinery Warehouse - 200-W, & T.C. Pipe Whse. 200-E	0	Nov. 26	3,000
C-68	Shielding for Exhaust Unit Fan Houses 291 T & B	58	Nov. 23	4,900
C-69	Section 12-L Jumpers Buildings 221 TUB	40	Nov. 27	2,100
C-71	500 Additional Sample Cans and Cases Building 231	10	Dec. 14	87,500
C-73	Process Waste Tie Lines from 241-T to 241-U and from 241-B to 241-C	8	Dec. 17	22,350
C-74	Replacement Skimmers for Centrifuges Cells D and E Buildings 224-T and B	0	Dec. 17	2,000
C-77	Relocation of Monitoring Station 200 E and W	0	Dec. 20	1,950
	Total			$164,950
300 Area				
C-70	Chip Reclamation Facilities Building 313	5	Dec. 20	28,000
Suspense 10093	- Rod Handling Facilities-Building 314	90	Oct. 9	2,000
	Total			$ 30,000
700-1100 Areas				
C-51	Additional Street Lighting 1100 Area	7	Oct. 24	2,200
C-61	Bus Maintenance Garage Alterations and Additions	10	Oct. 26	5,850
	Total			$ 8,050
Plant General				
C-42	Install Dial Telephones	96	July 11	5,800
	Total			$ 5,800
Grand Total - Work in Progress				$262,770

Engineering Studies

The following studies were completed and reports were issued:

J. I. Sheets - Freon "12" and Methyl Chloride Refrigeration Equipment

Stores Stock Adjustment - Oils and Greases - Caption 903-19

Freon "12" and Methyl Chloride Refrigeration Equipment Test and

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Engineering Studies (continued)

Overhaul - Buildings 105, 115, 146, 1701, 1704, 222, 231, 2701, 305, 321, 3701, 3706, 717A, 1111, 1113, 1117, 1118, 1121, 1123, 1130, 1135

Studies in progress at month-end were:

Sewage Lift Station - Pump Study
Reinforcement 230 KV Structures
Riverland Railroad Shop Area - Electric Heating
Pomona Pump Study
Downcomer Surge Study
V.R. Thimble Study
Additional Laundry Facilities
Additional Solution Preparation Facilities
Accounting Department - Assigned Clerical Personnel, 100 Areas
Maintenance Department - Effect of Standardization of Repetitive Maintenance
Manpower Requirements (Accounting, Maintenance, and Electrical) 100 Areas
Electrical Department - Shift Manpower Requirements, 100 and 200 Areas
Transportation Department - Lubrication Specifications
Transportation Department - J. I. Sheets, Heavy Equipment
Field Lubrication Work Sheets, 300 Area
Review Maintenance Spare Parts including Bearings, Packing, Gaskets and Belting
Curtail Stocks - Transportation Department Stores Stock and Spare Parts
Curtail Stocks - General Hardware
List of Suggested Spare Parts for 700-1100 Area Power Equipment

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ELECTRICAL DEPARTMENT

DECEMBER 1945

GENERAL

Work Order summary:

Area	Work on Hand Nov. 22		Work Completed in Dec.		Work on Hand Dec. 25	
	No. of Orders	Estimated Man Days	No. of Orders	Estimated Man Days	No. of Orders	Estimated Man Days
100-B	29	346	61	295	32	366
100-D	46	278	100	280	53	223
100-F	24	330	73	201	24	110
200-W	50	171	87	318	50	86
200-E	23	81	65	291	25	75
300	9	9	44	132	12	24
700-1100	54	114	90	246	48	79
Distribution	119	1498	120	1050	93	1170
Total	354	2827	640	2813	337	2133

100 AREAS

Two electrical disturbances occurred on the 230 KV system: (1) The one on December 5 caused a "scram" of the pile in the 100-D Area, the other areas were not affected. (2) The one on December 10 had no effect on process in any area. The first was caused by a fault on the Midway-Walla Walla 115 KV line initiated by the failure of two pole structures in a wind storm. No cause has been determined for the second disturbance.

Two more of the replacement end-bells were installed on process pump motors. Work on the project to provide electrical operation of the gates at the Retention Basin is complete in the 100-B and D Areas. Work also was completed on extension of the fire alarm system in the D and F Areas.

The Distribution Group constructed the signal circuit between the Pile and Retention Basin B, D, and F Areas, and tightened all guys on all 13.8 KV lines in 100-B Area. Similar work on 13.8 KV lines in the D Area is now 50% complete. Sub-station maintenance crews completed annual inspection and overhaul of the 230 KV type FG25 O.C.B.s A-366, A-344, and A-342.

200 AREAS

A speed control device (Revatrol) was installed on the F-2 centrifuge in the Concentration Building of B Plant.

A bearing failed on the 25 HP main ventilating fan motor in the T Concentration Building on December 6. The cause was determined as excessive V-belt tension. A spare motor was installed while repairs were made, and there was no interruption of production. Also a bearing failed on a 50 HP pump in the 200-E Filter Plant on November 30, due presumably to defects in manufacture. Normal service was maintained with spare equipment.

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Line crews completed approximately 30% of the project for construction of a 230 KV by-pass around Sub-station A-8 (Building 251). The annual inspection and overhaul of constant current regulators in both 200-E and 200-W Areas was completed.

The 115 to 66 KV, 3,333 KVA transformer was re-installed at the Hanford Sub-station.

300 AREA

In the Metal Fabrication Bldg., one bronze canning furnace element burned open on December 11. Experiments with the use of nickel terminals on the pot furnaces have shown that the corrosive action is not as rapid on nickel as on nichrome and stainless steel, and that, with the larger diameter terminal being used, some gain has been made in terminal life. Equipment in rooms provided for canning processes 2 and 3 was removed in preparation for the installation of machinery for turnings reclamation. A small table drive motor on the Frost Test Machine failed on December 14, causing a delay in scheduled work, but no production loss for the day. The motor was replaced with a spare unit.

Excessive heating took place at a loosely bolted current transformer bus connection on the 440 volt switchgear to the rotary hearth furnace in the Press Building on December 4. The furnace was not in use at the time but was standing-by in a heated condition. Repair was made with no loss of production. A short circuit occurred on the crane trolley in this building on December 10, when a chain control support was snapped against the wires. The chains have been replaced with ropes.

The voltage in the 300 Area dropped to approximately 87% normal value on December 5, when the PP & L 66 KV transmission system was affected by loss of a tie line due to damage by heavy wind. The low voltage caused improper action of some solenoid valves, magnetic contactors, fluorescent lights and fluoroscopes. The condition was relieved at 9:49 AM, when corrective switching measures were taken on the 66 KV system.

700-1100 AREA

The low voltage condition on December 5 affected equipment in the Village similar to that in the 300 Area, and also control and X-Ray equipment in Laundry and Hospital.

Projects on Fire Alarm System additions, Electric Heating and Rewiring of the Electric Appliance Shop, and work on Dormitory W-17 (Youth Center) were completed.

Line crews installed a new transformer bank for the Masonic Hall, where electric heat has been installed. Overloaded transformers near tract houses L-865 and L-894 were replaced. Services were removed from 25 additional prefabs, prior to their removal from the Project, and flood lighting was installed for the parking area at the Bus Terminal.

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POWER SUPPLY INTERRUPTIONS

Date	Area	Building	Circuit Affected	Time	Duration	Remarks
Nov. 27	Richland	House	1118 Willard St.	5:15PM	1 hr, 40 min.	Transf. fuse blown
Dec. 5	Hanford	Sub-Sta.	Mid-Hanford-Walla Walla 115 KV	3:58 AM	1 hr. 53 min.	Two poles down
Dec. 6	Richland	House	331 Sanford St.	12:00 N	10 min.	Broken transf. lead
Dec. 6	Richland	House	300 Sanford St.	Unknown	Unknown	Transf. lead
Dec. 8	Richland	Columbia High Sch.	Circuit to Columbia High School	8:20 AM	10 hrs, 40 min.	Blown pot head
Dec. 11	Richland	House	812 Willard St.	Unknown	Unknown	Broken transf. lead

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POWER STATISTICS - ELECTRICAL DEPARTMENT - DECEMBER 1945

ITEM	ENERGY - MWHRS Nov.	ENERGY - MWHRS Dec.	MAX. DEMAND - KW Nov.	MAX. DEMAND - KW Dec.	LOAD FACTOR - % Nov.	LOAD FACTOR - % Dec.	INCREASE OR DECREASE - % ENERGY	INCREASE OR DECREASE - % MAX.DEMAND
230 KV SYSTEM								
151 B Out	7510	5140	12000	11800	84.1	60.5	31.6 (d)	1.6 (d)
151 D Out	7950	7660	12500	12300	85.5	86.4	3.6 (d)	1.6 (d)
151 F Out	5780	5630	10100	10000	76.9	78.2	2.5 (d)	1.0 (d)
251 Out	2360	2360	3800	3900	83.5	84.0	-	2.6
TOTAL OUT	23600	20790	** 38400	** 38000	-	-	11.9 (d)	1.0 (d)
MIDWAY IN	26020	23022	* 38400	* 38800	91.1	82.4	11.5 (d)	1.0
Transm. Loss	2420	2232	--	--	-	-	-	-
Percent Loss	9.3	9.7	--	--	-	-	-	-
66 KV SYSTEM								
1151 A Out	2891	3394	6300	7100	61.7	66.4	17.4	12.7
1151 B Out	2281	2619	5400	5800	56.8	62.7	14.8	7.4
751 A Out	1800	1896	4046	4219	59.8	62.4	5.3	4.3
351 A Out	262	254	459	444	76.7	79.5	3.0 (d)	3.3 (d)
351 B Out	248	266	1080	1000	30.9	36.9	7.2	7.4 (d)
Hanford Out	157	152	400	400	52.8	52.8	3.2 (d)	-
TOTAL OUT	7639	8581	** 17685	** 18963	-	-	12.3	7.2
Hanford In	157	300	* 400	* 400	52.8	1.4	91.0	-
Pasco In	7509	8344	* 16000	* 18400	63.1	63.0	11.1	15.
TOTAL IN	7666	8644	** 16400	** 18800	62.8	63.8	12.7	14.6
Transm. Loss	27	63	--	--	-	-	-	-
Percent Loss	.35	.72	--	--	-	-	-	0
PROJECT TOTAL								
230 KV (Item 5)	23600	20790	** 38400	** 38000	-	-	11.9 (d)	1.0 (d)
66 KV (Item 15)	7639	8581	** 17685	** 18963	-	-	12.3	7.2
TOTAL OUT	31239	29371	** 56085	** 56963	-	-	6.0 (d)	1.6
230 KV (Item 6)	26020	23022	* 38400	* 38800	91.1	82.4	11.5 (d)	1.0
66 KV (Item 18)	7666	8644	** 16400	** 18800	62.8	62.8	12.7	14.6
TOTAL IN	33686	31666	* 52800	* 57600	85.7	76.3	6.0 (d)	9.1
Transm. Loss	2447	2295	--	--	-	-	-	-
Percent Loss	7.3	7.3	--	--	-	-	-	-

* Coincidental Demand
** Non-Coincidental Demand
(d) Denotes decrease

Average Power Factor - 230 KV System 98.8%
Average Power Factor - 66 KV System 99.9%

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INSTRUMENT DEPARTMENT

DECEMBER 1945

GENERAL

Work received during December was 12.6% greater than in November.

Work Order Summary:

Area	Work on Hand Nov. 25		Work Completed in Dec.		Work on Hand Dec. 25	
	No. of Orders	Estimated Man Days	No. of Orders	Estimated Man Days	No. of Orders	Estimated Man Days
100-B	5	70	57	354	7	72
100-D	13	105	66	351	16	108
100-F	18	67	73	336	17	63
200-E	29	77	105	283	19	67
200-W	41	49	95	307	23	40
300	76	260	81	440	58	290
700	46	113	56	220	47	100
Totals	228	741	533	2291	187	740

100 AREAS

No shutdowns or unusual incidents due to instrument failure occurred in any of the 100 Areas.

Instruments in the 100-D Power House were checked and calibrated.

In 100-F Area Pile Building, an insulated sample line was installed between the process sewer, at a point just below the downcomer, and the "A" sample room. Due to the pressure in the downcomer, it is possible to obtain a steady flow through this sample line and to check exit water temperature directly with a mercury thermometer. The installation is very simple, and permits an additional accurate check on pile power level.

200 AREAS

Clinton Laboratories experience is being duplicated here in that occasional stoppage of dip legs for the Ring Balance meters now is occuring in Canyon vessels. At Clinton, this effect first was noticed four months after start up. In some cases, clearance of these legs requires cleaning the process vessels with acid, the stoppage being too solid to be blown out with air.

The periscopes of all three Canyon Building cranes have accumulated rust on sliding parts to an extent which will require thorough cleaning and waxing.

An improved chemical assay panel has been installed in the Isolation Building. It includes a vacuum tube milli-voltmeter to indicate proper addition of titanium chloride prior to titration, and is specially arranged to avoid contamination of parts during the process.

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300 AREA

The electronic construction load has increased materially due to recent orders for contamination detecting equipment. Most requests are for instruments of the "Poppy" type.

700 AREA

By request of the Transportation Department, the Instrument Department has taken over responsibility for checking accuracy of gasoline distribution meters. The first month of this work has been done by the 700 Area group, who now are preparing instructions which will enable the job to be distributed among the various area groups.

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PROTECTION DEPARTMENT

DECEMBER 1945

PATROL DIVISION

General

Labor turnover in the Patrol Division remained at approximately 1% in December.

Plant Areas

Six Special Duty escorts were handled.

Requests handled totalled 721, mainly consisting of opening warehouses and various other doors and gates for employees of other departments.

A total of 139 Unusual Incident Reports was received, which consisted mainly of unlocked and open doors, windows and files, and traffic violations.

One Lieutenant is assisting the Medical Department in giving first aid instructions to Patrol supervision in the 100 and 300 areas, as the Patrol will administer first aid at times when a nurse is not in the area.

A practice evacuation was held in the 100-D area on December 19.

The H.I. personnel was discontinued on the first shift in the 100-B and 100-F areas on November 26 and in the 100-D and 300 areas on December 10, at which times the Patrol assumed the responsibility of preparing "B" or "C" type badges for issuance as well as maintaining the H.I. record system for these badges during this eight hour period (12 - 8 A.M.).

A medical pass procedure was instituted in the 200 areas to replace the issuing of red tag passes for medical examinations; it was made effective in the T Plant on December 17 and in the B Plant on December 18.

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	37	10	42	11
Marksman	117	30½	121	32
Sharpshooter	90	23	72	19
Expert	140	36½	141	38
Totals	384	100	376	100

The Sub-Machine Gun Course was not conducted during December, due to adverse weather conditions.

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Richland Area

	November	December
Check on absentees	7	5
*Persons assisted	166	190
Doors and windows found open in commercial facilities	15	26
Lost children found	8	3
Ambulance runs	75	71
Lost dogs reported	4	7
Dog and cat complaints	25	45
Totals	300	347

*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; and delivery of messages to residents who have no telephone.

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 DIVISION

General

On December 3, a comprehensive protective measures survey was instituted in the 200 East Area. Similar surveys in all areas will be conducted in order that security and protective policies may be standardized throughout the entire plant. These surveys were complete in the 200-E and 100-F Areas at month-end.

Security Education

A total of 202 Security Meetings was held. These meetings were attended by 2,695 employees throughout the entire plant and administration areas.

New security posters were installed in all the Village buses and distributed throughout the plant and administration areas.

Plant Visitors

Name-Organization	Purpose of Visit	Access to Areas: Classified	Access to Areas: Unclassified
Allied Project Visitors			
Dr. J. J. Nickson Metallurgical Laboratory University of Chicago Chicago, Illinois	Consultation on health.	X	

Protection Department

Name-Organization	Purpose of Visit	Access to Areas Classified	Access to Areas Unclassified
W. A. Hane Los Alamos, New Mexico	Consultation on electronics	X	
Outside Service Personnel			
Richard Eastman Richland Motor Company Richland, Washington	Inspection of excess equipment in Hanford Area.		X
Leonard W. Baur General Electric Company Seattle, Washington	Consultation with Electrical Department on breakers.	X	
Carl T. Moody Western Gas & Power Co. Yakima, Washington	Delivery of propane gas.	X	
Thomas B. Patterson Western Gas & Power Co. Yakima, Washington	Delivery of propane gas.	X	

Statistical Summary

	November	December
Number of employees cleared for classified information.....	81	142
Number of visitors cleared for classified information.....	1	1
Number of authorization cards issued to employees.....	15	8

Number of employees having access to each classified area as of month-end were (A, B, and C denote type of clearance):

Area	November A	November B	November C	November Total	December A	December B	December C	December Total
100-B	716	526	201	1443	740	509	193	1442
100-D	697	583	161	1441	725	569	153	1447
100-F	764	558	143	1465	766	542	137	1445
200-W	990	687	36	1713	974	715	34	1723
200-E	774	788	24	1586	769	802	23	1594
200-N	119	248	247	614	97	276	251	624
300	641	604	19	1264	627	631	17	1275

Area	Temporary Access November	Temporary Access December
100-B	11	20
100-D	14	26
100-F	18	23
200-E	13	32
200-W	11	30
200-N	2	18
300	17	43

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INVESTIGATION DIVISION

The following summary reflects the work of this division:

	November	December
Cases pending at beginning of month.....	321	415
Cases received during month.....	275	180
Cases closed during month.....	181	257
Cases pending at end of month.....	415	338
Number of employees approved for clearance.....	79	142
Construction personnel files reviewed for transfers.....	42	50
Number found satisfactory for employment.....	232	136
Number found unsatisfactory for employment.....	24	8
Number of Personnel Security Questionnaires concerning concessionnaire employees processed and forwarded to Military Intelligence Office without investigation....	81	123

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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	0	0	0	0	0
Attempted Suicide	0	0	0	0	0	0	0
Burglary-Breaking and/or Entering	1	0	1	1	0	0	(u)
Larceny-Theft (except auto & bike):							
(a) - $50.00 and over value	1	0	3	1(a)	1	0	1
(b) - Under $50.00 value	6	1	3	5	1	0	1
Auto Theft	1	0	1	1	0	0	(u)
Bicycle Theft	2	0	7	2	1	0	1
Destruction of Government Property	2	0	2	2(b)	0	1	4
Destruction of Personal Property	1	0	2	1	0	0	(u)
Disorderly Conduct	1	0	1	1(c)	0	1	2
Drunkenness	2	0	2	2	2	0	2
Missing Persons	0	0	3	0	0	0	0
Offenses against family & children	0	0	0	0	0	0	0
Prowlers	1	1	0	0	0	0	0
Rape	0	0	0	0	0	0	0
Sex Offenses	1	0	0	1	0	1	2
Vagrancy	0	0	0	0	0	0	0
Miscellaneous	5	0	4	5	0	0	(u)
Juveniles (other than reported above) Disorderly Conduct	3	0	2	3(d)	0	4(e)	8
	27	2	31	25	5	7	21

(a) - The one offense was perpetrated by one juvenile, of age 15 years.
(b) - One of the offenses was perpetrated by four juveniles, of ages 10 thru 13 years.
(c) - The one offense was perpetrated by one juvenile, of age 10 years, and one adult.
(d) - The three offenses were perpetrated by seven juveniles, of ages 14, 15 and 17 years.
(e) - One of the offenses reported in July 1945 was perpetrated by one juvenile, of age 16 years.
(u) - Represents "unknown".

Value of property recovered from November 25 through December 25 was $967.45 (includes 1 auto and 2 bicycles).

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PATROL DIVISION - TRAFFIC CONTROL STATISTICS

Motor Vehicle Accidents

	Total Number		Fatalities		Major Injuries		Minor Injuries	
	Nov.	Dec.	Nov.	Dec.	Nov.	Dec.	Nov.	Dec.
Plant	1	3	0	0	0	0	0	0
Richland	15	11	0	0	0	0	8	4
Totals	16	14	0	0	0	0	8	4

Accident Causes

	Negligent Driving		Failure to Yield Right-of-Way		Reckless & Drunken Driving		Miscellaneous Causes	
	Nov.	Dec.	Nov.	Dec.	Nov.	Dec.	Nov.	Dec.
Plant	1	2	0	0	0	0	0	1
Richland	4	5	6	3	1	1	4	3
Totals	5	7	6	3	1	1	4	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	3	4	0	0	0	0	0	0	1	0	4	4
Richland	6	6	8	8	62	75	3	3	88	51	167	143
Totals	9	10	8	8	62	75	3	3	89	51	171	147

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	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Richland	22	23	12	10	3	3	1	1	2	3	12	10	52	50
Totals	22	23	12	10	3	3	1	1	2	3	12	10	52	50

Traffic Volume

	November	December
Plant - Perimeter Barricades (average car count - 24 hour period).....	961	893
Richland - Duportail Street (average car count - 24 hour period)	9,897	9,213

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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 Average	One Month Average	Six Months (Jan.-June 1945)	November	December
Murder	0.225	0.037	0	0	0
Robbery	5.32	0.89	0	0	0
Aggravated Assault	2.49	0.615	5.33	0	0
Burglary	30.97	5.16	8.66	1.5	0.66
Larceny	86.08	14.34	56.0	9.75	5.33
Auto Theft	23.96	3.97	24.0	0.75	0.66

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 Average	One Month Average	Six Months (Jan.-June 1945)	November	December
Murder	0.215	0.036	0	0	0
Robbery	3.62	0.6	0	0	0
Aggravated Assault	1.17	0.19	5.33	0	0
Burglary	27.8	4.63	8.66	1.5	0.66
Larceny	81.22	13.53	56.0	9.75	5.33
Auto Theft	24.04	6.0	24.0	0.75	0.66

The portion of offenses committed by persons under the age of 21 years is shown by the following figures:

		Richland		
Classification	National Average (1944)	Six Months (Jan.-June 1945)	November	December
Robbery	34.5%	0	0	0
Burglary	51.8	40.0%	100.0%	0
Larceny	35.0	19.0	23.0	12.5%
Auto Theft	63.1	50.0	0	0

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 age groups because of the practice of some jurisdictions not to fingerprint youthful offenders."

In Richland every delinquent juvenile is entered in the records.

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SERVICE DEPARTMENT

DECEMBER 1945

PLANT SERVICE

PERSONNEL

Department	Additions	Inter-Dept. Transfers In	Inter-Dept. Transfers Out	Roll Terminations	Net Roll Change
Management	-	-	-	-	-
P Department	12	-	6	6	-
S Department	6	9	-	3	+ 12
Technical	18	-	3	16	- 1
Power	9	3	-	16	- 4
Maintenance	6	-	-	10	- 4
Electrical	6	-	-	-	+ 6
Instrument	-	-	-	2	- 2
Protection	4	-	-	6	- 2
Service	4	1	-	4	+ 1
Transportation	21	-	7	16	- 2
Medical	19	4	-	15	+ 8
Accounting	32	-	1	25	+ 6
Totals	137	17	17	119	+ 18

Roll Additions

	Exempt	Non-Exempt	Total
New Hires	-	92	92
Re-employs	-	18	18
Reinstates	1	17	18
Other Plant Transfers	1	-	1
Net Additions	2	127	129
Payroll Exchanges	8	-	8
Gross Additions	10	127	137

Terminations

Going Home	-	12	12
Another Job	-	11	11
Dissatisfied with Work	-	3	3
Personal Illness	-	2	2
Family Illness	-	2	2
Getting Married	-	3	3
Pregnancy	-	1	1
Husband Leaving	-	1	1
Husband Returning from Service	-	10	10
Going to School	-	3	3
Reduction of Force	8	11	19

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	Exempt	Non-Exempt	Total
Transfer to Other Plants	10	4	14
Discharged for Cause	-	8	8
Voluntary Unexplained Absence	-	2	2
Other	5	15	20
Net Terminations	23	88	111
Payroll Exchanges	-	8	8
Gross Terminations	23	96	119

Approximately 21% of all terminations occurred in the Accounting Department; 13% in the Technical, Power, Transportation and Medical Departments.

Personnel Turnover

	November	December
Exclusive of Military Service Terminations..	2.69%	2.38%
Total Turnover.....	2.73%	2.38%

Plant Absenteeism (Non-Exempt)

Male.....	2.78%	4.81%
Female.....	4.55%	7.58%
Plant Average.....	3.17%	5.40%

The influenza epidemic responsible for the marked increase in absenteeism is covered in the Medical Department section of this report.

Non-Exempt Personnel - Interviews

Accepted.....	153	75
Rejected.....	404	342
Others.....	363	326
Total Interviews.....	920	743

Non-Exempt Personnel - Placed on Roll

Current Month Interviews.....	85	59
Previous Month Interviews.....	45	68
Total Placed on Roll.....	130	127

Military Service Personnel (World War II)

	December	To Date
Employees Entering Military Service.....	-	151
Employees Returned from Military Service....	-	5
Other Veterans Hired.....	42	330
Total.....	42	335

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HW-7-3171-Del

Service Department

WAR DEPARTMENT

SELECTIVE SERVICE

Number of 4-F, 2A(F) and 2B(F) Classifications	77
Number of 1-C's	93
Number of male employees 18-25, excluding 4-F, 2A(F), 23(F) and 1-C Classifications	51
Total number of male employees under 26	221

The Manhattan District Headquarters advised on December 13, 1945, that the State Director of Selective Service had agreed to request reopening of five cases in which technically trained men had been placed in Class 1-A by the Board of Appeal

CENTRAL FILES

	November	December
Classified Documents Received (In Mail)	117	77
Unclassified Documents Received (Total)	2,377	2,095
Classified Documents Issued	2,230	2,501
Inter-Area Transfer (Classified)	3,413	3,466
Documents Routed (Classified)	4,136	4,523
Requests - File Documents (Classified)	596	499
Requests - Technical Library	113	96

SAFETY AND FIRE PROTECTION

Safety

Plant Safety Record - 104 Days

Injury Statistics

	November	December	Year to Date
Major Injuries	-	-	9
Non-Tab. Major Injuries	-	-	10
Sub-Major Injuries	2	2	35
Minor Injuries	263	246	4729

Sub-Major Injury No. 50

December 6 -

sustained a transverse fracture to distal phalanx left fourth finger. Injured was helping a fellow employee load a box weighing approximately 200 pounds onto a hand truck. The load shifted and his finger was caught between a corner of the box and a 2½" pipe "L" which was used to support one end of the box.

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WITH DELETIONS

Sub-Major Injury No. 51

December 20 -
sustained a fracture of the right index finger. Injured had placed his hand on the door post (body) while entering the rear seat of an automobile. A fellow passenger in the front seat closed the front door which pinched the injured's finger, resulting in the described injury.

Minor Injuries

See charts appended to this departmental report.

A total of 398 Safety Meetings were held, with an attendance of 4,624.

Fire Department supervision is meeting with the Safety Engineers for a general re-training course to cover both safety and fire topics.

The program of job hazard breakdowns, as presented by the Safety Standards Subcommittee, was accepted by the Central Safety Committee. Written job hazard breakdowns are to be compiled covering the hazards involved on all plant jobs.

The Accident Investigation and Prevention Subcommittee of the Central Safety Committee investigated the near serious accident of an acid spill in 100-B Area and Sub-Major Injury No. 50.

The Traffic Subcommittee of the Central Safety Committee met during the month to study the re-routing of Village buses through the Bus Depot, as well as other traffic items.

The pocket safety calendar, with a shift schedule on the back, was distributed to all employees.

Amber lenses were installed for the slow blinker light in front of the Recreation Hall.

A test for carbon monoxide gas in the Bus Terminal Garage was made.

Fire Protection

Fires

	Number of Fires		Estimated Damage	
	November	December	November	December
Village	11	9	$ 7.75	$13.50
Area	5	10	15.00	47.00
Miscellaneous	-	-	-	-
Totals	16	19	$22.75	$60.50

All fires were investigated, and of a trivial nature.

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Arrangements were made for the installation of additional gate valves on each of the five dry sprinkler systems in the Hospital, to prevent further leaking of air supply line at sprinkler valves.

A survey was completed of the Tube Shop (Building 717), and a Ganewell detector system with master alarm box was recommended for protection of building and contents during times the building is not occupied.

Cooperation of merchants and residents in complying with request to have all evergreen trees flame-proofed was very good.

INDUSTRIAL RELATIONS AND TRAINING

Industrial Relations

Contacts are summarized as follows:

	November	December
Policy	8	19
Military Service	1	-
Transportation - Tire Applications	42	18
" - Miscellaneous	3	-
Insurance	9	4
Housing	30	22
Municipal - Facility	1	4
Personal	33	23
Miscellaneous	31	26
Total	158	116

A final report from departmental chairmen on the Victory Loan Drive revealed that the plant "Special Purchase" quota of $250,000 was exceeded by $150,991.90 (A total cash purchase value of $400,991.90, or 160.4% of quota). These purchases were over and above regular bond purchases authorized through payroll deductions for the period October 29 to December 31, 1945 (estimated at $250,000).

Plans have been made to furnish assistance to employees in the filing of final income tax estimates for the year 1945 (due January 15, 1946) and filing returns for 1945.

Notices regarding the Special NBC Broadcast of December 9 on the National Safety Council Award to the Manhattan District were posted in all areas on December 7.

Transportation Committee

This Committee processed 25 applications for tires.

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GENERAL DIVISION

Laundering volumes were as follows:

Plant Laundry (Bldg. 2723)

	November	December
Coveralls - Pieces	13,743	15,310
Towels - "	4,162	4,240
Miscellaneous "	13,759	15,307
Total Pieces	31,664	34,857
Total Dry Weight - Lbs.	49,392	55,771

700 Area Laundry (Bldg. 723)

	November	December
Flatwork - Pieces	35,227	29,772
Rough Dry - "	17,907	16,327
Finished - "	1,659	1,639
Total Pieces	54,793	47,738
Total Dry Weight	31,232	27,210

VILLAGE ADMINISTRATION

HOUSING

Permanent Village Houses

	Family Occupancy Figures		
	Moved In	Moved Out	Month End
Du Pont	97	54	1996
Government	17	5	154
Totals	114	59	2150

Summary:

Houses occupied by family groups	2150
Houses utilized by Housing Section	2
Houses utilized by Medical Department (Public Health Section)	1
Houses assigned but unoccupied pending arrival and installation of furniture	11
Houses available for assignment	331
Government houses without lease in du Pont possession exclusive of authorized rent-free houses	5
Total Houses	2500

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Prefabricated Houses

	Family Occupancy Figures		
	Moved In	Moved Out	Month End
Du Pont	39	55	1349
Government	5	7	65
Totals	44	62	1414

Summary:

Houses occupied by family groups		1414
Unoccupied pending installation of effects and arrival of families		1
Houses available for assignment		25
Government houses without lease in du Pont possession		1
Total Prefabs (active)		1441
Closed and available for excess		63
Turned over to excess	298	
Removed from Project	27	
Awaiting removal		271
Total Prefabs on Project		1775

Tract Houses

Total	84	
Occupied	49	(Includes occupancy by du Pont, Government, sub-contractors, and Concessionaires. Some of these houses will be sold and removed, or boarded up, when vacated.)

Dormitories

Occupied by men	5
Occupied by women	8
Vacant	12
Total	25

General

All persons having trailers parked in residential areas removed them to approved storage locations in accordance with notices issued the previous month. Further regulations were issued requiring trailer owners who wished to move their trailers to their residences, for the purpose of making repairs or reconditioning, to obtain prior clearance from the Housing Office and to return the trailer to the approved storage location upon completion of the work.

In view of the program for excessing of prefabricated houses, and the attendant unsatisfied demand for family housing in the lower rental brackets, the renting of houses to single women was temporarily discontinued.

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Investigation of available Government-owned furniture, in excess at other locations, is being made to determine the possibility of obtaining a limited additional supply to relieve the current shortage of furnished houses.

COMMERCIAL FACILITIES

Operation

Progressive Cafeterias	November	December
Cafeteria Meal Customers	34,561	34,052
Total Dollar Sales	14,924	15,144
Per cent of room-day occupancy, Transient Quarters	83.60%	77.50%
Morning Milk Company		
Gallons of milk sold	46,789	45,772
Gallons of cream sold	1,481	1,431
Gallons of ice cream sold	2,449	2,565
"Richland" and "Village" Theaters		
Customer Count	46,679	34,439

Gasoline Sales (calendar month)	October	November
Total gallons, all stations	85,287	91,663

General

The idle serving line in the Cafeteria was revised to provide more efficient canteen service.

A Post Office Sub-station was established at the Penny Wise Drug Store to assist in the handling of Christmas mail and parcels, under arrangements made with the Post Office Department by that facility.

A comparative check of laundry prices was completed and is being reviewed with the operator of the Richland Laundry.

Employment record procedure affecting facility personnel was revised and reviewed with facility operators in an effort to obtain more uniform compliance.

A conference was held with the Public Health Section to facilitate medical examinations of food handlers and issuance of health cards. All food handling establishments are being contacted regularly to assure compliance with requirements for these examinations.

Agreement was reached for the establishment of a photographic studio in Building 50-X, on George Washington Way, to be operated under contract by Robby L. Johnson. The necessary remodeling of the building is under way.

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COMMUNITY ACTIVITIES

Schools

Operation of the schools continued through the month in spite of a mild influenza epidemic; absenteeism increased to a maximum of approximately 25 per cent during the peak of the disturbance.

General

The Richland Choral Society, established for the purpose of music appreciation and education through community concerts, and the Richland Technical Society, an organization interested in scientific and engineering problems, were approved as recognized Village groups.

The remodeling of Dormitory W-17 by Villagers, Incorporated, as a Youth Center, was completed and the building was opened to youth activities on December 21.

All community organizations, churches, schools, and facilities, cooperated in the community Christmas program. Major activities of the Christmas Program Committee pertained to the decoration of the Village square, coordination of group activities, and publicity.

VILLAGE - GENERAL

Village Administration operation of the Dog Pound was discontinued on December 20, when the operation was taken over by Mrs. Edith Earp under contract providing for payment of standard charges for boarding and for disposition of impounded animals.

A total of 956 dog tags have been sold to date.

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MONTHLY INJURY ANALYSIS

Period - November 26 through December 25, 1945

Minor Injuries

	Misc. Burns	Abrasions	Contusions	Lacerations	Punctures	Splinters	Strains & Sprains	Foreign Body	Unclassified	TOTAL DECEMBER	TOTAL LAST MONTH
Production P	11	4	5	5	0	0	3	0	0	28	39
S	2	8	2	2	1	1	0	0	0	16	24
Technical	6	6	3	12	1	1	0	0	1	30	27
Power	4	5	3	2	0	0	1	2	0	17	13
Maintenance	9	15	3	14	3	4	0	4	3	55	67
Electrical	1	2	1	4	1	4	1	1	0	15	11
Instrument	4	2	2	5	0	0	0	0	1	14	9
Protection	0	2	1	0	0	0	0	0	1	4	6
Service	1	1	0	1	0	0	0	0	1	4	12
Transportation	1	10	9	10	1	0	2	2	1	36	29
Medical	0	4	0	2	2	2	1	0	1	12	14
Accounting	0	4	4	3	1	1	1	0	1	15	12
TOTALS	39	63	33	60	10	13	9	9	10	246	263

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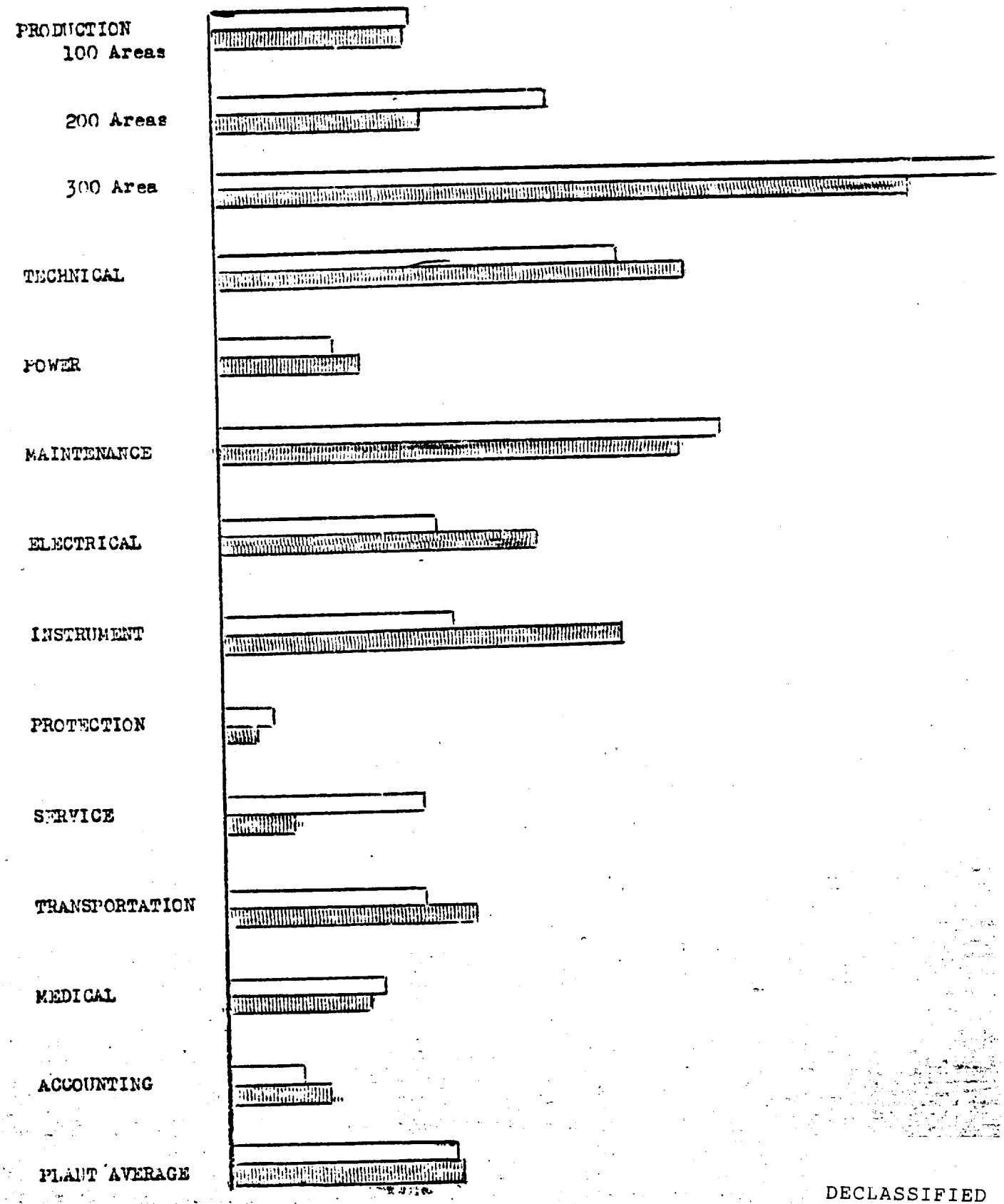
Last Month

This Month

DECEMBER
FREQUENCY RATE CHART
Minor Injuries



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TRANSPORTATION DEPARTMENT

DECEMBER 1945

RAILWAY AND AUTOMOTIVE OPERATIONS

A Milwaukee Railroad train was derailed while entering Riverland Yard on December 3, due to excessively worn wheel flanges. The necessary repairs were effected.

A further reduction of automotive equipment inventory was effected, with four units being declared excess. Total units excessed since March 1, 1945 is 502.

Off-the-plant automobile trips (Company business and official visitors) totaled 51.

Comparative figures for plant bus trips are:

	Average Daily Trips	
	November	December
Passenger Busses - 100-B	13	13
Passenger Busses - 100-D	12	12
Passenger Busses - 100-F	13	13
Passenger Busses - 200-W	18	18
Passenger Busses - 200-E	13	13
Passenger Busses - 300	8	8
Inter-area passenger service (Stretchouts)	3	3
Inter-area express service (1 panel delivery)	1	1
Inter-area mail service (1 panel delivery)	1	1

Significant daily averages for Village bus operation are:

	November	December
Total passengers handled, including transfers	2,441	2,437
Total bus trips	105	105
Total bus miles handled	557	557
Revenue	$119.70	$119.50

MECHANICAL AND LABOR

Work was completed in lengthening the run-around track at the acid unloading spot of B Canyon Tank Farm (200-E Area).

Work Order summary:

	Work on Hand Nov. 25		Work Completed in Dec.		Work on Hand Dec. 25	
Area	No. of Orders	Estimated Man Days	No. of Orders	Estimated Man Days	No. of Orders	Estimated Man Days
Labor:						
100,200 & 300	59	408	228	909	53	1334
700 & 1100	44	1437	251	3417	113	1634

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Work Order summary (continued)

Area	Work on Hand Nov. 25		Work Completed in Dec.		Work on Hand Dec. 25	
	No. of Orders	Estimated Man Days	No. of Orders	Estimated Man Days	No. of Orders	Estimated Man Days
Repairs:						
100,200 & 300	--	--	--	--	14	131
Riverland Yard	19	128	14	185	14	123
700 & 1100	148	1021	471	2094	99	1075
Totals	270	2994	964	6605	293	4297

Bulk fuel plant statistics (in gallons):

	Gasoline	Diesel Fuel	Kerosene
Stock at start of month	24759	4624	488
Received during month	117800	17300	1630
Dispensed during month:			
du Pont	84660	12934	2053
Government	21233	1310	65
Total	105893	14244	2118
Stock at end of month	36666	7680	0

Repair and service statistics for du Pont-operated equipment are:

	November Totals	December								
		100 B	100 D	100 F	200 W	200 E	300	700-1100	Portable Units	Totals
Inspections (Preventive Maintenance)	1058	75	65	34	77	69	-	598	196	1114
Grease Jobs	1056	75	65	34	77	69	-	598	196	1114
Shop Orders	3145	141	79	89	126	82	6	2504	-	3027*
Gasoline Dispensed (Gallons)	80907	5477	4587	4935	6500	5903	1137	47020	6842	85215**
Kerosene Dispensed (Gallons)	1841	3	1	-	-	-	2	15	1940	1961
Diesel Fuel Dispensed (Gallons)	15292	-	-	-	-	-	-	-	12943	12943
Antifreeze Dispensed (Quarts)	2549	109	54	41	127	141	21	1311	320	2201***

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* Includes 120 shop orders at Riverland Yard.
** Includes 2814 gallons disbursed from Morrison-Knudsen underground tanks.
*** Includes 7 quarts disbursed from Morrison-Knudsen tanks.

Labor work volume statistics are as follows:

	November Totals	December 100 B	100 D	100 F	200 W	200 E	300	700-1100	Totals
Cars Coal Unloaded	324	103	101	110	-	-	24	64	402
Cars Other Materials Unloaded	24	7	8	7	12	7	-	3	44
Frt. Shipments Handled	77	13	17	16	-	-	17	42	105
Personal Effects Moved, Including Baggage	68	-	-	-	-	-	-	18	18

RICHLAND TRAFFIC OFFICE

On December 14th, advice was received that the carriers have approved a rate of 2 5¢ per cwt., minimum 60,000 pounds, on lime cars from Evans, Washington to Hanford. Publication on statutory notice has been requested. This reduction from 28¢ will result in considerable savings on lime from Evans to Hanford.

Work volume statistics are as follows:

	November	December
Office Business		
Household Goods Movements Arranged	31	32
Household Goods Movements Traced	19	2
Automobile Shipments Arranged	5	7
Automobile Shipments Traced	1	0
Rail Bills Approved	68	197
Truck Bills Approved	155	83
Express Bills Approved	101	80
Household Goods Claims Filed	12	6
Household Goods Claims Collected - Number	9	22
Household Goods Claims Collected - Amount	$476.09	$2391.26
Work Orders Issued - RHG Repairs	6	101
Insurance Riders Issued	37	9
Insurance Bills Approved	96	0
Freight Claims Filed	9	2
Freight Claims Collected - Number	12	15
Freight Claims Collected - Amount	$787.91	$293.67
Requests for Billing	0	1
Rail Reservations Made	65	101
Air Reservations Made	42	30
Ticket Refund Claims Filed - Number	0	2
Ticket Refund Claims Filed - No. of Tickets	0	3

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Transportation Department

	November	December
Office Business (continued)		
Ticket Refund Claims Collected - Number	5	1
Ticket Refund Claims Collected - Amount	$248.10	$34.37
Freight Shipments Traced	30	23
Express Shipments Traced	0	0
Carload Shipments Received	458	547
Hotel Reservations Made	21	10
Expense Accounts Checked	47	60
Freight Shipments Converted	382	417
Express Shipments Converted	0	17
Government Bills of Lading Accomplished	69	71
Freight Bill Pre-Audit Savings	$170.87	$1011.94
Rates, Routings, Schedules Checked	636	632
Routing Instructions Issued	6	15
Household Effects		
Lots Shipped Out	34	32
Lots Pending	39	40
Automobiles Shipped Out	3	9
Household Lots Via Express	10	22
Household Lots Via L.C.L. Freight	3	2

Commodities Received - Carloads	November	December
Ammonium Sulphate	1	0
Argon Gas	1	0
Caustic Potash	1	1
Caustic Soda	20	12
Cement	0	2
Chemicals	3	4
Chlorine	1	1
Coal	372	454
Ferric Sulphate	3	14
Helium	2	2
Household Goods	1	0
Lime	2	5
Machinery	0	3
Merchandise	7	4
Metal	1	0
Nitric Acid	17	19
Hydrogen Peroxide	0	1
Phosphoric Acid	4	3
Salt	2	1
Sodium Bichromate	1	0
Soda Ash	6	5
Sodium Bicarbonate	0	1
Sodium Nitrate	1	3
Sodium Silicate	12	12
Totals	458	547

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MEDICAL DEPARTMENT

DECEMBER 1945

PLANT MEDICAL SECTION

Physical Examinations	November	December	Year To Date
Employment Examinations	184	82	3,154
Transfer Examinations	9	6	379
Annuals	262	244	3,287
Sub-contractor Examinations(food handlers,etc.)	10	81	427
Rechecks	133	95	1,787
Termination Examinations	112	104	2,539
Army and Government	24	36	294
Area Rechecks	934	964	16,327
Construction Examinations	0	0	144
Examinations-Assists to Clinic(A&H Insurance)	3	0	35
Total.	1,671	1,612	28,873

Treatments			
Occupational Treatments	296	280	5,562
Occupational Retreatments	866	827	17,643
Non-occupational (Welfare) Treatments	3,593	4,389	48,198
Total.	4,755	5,496	71,403

Laboratory Examinations

Medical Laboratory

Pre-employment, terminations, transfers	1,717	1,595	34,804
Annuals	1,693	1,619	20,525
Clinic	1,645	1,575	23,429
Hospital	1,564	1,356	19,061
First Aid	87	33	639
Area Rechecks	5,092	4,463	83,936
Public Health	50	80	418
Military	0	0	125
Visitors	20	96	303
Total.	11,868	10,817	183,240

X-Ray

Industrial (pre-employment, transfers, terminations	320	309	6,069
First Aid	76	59	973
Annuals	273	383	3,574
Construction	0	0	77
Hospital	69	79	1,064
Clinic	220	262	3,097
Public Health	4	19	48
Military	12	2	84
Total.	974	1,113	14,986

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Electrocardiographs	November	December	Year To Date
Industrial	109	132	1,424
Clinic	10	8	212
Hospital	6	6	160
Total.	125	146	1,796

Absentee Investigation Report

Total number calls requested	223	238	2,334
Total number calls made	223	238	2,334
Number absent due to illness in family	18	25	167
Number not at home when call was made	10	10	233

General

Thus far, there has been no evidence of occupational disease due to special or other chemical hazards of operation.

The monthly program of the Health Activities Committee covered the topic of "Colds".

HEALTH INSTRUMENT SECTION

100 Areas

General

Interest in the 100 Areas was focused on the inspection and removal of horizontal and vertical rod thimbles in the 100-B Area. Careful plans were made to execute the program without undue exposure, and the task was accomplished very successfully.

Work Permit Summary

Special Work Permits were processed as follows:

	November	December
100-B	468	574
100-D	354	222
100-F	562	574
Total	1,384	1,370

Retention Basin Effluent

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

	100-B	100-D	100-F
Power level (Ave. MW while operating)	225	255	230
Average beta dosage - rate (mrep/hr)	0.7	0.7	1.0
Average gamma dosage - rate (mr/hr)	2.1	1.[illegible] .9	2.4

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Medical Department

	100-B	100-D	100-F
Average total dosage - rate (mrep/hr)	2.8	2.6	3.4
Average integrated dose in 24 hrs (mrep)	67	62	82
Maximum integrated dose in 24 hrs (mrep)	77	67	96

It has been normal practice in these reports to compute the average dosage-rates for the entire month. This would include the periods of shutdown during which the exit water activity would be low. During the present period, the B pile has been shut down since 12/11/45. The average dosage-rates have, therefore, been computed only for the period prior to that date to maintain continuity with the previous record.

There has been no significant change in the status of the active springs in the 100-D and 100-F Areas.

Inspection and Removal of Rod Thimbles

In the 100-B Area, the #15 vertical rod thimble was inspected by means of the borescope and found to require replacement. The inspection was performed with close attention to the potential radiation hazard. Special shields had been built to confine the radiation, and the only hazard of consequence arose from an annular beam reading about 2000 mrep/hr, between the time of rod removal and insertion of the borescope. No person was required to expose himself to this well-defined beam. All the rod thimbles were subsequently examined in the same way, but the program was steadily expedited as experience indicated that some of the early maneuvers were unnecessarily overcautious.

Ten vertical rod thimbles were replaced. Basically the technique was to withdraw a suitable length of the thimble, cut it off by remote control methods, and to remove it inside a shield. As the work progressed, the degree of shielding was reduced and the thimble segment increased. At all times the hazard to the personnel was kept low. In a typical case the calculated exposure to an individual was 20 mr, while the exposure measured by pencils was 30 mr. It is believed that no-one received a significant dose during the operations. However, it is necessary to report that one employee showed a badge film exposure of 2400 mr for the two-week period, as compared with a permissible total of 1200 mr. The exposure measured by pencils was 75 mr, in good agreement with the anticipated value. It seems highly probable that the badge exposure was fictitious in some manner not yet discovered.

Another peculiar circumstance in the badge system occurred in the same period in the same area. A badge film provided for an employee who had terminated prior to the insertion of the film showed a reading of 1000 mrep. Despite the apparent illogicalities involved, the badge system is compelled to report that this film was exposed either to beta rays or to low energy gamma rays, whereas the previous case had an exposure to hard gamma rays.

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200 Areas - T, B, and U Plants

Survey Statistics

	November			December		
	T	B	Total	T	B	Total
Surveys for Special Work Permits	363	406	769	430	325	755
Other routine and special surveys	399	457	856	417	554	971
Smear samples for alpha counts	729	820	1549	479	931	1410
Smear samples for beta counts	584	118	702	665	275	940
Air monitoring samples	366	457	823	339	468	807
Thyroid checks	343	179	522	283	205	488

Canyon Buildings

Radiation levels near the samplers were again high, with dosage-rates up to 2000 mrep/hr including 500 mr/hr of gamma radiation. These dosage-rates were measured with a Beckman Survey Meter at a nominal distance of one inch. The effective distance for the gamma ray readings was therefore about 3-1/2 inches, being the chamber radius plus one inch. If an operator knelt at the sampler, the chest and the normal position of the pencils would receive about 1 mr/hr or less. At the same time, a hand inadvertently held near the sampling port might receive as much as 10,000 mrep/hr, since the observed Beckman reading would be low by a factor of possibly 5. This means that the sampling procedure must be continually well controlled.

Measurements of the atmospheric concentration of plutonium in the Canyons have continued to show very satisfactory conditions. The highest recorded concentration was 5×10^{-11} μg Pu/cc.

Control Laboratories

A very marked improvement in the alpha-particle contamination of the laboratories has been sustained. The aggregate of contaminated items has scarcely decreased, but the residual activity of each has been kept low, thereby reducing the hazard of handling the piece. High dosage-rates, up to 350 mrep/hr, are still found at the surfaces of contaminated waste cartons.

Product concentration in the air of the laboratories did not exceed 5×10^{-11} μg Pu/cc.

Concentration Buildings

No new hazard problem arose in these buildings. The vigorous and continued efforts of S Department personnel have eventually succeeded in keeping the surface contamination in the F Cell and F 10 Room down to acceptable levels. Atmospheric concentration of product was low at all times. A low but positive reading of undetermined origin was obtained in one of the lunch rooms.

200 Area Isolation Building

Air Monitoring

Of 90 long-period air samples, 83 read at the observational limit of 4×10^{-12} μg Pu/cc. The highest reading was only 1.2×10^{-11} μg/cc. Thirteen measurements of the filtered hood air system indicated no concentration greater than 4×10^{-12} μg/cc. 212 spot samples were taken, with a top value of 4×10^{-11} μg/cc.

Surface Contamination

Zone	Items or Locations checked	Contamination Found ($\mu\mu$g) 0.01-0.04	0.04-0.2	Above 0.2 Inside Hoods	Above 0.2 Outside Hoods
Operating zones	8273	544	348	75	110
Laboratories	6419	395	225	52	69
H.I. & Gen.Bldg.	1717	3	1	0	0
Miscellaneous	1467	73	37	0	17
Total	17,876	1,015	611	127	196

2856 smear tests on other items included 67 positive results. For the greater part of the month, there was a complete absence of floor spills and also of shoe contamination. However, there was a potentially dangerous situation when a fully charged pipette slipped and broke. Fortunately the sharp fragments of contaminated glass caused no injury, and clean-up of the area was successful.

Gamma Radiation

Gamma ray dosage-rates were normal in the Cells and against PR vessels and Sample Cans.

300 Area

Metal Fabrication Plant

Fifty-two air samples were taken in the Press Building during the month. Thirty-one indicated more than the preferred plant limit of 1.5×10^{-4} μg U/cc, and about one-half of these were above the now-accepted tolerance concentration of 5×10^{-4} μg/cc. In view of the recent upward trend in metal dust concentrations, zones previously declared proper for entry without respirators have been eliminated. Employees have, therefore, not breathed excessively contaminated air, since the respirators are about 99% efficient. Nethertheless, continued attention to the reduction of dust hazards is being emphasized.

Unusually high activity (100 mrep/hr) was observed in a bronze canning bath crucible checked prior to removal to the burial ground. Similar results have been reported elsewhere, especially for graphite crucibles. The activity

was supposed to be due to U X_1 and U X_2. There was no obvious reason why such an accumulation should have occurred in this particular crucible. The incident is of value in justifying repetitive checks of radioactive systems that seem to have been under effective control for long periods.

Separations Laboratories

These laboratories showed no significant hazard features.

Plant General

Well and River Water Monitoring

One hundred and thirty water samples were taken from wells and rivers. The activity remained low in general. Spring #13, Richland Well #12, and the 300 Area Well #2 showed positive results in the neighborhood of 6×10^{-5} μc/liter. Ranch #13 had one reading of 4×10^{-4} μc/liter. Apart from local activity near the return flumes, the highest Columbia River activity was 7.4×10^{-4} μc/liter at Hanford. The maximum level at Richland was 1.5×10^{-4} μc/liter.

Atmospheric Monitoring

The integrons indicated average dosage-rates in mr/24 hours as follows:

Location	Integrons November	Integrons December	C Chambers
100-B	0.8	0.3	0.3
100-D	1.0	0.5	0.4
100-F	1.3	0.2	0.4
200-W	0.6	0.4	0.5
200-E	1.1	0.8	0.8
Riverland	0.6	0.2	-
Hanford	0.6	0.3	-
300 Area	1.2	1.2	0.8
Richland	0.4	0.5	-
Benton City	0.2	0.6	-
Kennewick	0.1	0.0	-
Pasco	0.1	0.2	-

The comparison readings of the C Chambers include also a reasonable part of the beta ray dose. Film packets exposed in these same locations did not record any exposure above background.

Ground Contamination

The maximum ground contamination inside the operating areas was 1.5 mrep/hr in 200-W at a point 2000 feet southeast of the T Plant stack. The maximum in 200-E was 0.8 mr/hr, 3500 feet southeast of the B Plant stack.

The concentration of iodine activity on vegetation was as follows:

Location	Reading (μcuries/gm) November	December
Rt. 4-S, Mi. 6	8.7×10^{-3}	1×10^{-2}
RT. 10, Mi. 2	4.7×10^{-4}	3.3×10^{-3}
100 Areas	3.6×10^{-4}	8×10^{-4}
Richland	5.0×10^{-4}	4×10^{-3}
Benton City	5.5×10^{-4}	2×10^{-3}
Kennewick	3.1×10^{-4}	6.9×10^{-3}

There has been a sharp increase in the concentrations at points remote from the stacks, and particularly near populated regions outside the reservation. The problem of permissible iodine concentration was therefore critically reviewed. It was found that the original basis for the tolerable concentration differed from the currently accepted breathing rate and spectral energy. The tolerable concentration for repeated inhalation for 8 hours per day was reduced from 2.6×10^{-13} curie/cc to 1.0×10^{-13} curie/cc. No official calculation of the hazard to grazing animals exposed to radio-iodized fodder has been made, but reasonable assumptions led to a provisional tolerance value between 10^{-4} and 10^{-3} μc/gm of vegetation. This value has been temporarily exceeded in the Richland, Pasco, Kennewick and Benton City area. These observations have led to a decision to increase metal cooling time during winter meteorological conditions.

Laundry, Decontamination and Hand Counting

About 40,000 items were monitored in the Plant Laundry. Included were 11,860 coveralls, 10,740 overshoes and 11,490 gloves.

13,063 alpha hand counts and 23,788 beta hand counts were recorded. 1.4% of the alpha counts and 0.7% of the beta counts were above the warning limits, prior to further decontamination, which was adequately performed in all recorded cases.

Calibration Service

Radium calibrations were:

Type	Instrument	Number of Calibrations November	December
Stationary:	Integron	425	389
	* HM & GE Chamber	207	195
	Total	632	584

* Done in Areas

[redacted]

Type	Instrument	Number of Calibrations November	December
Portable:	Beckman survey meter	158	154
	Lauritsen Electroscope	81	64
	Victoreen survey meter	87	93
	GM survey meter	41	38
	Miscellaneous	5	16
	Total	372	365
Personnel Meters:	Pencils	6326	5913
	Badges	298	683
	Total	6624	6596
Total Radium calibrations		7628	7545

X-ray and Intermediate energy gamma and beta calibrations:

	Portable Instruments	25	8
	Pencils	6073	5913
	Miscellaneous Film	66	413
	Total	6164	6334
Grand Total		13,792	13,879

Miscellaneous

Two representatives of the H.I. Section visited the Radiation Laboratory, University of California, during the period November 27 through December 1. The procedure used there for product analysis in urine was studied, and is now being developed here for a routine plantwide program. Useful data for the improvement of field surveys for product contamination are correction factors to the observed surface reading when product solutions have been spilled on various surfaces, e.g.:

Metals, Lucite, Bakelite	1.1
Masonite	1.6
Linoleum, Cardboard	2
Hardwoods	~ 2
Softwoods	~ 3

The low activity of the springs in the 100 Areas, which discharge water almost as elevated in temperature as that in the Retention Basins, indicated that the activity was being removed by the soil despite possibly rapid flow of the escaping water. Absorption column tests with the effluent water indicated absorption between 97% and 98% until 0.5 gm water/gm of soil had passed through. The value then fell rapidly to ~ 50% for 1.25 gm H_2O/gm soil. This suggests the possibility that the 100 Area springs may rather quickly become more active if the breakthrough condition should be reached. The activity is being carefully followed.

A comparison of the badge film system here and at the Metallurgical and Clinton Laboratories was issued as a separate report. General agreement was found, but the study led to suggestions for improved control.

Ionization in the Beckman Survey Meter outside the ionization chamber was studied with x-rays and gamma rays, and preliminary steps to improve the meter performance were taken.

Personnel Meters

Pencils

Summarized results by Areas were:

	100-B	100-D	100-F	(E&N) 200	200-W	300	Total
Total Pencils read:	10,435	9,633	10,049	25,676	30,064	8,470	94,327
Number of Single readings: (100 to 200 mr)	30	48	71	131	220	36	536
Number of Paired readings: (100 to 200 mr)	1	1	1	6	10	0	19
Number of Single readings: 200 mr	35	72	49	165	224	63	608
Number of Paired readings: 200 mr	0	0	1	1	2	0	4

Badges

Badge results by Areas were:

Total badges processed	3,386	3,303	3,477	4,568	4,430	2,935	22,099
Number of Readings: (100 to 300 mrep)	3	0	5(a)	14	9(b)	64	95
Number of Readings: (300 to 600 mrep)	0	0	5(a)	0	0	0	5
Number of Readings: (600 mrep)	2	0	2(a)	0	0	0	4
Number of film packets lost in processing:	4	2	8	12	4	2	32

NOTE: (a) All fogged
(b) One fogged

There was no high pencil reading confirmed by badge results. One of the high badge readings was necessarily spurious, due to its occurrence after the employee concerned had terminated.

VILLAGE MEDICAL SERVICE

Clinic

Treatment Summary

	Men	Women	Children		November	December
First Visits	196	173	192		647	561
Retreatments	610	1117	628		2351	2355
				Total	2998	2916

Seen in Well-Baby Clinic.....	232	0
Immunizations.....	486	0

The Well-Baby Clinic was temporarily discontinued during the month of December because of the influenza epidemic.

Clinic Visits

Medical.....	423	496
Pediatrics.....	520	406
Surgical.....	588	503
Gynecologic.....	225	238
Obstetric (New).....	29	38
Obstetric (Recheck).....	369	390
Venereal Disease.....	78	93
Ear, Nose, and Throat.....	340	292
Eye.....	166	168
Visits handled by nurses (hypodermics, dressings, etc.).....	240	210
Total	2900	2834

Home Visits

Doctors.....	62	265
Nurses.....	167	206
Total	229	471

Dental Health Center

Patients treated.....	1382	1222

Kadlec Hospital Section

General

There were fewer admissions, discharges, and patient days this month than last. However, December is usually a slack month and there will probably be more admissions after the holidays. As compared to a year ago, the admissions and discharges are approximately the same in number.

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Census	November	December
Admissions	279	256
Discharges:		
Surgical	60	51
Medical	51	57
Obstetric and Gynecologic	60	57
Eye, Ear, Nose and Throat	53	48
Pediatrics:		
Children	21	27
Newborn	36	31
Total discharges	292	271
Patient days	1863	1546
Average Stay	6.3	5.7
Average Daily Census	60	51.5
Discharged against advice	0	2
One Day cases	47	38
Operations		
Transfusions	5	7
Eye, Ear, Nose and Throat	39	31
Dental	0	4
Casts	14	3
Minors	47	40
Majors	14	12
Deaths	3	1
Deliveries	35	31
Stillborns	0	0
Physiotherapy Treatments		
Clinic	103	161
Hospital	44	42
Army	6	17
Industrial:		
Plant	89	104
Personal	54	79
Total	296	403
Patient Meals.		
Regulars	2310	1541
Lights	265	335
Softs	873	988
Surgical liquids	76	43
Tonsils and Adenoids	144	97
Specials	207	281
Liquids	273	261
Total	4148	3546

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Cafeteria Meals	November	December
Noon	1928	1803
Nights	329	303
Total	2257	2106

Nursing Personnel		
First Aid Nurses	25	24
Clinic Nurses	12	12
Public Health Nurses	8	7
Hospital General Nurses	49	51
Aides and Orderlies	40	43
Total	133	137

Public Health Section

General

The outbreak of influenza reached its peak during the month. The total number of cases reported to date is 985, in which 46% were among females and 54% among males. A breakdown in cases by age shows that the age groups 6-14 and 31-40 were hardest hit. The height of the epidemic was reached the week ending December 1. The epidemic began to level off during the last two weeks of December.

To date, the attack rate has averaged 72 cases per thousand. A further breakdown of cases by place of residence shows that the areas of heaviest incidence were the areas with the greatest population density. It is anticipated that we will continue having flu in the Village until the immunity level of the population is reached by at least 50% of the residents. To date, this level is about 35%. At this rate, incidence of the flu can be expected to continue into February. Immunization vaccine is still being offered, but the response has not been great; approximately 100 additional residents were given shots.

Of the other communicable diseases, chickenpox remains higher than a normal incidence. Since the height of this disease is in late winter, and it is primarily a disease of school children, a greater prevalence of this disease is anticipated.

Communicable Diseases Reported	November	December
Chickenpox	83	49
German Measles	7	8
Mumps	3	0
Scarlet Fever	3	2
Whooping Cough	2	0
Influenza	264	721
Malaria	2	0
Impetigo	2	2
Ringworm	1	10

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Scabies	7	3
Erysipelas	0	1
Tuberculosis	0	4
Syphilis	1	1
Gonorrhea	2	1
Total	377	802

Visits	November	December
Communicable Disease Control	344	573
Venereal Disease Control	9	6
Tuberculosis Control	1	20
Maternal Visits	141	111
Infant Visits	144	55
Preschool (1-5 years)	8	20
School Hygiene	33	24
Adult Hygiene	9	15
Morbidity	338	206
Crippled Children	1	2
Total	1028	1032

Administration		
Newspaper articles	2	4
Committee meetings	1	1
Attendance	9	11
Staff meetings	3	2
Lectures and talks	5	1
Attendance	565	10
Sanitation Inspections	153	148

As of the last inspection, all the food-handling establishments were Grade B or better, or scored above 80 on the numerical scale. Five establishments were in the 90-100 range and two were in the 80-90 range.

The sewage plant continues to function satisfactorily from a bacteriological standpoint, in that all samples were acceptable.

Although several inspections were made for vermin infestations, none were found that required fumigation.

Ten of the 62 raw milk samples taken exceeded the maximum bacterial count allowable. A portion of the producers involved have been notified of this discrepancy, and their supply will be excluded if improvement is not forthcoming. The remainder will be notified in the near future, and the same stipulation will apply.

A meeting was held to formulate plans for mosquito control during 1946. It was decided to form a committee, composed of at least one individual from each of the departments that would be involved in effecting control measures.

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Bacteriology Laboratory	November	December
G. C. Smears	51	57
G. C. Cultures	41	48
Fungus Cultures	5	4
Vincents Examinations	4	3
Trichomonas Examinations	24	22
Quantitative test for alcohol in blood	2	0
Tuberculosis Examinations	9	16
Bacterial Cultures	27	20
Examinations for parasites	6	0
Throat smears and cultures	11	5
Blood cultures	5	1
Stool cultures	0	3
Eye smears	1	2
Examination for presence of spermatozoa	5	2
Treated water samples	61	71
Raw water samples	81	84
Milk, cream, and ice cream tested	96	79
Sewage samples	8	8
Total	437	425

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ACCOUNTING DEPARTMENT

DECEMBER 1945

GENERAL

The Advance Account remained at $8,000,000.

The average hourly rate for the Monthly and Weekly Salary Rolls was $2.07 and $1.53, respectively.

ACCOUNTING

Through December 15th, billings totaling $355,773,128.31, representing 9,413 public vouchers (Form 1034), have been submitted to the Government, of which the General Accounting Office has approved 9,306, with a total value of $354,533,085.38.

CLERICAL

The general reduction of stores stock minimums from a sixty-day standard to a thirty-day standard has increased the volume of work in the Purchasing Unit.

Material in captions 903-22 (lumber), 103-2 (bolts, nails, etc.) and 903-4 (bearings) was transferred from the area storerooms to Richland during the month, as a part of the stores centralization program.

The central work order procedure started in 100-F Area last month was extended to the 100-B, 100-D, 200-E and 200-W Areas during December.

Work on rearrangement of parking facilities at the Bus Terminal, to eliminate an unsafe condition during the weekly payoff period, was completed during the month.

STATISTICS

Accounting (calendar month basis)

	November		December	
	No.	Amount	No.	Amount
P.O.'s Received	532	—	486	—
MR's Received	2,021	—	1,240	—
APV's Entered	2,010	$ 8,575,289.07	1,687	$ 635,961.40
Checks Issued	1,522	8,854,236.59	1,348	673,204.61
Cancelled	53	—	94	—
PR Transfers	5	784,496.83	4	630,180.58
EB's Entered	293	5,044.24	218	5,210.65
1034's Issued	152	1,747,088.48	128	1,739,658.45
Reimbursed	170	2,751,912.36	132	1,474,465.00
Non-Payment Credits	0	—	0	—
War Bonds Issued (Maturity Value)	5,050	193,050.00	5,322	212,775.00

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STATISTICS (Cont'd.)

Purchasing

	November	December
PHX Purchase Orders Placed	443	758
Orders Placed by Government	21	35
Requisitions Received	745	1,095
Requisitions Placed	721	962
Requisitions Transferred or Voided	33	43
Requisitions on Hand (Unplaced at month-end)	302	392

Stores

Returnable Containers Received	927	222
Returnable Containers Returned	912	742
Balance on Hand (at month-end)	2,801	2,281
Shipments Made (OROM)	31	33
Receiving Reports Issued	2,275	1,752
Material Exception Reports Issued	49	47
Items Set-Up in Stores Stock (at month-end)	41,373	41,777
Excess Material Shipped to Date	$ 827,642.98	$ 922,363.31
Value of Excess Material Inventory	1,139,005.39	1,806,885.39
Stores Disbursements	71,850.28	195,346.38
Spare Parts Disbursements	9,996.94	6,361.16
Value of Stores Stock (at calendar month-end)	3,239,704.95 *	1,804,697.01
Value of Spare Parts (at calendar month-end)	928,777.85	963,036.26

* Included Spare Parts

Essential Materials

Value of Materials Consumed during Month	$ 530,188.83	$ 496,272.48
Value of Materials in Stock (at calendar month-end)	1,178,753.11	907,282.20

Miscellaneous Clerical

Duplicating & Printing Orders Received	5,724	2,943
Duplicating & Printing Orders Completed	5,033	3,102
Mail Handled (Incoming & Outgoing)	16,332	17,439

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GOVERNMENT AND OTHER PERSONNEL

	11/25/45	12/25/45
Government Employees		
Civilian Personnel - Corps of Engineers	213	231
" " - GAO	6	5
Commissioned Officers (exclusive of MP's and MI)	15	14
MP Company (including C.O.)	179	182
MI Detachment (including C.O.)	17	15
Special Detachments	10	13
Military Personnel (other than above)	19	19
Total	459	479
Prison Industries (total)	266	261
Richland Village Personnel		
Facilities	603	628
Schools and Churches	181	181
Total	784	809
Morrison-Knudsen Personnel	89	92
Du Pont Personnel	4641	4659
GRAND TOTALS	6239	6300

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