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HW-7-870-Del

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November 10, 1944

HW-7-870-Del

HANFORD ENGINEER WORKS

MONTHLY REPORT

OCTOBER 1944

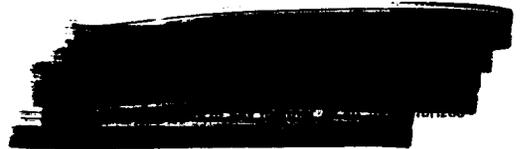
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1222268

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GENERAL

The 100-B Area operated all month increasing the charge in 105-B from 900 to 1500 tubes and reaching an operating level of 90 MW.

The T section of the 200 Area was accepted on October 9 and an extensive system of pre-testing and practice operation was started.

New records of yield and efficiency were established in slug production in the 300 Area.

The roll increased by 593 or 14.8% to 4576 employees. Turnover increased to 5.58% representing terminations of 267 people. This is attributed to the rapid increase of total personnel in the last few months.

The Richland Village was 71.5% occupied on November 1.

HW-7-870-De1

H.E.W. STAFF

MANAGER	W. O. SIMON
ASSISTANT MANAGER	D. O. NOTMAN
PRODUCTION SUPERINTENDENT	E. E. SWENSSON
ASSISTANT TO PRODUCTION SUPERINTENDENT	F. A. OTTO
TECHNICAL SUPERINTENDENT	S. J. HUGBEE
GENERAL SUPERINTENDENT - PLANT	J. A. GRADY
GENERAL SUPERINTENDENT - VILLAGE	W. O. RHODES
GENERAL SUPERINTENDENT - PROTECTION	T. H. STAPLETON
WORKS ENGINEER - PLANT	L. A. DARLING
WORKS ENGINEER - VILLAGE	C. STEELMAN
P DEPARTMENT SUPERINTENDENT	M. H. SMITH
S DEPARTMENT SUPERINTENDENT	W. C. KAY
POWER SUPERINTENDENT	F. M. ACKER
MAINTENANCE SUPERINTENDENT	ROSS HARE
ELECTRICAL SUPERINTENDENT	P. S. SKAFF
INSTRUMENT SUPERINTENDENT	V. F. HANSON
SERVICE SUPERINTENDENT	W. T. CLOUD
TRANSPORTATION SUPERINTENDENT	R. T. COOKE
TRAFFIC SUPERINTENDENT	F. D. BADER
MEDICAL SUPERINTENDENT	W. D. NORWOOD
CHIEF ACCOUNTANT	T. W. BROWN

10-31-44

122270

H.E.W. ROE REPORT

DEPARTMENT	NON-EXEMPT		EXEMPT						TOTAL	
			AT H.E.W.							
			ELSEWHERE		TOTAL					
	9-30-44	10-31-44	9-30-44	10-31-44	9-30-44	10-31-44	9-30-44	10-31-44	9-30-44	10-31-44
Management	—	—	7	7	—	—	—	7	7	7
P	233	214	105	108	4	4	4	109	112	342
S	7	43	88	94	—	3	—	91	94	98
Technical	74	92	212	265	43	12	255	277	277	329
Power	292	326	60	70	—	—	60	70	70	352
Maintenance	329	353	100	129	—	—	100	129	129	429
Electrical	90	100	30	37	—	—	30	37	37	120
Instrument	168	171	51	54	—	—	51	54	54	219
Village Engineering	20	55	20	26	—	—	20	26	26	40
Protection	937	1038	121	119	—	—	121	119	119	1058
Service	62	84	38	43	1	1	39	44	44	101
Village	—	5	19	19	—	—	19	19	19	19
Transportation	38	130	14	25	—	—	14	25	25	52
Traffic	—	—	2	4	2	2	4	4	6	4
Medical	119	166	52	72	16	5	68	77	77	167
Accounting	589	668	36	35	1	—	37	35	35	626
TOTAL	2958	3445	955	1107	71	24	1025	1131	3963	4576

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ARRIVALS AND DEPARTURES - KREDIT ROLL

OCTOBER 1944

ARRIVALS

<u>Name</u>	<u>Department</u>	<u>Arrival Date</u>	<u>Origin</u>
Donald C. Jenne	"	10-14-44	Construction
Robert W. Harvey	"	10-15-44	Clinton Laboratories
J. S. Bussey	"	10-15-44	"
J. A. Raymond	Technical	10-1-44	New
W. L. Kay	"	10-3-44	Clinton Laboratories
W. J. Knox	"	10-5-44	New
Dwight C. Lincoln	"	10-6-44	New
E. F. Storey	"	10-9-44	Metallurgical Lab.
J. K. Figsushan	"	10-9-44	"
J. B. Cavanaugh	"	10-9-44	"
J. R. Mollwain	"	10-9-44	"
H. W. Murray	"	10-9-44	"
R. C. McConnell	"	10-9-44	"
R. A. Wegner	"	10-9-44	"
W. B. Crawford	"	10-9-44	"
R. H. Turk	"	10-11-44	New
W. C. Johnson	"	10-11-44	Metallurgical Lab.
O. F. Hill	"	10-11-44	New
B. R. Gaarder	"	10-11-44	New
E. H. Shade	"	10-12-44	Metallurgical Lab.
H. E. Bailou	"	10-12-44	New
Gordon B. Leader	"	10-12-44	New
R. W. Berger	"	10-14-44	Metallurgical Lab.
T. P. Kohman	"	10-15-44	New
R. L. Veight	"	10-15-44	Clinton Laboratories
H. R. Neekstra	"	10-15-44	New
J. W. Jordan	"	10-16-44	Metallurgical Lab.
J. S. Cobble	"	10-16-44	"
L. B. Werner	"	10-18-44	New
J. B. Werk	"	10-6-44	Clinton Laboratories
Stanley G. Thompson	"	10-18-44	New
P. A. Gerov	"	10-21-44	Metallurgical Lab.
H. A. McGuire	"	10-21-44	"
J. R. Jones	"	10-22-44	Clinton Laboratories
H. W. Rebel	"	10-22-44	Metallurgical Lab.
Robert B. Bixler	"	10-22-44	"
A. L. Breen	"	10-23-44	"
E. M. Trigg	"	10-23-44	"
B. H. Arison	"	10-23-44	"

<u>Name</u>	<u>Department</u>	<u>Arrival Date</u>	<u>Origin</u>
Herbert B. Sanford	Technical	10-24-44	Metallurgical Lab.
J. A. Searthout	"	10-25-44	Clinton Laboratories
B. A. Fries	"	10-25-44	Now
F. R. Yett	"	10-26-44	Now
R. K. Geckermann	"	10-26-44	Now
D. S. Pyc	"	10-27-44	Now
Don W. Gay	"	10-29-44	Metallurgical Lab.
D. Rickabaugh	"	10-29-44	"
Glen H. McCasmon	Service	10-1-44	Clinton Laboratories
Glands T. Edwards	"	10-1-44	Construction
T. G. Weissenger	"	10-1-44	Construction
Earl L. Van Kirk	Power	10-2-44	Morgantown Ordnance Works
Thos. A. Askew	"	10-4-44	Construction
Harry K. Hale	"	10-4-44	Belle Works
James M. Hale	"	10-4-44	"
Charles A. Meadows	"	10-4-44	"
Gerald G. Edwards	"	10-4-44	"
Andrew B. Shelton	"	10-9-44	Construction
Charles Westendorf	"	10-9-44	Clinton Laboratories
B. M. Wright	Maintenance	10-2-44	Construction
G. D. Brown	"	10-5-44	"
Ernest G. Panther	"	10-5-44	"
Carlin L. Smith	"	10-7-44	Belle Works
James V. Glatworthy	"	10-8-44	"
C. R. Freselle	"	10-12-44	Construction
Homer Lakay	"	10-16-44	"
James F. Lee	"	10-17-44	"
Carl W. Hasty	"	10-18-44	"
Joseph E. Vayne	"	10-18-44	"
John E. Baell	"	10-23-44	"
Oliver H. Lang, Jr.	"	10-23-44	"
John L. Gastkill	"	10-24-44	"
Gregory T. Barber	"	10-24-44	"
Carl E. Geer	"	10-24-44	"
W. H. Finrock	"	10-27-44	"
W. J. Stubblefield	Electrical	10-6-44	Construction
Ernest G. Doskey	"	10-2-44	Now
Howard E. Evans	"	10-9-44	Construction
Richard F. Smith	"	10-23-44	Now
Eddie S. Bell, Jr.	Village Eng.	10-2-44	Construction
Earl L. Givens	"	10-16-44	"
Robert L. Bailey	"	10-27-44	"
Olaf S. Opdahl	Medical	10-1-44	Now
Mary C. Abney	"	10-2-44	Now
David H. Smith	"	10-6-44	Now
John W. Healy	"	10-9-44	Clinton Laboratories

<u>Name</u>	<u>Department</u>	<u>Arrival Date</u>	<u>Origin</u>
W. D. Edson	Traffic	10-2-44	Construction
G. Christiansen	"	10-2-44	"
Andrew P. Mitchell	Transportation	10-3-44	"
Marion E. Miller	"	10-3-44	"
Lyman A. Powell	"	10-6-44	"
Glen T. Adams	"	10-12-44	"
James E. English	"	10-17-44	"
W. L. Stranghen	"	10-17-44	"
E. B. Banwell	"	10-18-44	"
Paul P. Barr	"	10-18-44	"
Walter H. Hagsdill	"	10-19-44	"
Edward E. Gillum	"	10-24-44	"
Melvin F. Rice	"	10-24-44	"
Luther O. Williams	"	10-26-44	"

DEPARTURES

<u>Name</u>	<u>Department</u>	<u>Date</u>	<u>Reason</u>
Earl E. Swensson	Management	10-31-44	Transfer - Old Hickory Rayon
Neal Thurman	Technical	9-30-44	Transfer - F&F Dept.
Carl V. Harlowe	Power	10-27-44	Transfer - Waynesboro Rayon
Justin W. Wyatt	Protection	10-9-44	Termination - Military Service
H. G. Holshanser	"	10-19-44	Termination - Medical Reject
Woodson L. Powell	Service	10-14-44	Termination - Force Reduction
August A. Lind	"	10-24-44	Termination - Voluntary
Martin E. Wulff	Transportation	10-20-44	Termination - No Work
Harry F. Tubergen	Medical	10-25-44	Termination - No Work
Thomas A. Baldwin	Accounting	10-14-44	Transfer - Gopher Ordnance Works

BAA

	<u>AA</u>	<u>AB</u>	<u>AC</u>	<u>AD</u>
A	—	—	—	2
B	—	108	—	1,022
C	—	—	—	6
D	—	—	13,115	52
E	—	—	36,507	145*
I "B"	37,434	145	85,047	330
I "Z"	14,792	58	14,792	58
J	1,224	5	6,041	23
K	1,824	7	1,824	7
L	3,959	16	142,108	561*
M "B"	29,096	113	71,513	277
M "Z"	14,867	58	14,867	58
N	0	0	0	0
R	1,612	6	134,727	531
S	45,575	177	221,107	866
U	37,347	147	82,552	326
V	—	2	—	—
W	—	173	—	—
X	—	3	—	—
Y	13,484	53	—	—
Z "B"	17,580	69	—	—
Z "Z"	2,629	10	—	—
B-1 "B"	1,196	5	—	—
B-1 "Z"	7,218	28	—	—
C-1	6,051	23	—	—
D-1	8,173	32	—	—
E-1	34,541	137	—	—
F-1	30,002	117	—	—
I-1	19,168	75	47,973	189
M-1	0	0	0	0
Q-1	—	27	—	—
R-1	47,973	189	—	—
		<u>AE</u>		<u>AF</u>
W-1		863,032		867,622
A-2		0		0

* Corrected

1222275

HW-7-870-Del

P DEPARTMENTOCTOBER 1944100-B AREAGeneral

The most significant development this month was the discovery of the self-poisoning effect of the unit which is roughly proportional to operating rate. This has caused a major change in loading plans, and we have raised the loading from 901 to 1500 in order to permit operation at rates reasonably close to those expected originally. This loading was done in four steps with short periods of operation between. The following tells the story of the raising of the level:

<u>Date</u>	<u>Level</u>	<u> Tubes</u>
10-1	1.6	901
10-3	10.	1004
10-5	15.	1004
10-6	28.	1128
10-7	38.	1128
10-15	50.	1300
10-17	60.	1300
10-22	75.	1500
10-24	90.	1500

The general operation has been very successful. Control of the unit has functioned well and comparatively simple instrumentation changes have proved adequate, although some further development is indicated. The health aspect is very good.

The dependability and pressure control of the process water to the unit has been extremely good. Water treatment has been held closely to specification. The condition of the effluent water seems satisfactory, although study is continuing on analytical phases. The monitor system provided in the sample rooms promises to be adequate.

The tube puller and cab have been tried out and appear to perform reasonably well, although very cumbersome and with obvious limitations. Two tubes were removed successfully from the front of the unit after operations had commenced and machinery to further aid this operation has been developed. Cask loading has been practiced under water.

No significant change has been reported in the overall structure, and no necking was found after fifty hot and cold cycles on two of the water tubes. No evidence of film formation has been noted either by instruments on the unit or by conditions in the Flow Laboratory. The expected changes in the physical constants of the packing are being found, but whether these will be serious in their effect is not clear at this stage.

1222275

Bldg. 115 is performing all functions smoothly except purification, and this is being carried out in a temporarily satisfactory manner through hand control of the refrigeration cycle. Leakage from the unit is 2000 to 3000 cubic feet per day which is being made up from purified gas. The installation of the special spectrograph is approaching completion and it will be used for complete gas analyses.

The transfer of men to "D" unit has started. The "B" organization has been revamped to suit the comparatively static operating conditions. "Information meetings" for all shifts have been started to stimulate interest.

Unusual Incidents

An as yet unexplained heating up of gas in one of the purification towers occurred while operating on gas which had been circulating through the unit, although the unit was shut down at the time. Gas of this source will not be purified until the phenomenon is better understood and suitable precautions set up. Meanwhile purification continues on tank car material.

The raw water line broke near the south high tank, pouring out a large quantity of water over the vicinity. Later, trouble developed in a joint near the reservoir in the same line, causing it to be necessary to take pressure off the line again. Repairs have been made satisfactorily in both cases.

During cab tryouts, a member of supervision was caught inside for about two hours due to a jam in the turning mechanism. No ill effects were experienced. Redesign of the door consisting of cutting it in two so that a man can get out, regardless of the position of the cab, is being actively worked on.

Problems Solved

The purification system in the 115 Bldg. has operated successfully except for the refrigeration system float valves. Although design temperatures are not attained, cleanup is 100% within the accuracy and sensitivity of the gas analyzing equipment.

Back up of active gas from the process sewer system has been stopped by installing about 1" traps in the sewer openings at the points affected. The pressure in the cushion chamber has been relieved by removing the top section of the baffle. By blocking the vent at the junction box just outside the building, the gas is expelled at the lower junction box in an area where its existence does not cause difficulty. These measures have removed the principal objections to the large volume of air drawn into the downcomer. Unless other conditions manifest themselves, we do not believe any more action will be necessary at "B".

The large oil leakage from the horizontal rod system has been eliminated by providing separate drains from the three lower hydraulic motors.

The third safety system was pickled and this, together with other minor measures, has enabled it to be put into operation as originally planned. It is still considered to be too touchy and redesign is being carried out. One tank was tripped accidentally while the unit was down. Fortunately, the back-up valves to the thimbles were closed at the time, so that no harm was done.

1222277

Two of the safety rods have at times stuck in the guides, causing a serious hazard to exist in breaking them loose with slack cable above them. We have developed a technique of "exercising" them once per shift to prevent this freezing. To date this has been successful and can be done without materially affecting operation of the unit.

Problems Unsolved

A fairly large number of trips have been experienced due principally to the Panellit units, transients in the Beckmans and electric power line surges. A report is being written on each such incident and means to control them studied.

Conditions on top of the unit are not satisfactory for some time following a trip due to gas expelled from the thimbles. The CO₂ system is inadequate to properly purge. Means for positive ventilation from the top of the thimbles is being studied, as well as means to render the CO₂ system more effective.

Charging and discharging machinery is not satisfactory due to jamming at nearly every point. Complete revamping is being considered, as well as changes to existing equipment. A mockup has been made which looks promising, and active work is going on to solve this problem.

The ventilating fans continue to be a source of difficulty, principally due to mechanical troubles at many points. The solenoid steam admission valves seem least amenable to adjustments.

The regular effluent water measuring instruments are not satisfactory due primarily to oil leakage into the water stream from the sampling pumps. This oil does not wash clean in the instrument and retains active matter, thus indicating a high condition which does not actually exist.

Several gas leaks have been found on the front face and attempts at stopping them have been only partly successful. The rubber sleeves provided are incorrectly dimensioned and cannot be used.

The float valves in the refrigeration system of the purification cells at 115 have not operated successfully. It is most likely due to water in the system. Work is underway to modify the system and use a float control separate from the valve, which is then actuated electrically. Also, the system is to be thoroughly cleaned and dried, and all new refrigerant will be used. In the meantime purification is obtained by hand manipulation of the valves.

100-D AREA

Status of Construction

At the end of the month the status of the area was as follows:

The 1700 series buildings have been accepted with minor exceptions. The 181 and 184 buildings have likewise been accepted. The 182 and 183 buildings require only some running in to be ready for acceptance. The remainder of the area is rapidly nearing completion.

At 105 the gas test has been completed. The tubes are piped up and emitting treated water for hydrostatic test. The horizontal rods are being run in. The 60" effluent line has been tested and accepted.

At the gas house the H.P. Storage is ready for operations testing. The 115 Building is due for completion early in the coming month.

300 AREA

305 Building (Test Pile)

Seven operators from the metal fabrication group were given training in the operation of the test pile.

Routine Tests

A total of 2372 canned slugs were tested with satisfactory results in all cases.

Special Tests

Ninety samples of metal filings were tested for the Technical Department. Three special tests were run for the Instrument Development Section and one special test was run for the Separations group of the Technical Department. One hundred ninety-six aluminum cans, the purity of which was suspected of being below standard, were tested and found satisfactory.

313 Building (Metal Fabrication)

Outgassing and Straightening

Outgassing and straightening has proceeded throughout the month without difficulties. With the exception of one lot, all outgassed material has shown an analysis of less than one part per million. One bar from this one lot was found to exceed specifications. Further analyzes are being made. A check analysis on the standard run of incoming material showed one and one-half parts per million.

Machining

The machining operation was shut down on October 4, to conserve rod supply for possible further changes in design. Machining personnel has been used in other operations. Miscellaneous work done by the group includes machining of special cast pieces and machining of special test samples for the 100 Area.

Canning

Canning has continued by the submerged process on a three-shift, six-day per week basis with two assembly units in operation. Overall canning yield to 111 class material has been 84.8%. This compares with 67.4% for the month of September.

Some difficulty was encountered for one week with poor wetting of the slug. An impurity, possibly introduced from the recovery operation, was causing the trouble. The difficulty has been corrected.

1222279
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The welding yield with submerged caming method has been somewhat below that experienced with press caming. The overall results for September were 1.02% bad welds compared with 2.09% bad welds in October. The poor result is largely due to poor wetting of the cap and depends on the proper condition of the cap surface and very careful cap heating time. The work of correcting this difficulty is continuing. In spite of the bad weld results, the autoclave testing has shown considerable improvement. Autoclave failures during the month of October were .48 per thousand as compared with 1.27 per thousand during September.

The can supply has been critical throughout the month. A change in design to permit a depression in the bottom of the can has resulted in a promise of a greatly increased supply.

Inspection and Testing -

The classification system has been further changed to reject all but Class III pieces. These pieces are being graded to Grade A (made from new machined slugs), Grade B (from nitric recovery), minimum weight 7.62 lbs., Grade Z (from HF recovery), minimum weight 7.77 lbs.

The metal record system has been altered to provide a continuous inventory of material in the area.

Recovery

The recovery process was changed on October 15, to minimize weight loss in the recovered slug. The new process consists of removal of the aluminum can by the standard caustic, sodium nitrate treatment; immersion for one hour in 10% hydrofluoric acid, followed by a three-minute dip in boiling nitric acid. This new process has permitted a yield to Grade Z slugs of 89.8% with an average slug weight of 7.845 pounds. This can be compared with a September yield of 87.04% having an average weight of 7.737 pounds. The overall figures for October were 94.87% to usable slugs having an average of 7.812.

Some difficulty was experienced with the new process after one week's operation. The slugs produced had a black surface deposit that was found to be largely iron. This trouble has been corrected by blowing air continuously through the nitric acid bath.

A considerable amount of neutralized sludge has been segregated by decantation and evaporation and packed in five-gallon containers ready for shipment.

HW-7-870-DeI

S DEPARTMENT

OCTOBER 1944

OPERATIONS

On October 9 all operating buildings (except 241-T) in the T Section of the West Area, and all general service buildings (except First Aid) were taken over from the Construction Department. The T Section operating buildings are now staffed with a complete supervisory organization who are distributed on the regular shifts. Weekly roll operators are in training in the T Area. The service groups are functioning.

The regasketing of process pipe connectors with G-9 (blue asbestos) has been completed, and a number of water runs have been carried out for the purpose of checking equipment. The hydraulic lines connecting to the skimmer and flow mechanisms on the centrifuges have been found to be unsatisfactory because of numerous leaks. Work is in progress to correct this situation. Other mechanical jobs remaining to be done before operations can commence are (1) adjustment to the samplers, (2) adjustment to sound equipment, and (3) provision for the hot drainage from Bldg. 222. Chemical runs are scheduled for November 15.

Procedures have been compiled for the following:

1. Procedure and record sheets for operations in 212, 221, 224, 241 and 271 Buildings.
2. Essential material control.
3. Operations methods for recording and reporting laboratory results.
4. Procedure and record sheets for test work.
5. Movement of material between Areas.

STATUS OF CONSTRUCTION WORK

Construction work is progressing rapidly in the U Section of 200-W Area. The schedule for this work is as follows:

<u>Bldg. No.</u>	<u>Name</u>	<u>Completion Date</u>
211-U	Tank Farm	Nov. 4, 1944
222-U	Laboratory	Nov. 4, 1944
271-U	Service Bldg.	Nov. 19, 1944
221-U	Canyon	Dec. 4, 1944
241-U	Waste Storage	Dec. 4, 1944
291-U	Fan House	Dec. 4, 1944
224-U	Bulk Reduction Bldg.	Dec. 4, 1944
212-R	Raw Material Storage	Nov. 1, 1944
212-N	" " "	Accepted
212-P	" " "	"
213	Finished Storage	"
231	Finishing Bldg.	Dec. 15, 1944

1222201

A group of supervisors is now engaged in flushing outside lines and service piping in the U Section, and will be in a position to flush process lines and equipment as rapidly as construction work will permit.

Five supervisors have been assigned to checking construction work in Bldg. 231, the Finishing Building. In this building, plastering and floor finishing are progressing rapidly and should be completed early in November. Two of the 26 ft. stainless steel hoods have arrived and will be installed on an early date.

In the 200-East Area, concrete work in the Canyon, Bldg. 221, is about 75% complete. The roof is ready for waterproofing, and concrete finishing in the galleries is nearing completion. The horizontal tanks for the Tank Farm, Bldg. 211-B, are being installed this week.

All tanks in the Waste Storage Area, Bldg. 241-B, are poured, and the installation of membranes and gunite on the tank tops is about 65% complete. The 75-foot tanks in 241-C are dropped into position and five are poured.

METEOROLOGY SECTION

The Meteorology Section now consists of seven men, three of whom are experienced meteorologists, and four of whom are in training. Effective October 30, these men were assigned to shifts, and are now giving 24-hour forecasting service. One more experienced meteorologist is needed to round out the group for adequate shift coverage.

The Meteorological Office and Observations Tower, Bldg. 622, is scheduled for completion on November 18, 1944.

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TECHNICAL DEPARTMENT

OCTOBER 1944

100 AFRA

Physics

Reactivity

The pile has been operated for periods of several days each at successively higher levels, with additional tubes loaded to give the reactivity required to overcome the poisoning effect, which increases with power level. In cooperation with the Technical Division and Mr. Farmer, the data obtained has been analyzed to determine if the behavior of the reactivity followed the 6.6-hr. I^{135} -9.4-hr. Xe^{135} poisoning, to determine the yield and absorption cross-section of the poison, and to look for any indications of other similar poisoning effects. It was considered important to develop this information as early as possible in order to plan the charging of 105D so that any loss of reactivity which would develop during continued operation at high power might be anticipated. The program for the operation of the pile has been determined to a considerable extent by consideration of the development of this information.

The loss in reactivity due to the Xe^{135} poisoning is a function of time, power level, and number of tubes. If the half-lives of the parents and of the poisoning Xe^{135} , the yield of this particular chain, and the neutron absorption coefficient of the Xe^{135} are known, the loss in reactivity can be calculated as a function of time and power level for each pile loading. The following table summarizes estimates based on the operation of the pile which are of varying reliability, but indicate substantial agreement with the expected behavior on the Xe^{135} hypothesis.

<u>No. Tubes</u>	<u>Excess Reactivity</u> In hours	<u>Operation</u>		<u>Power at</u> <u>Observed</u>	<u>Saturation, MW</u> <u>Calculated</u>
		<u>Days</u>	<u>Power, MW</u>		
a) 903	32	3	1-9	about 2	2
b) 1004	120	3	10-18	18	18
c) 1128	(204)	6	16-38	34	34
d) 1300	(290)	5	35-60	60	62
e) 1500	(370)	10	75-90	105	102

The "Power at Saturation" given above is the power at which the unit would run indefinitely with all the excess reactivity which was present at the beginning of operation used up by the Xe^{135} absorption. The calculated values are based on a value of 4.2×10^{-18} cm², for the slow neutron absorption of Xe^{135} , a fission yield for the chain yielding Xe^{135} of 4.3% of the atoms destroyed by fission, and a half life of 6.6 hours for the I^{135} parent and of 9.4 hours for the Xe^{135} . The excess reactivity (the reactivity before poisoning starts) for the first two loadings is based on the period of the rise of the activity of the pile resulting from rod removal, and also on the accepted relationship between reactivity and period. These bases are considered to be reliable. For the other three

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loadings, the excess reactivity given is a calculated value based on the observed critical size and the added number of tubes. The rod calibrations were open to question and did not give a reliable value for the excess reactivity.

The observed "Power at Saturation" given above is based on the reactivity-time curves as operation with attendant poisoning proceeds. When the power is held constant without interruptions for several days, a good estimate of the equilibrium reactivity corresponding to that power level can be made without basing it on the Xe^{135} poisoning hypothesis. Such occasions have not been frequent and the figures given in the table are estimates of varying reliability and include estimates of the reactivity calibration of the rods remaining in the pile at the time equilibrium is being approached. The reactivity-time relationship to be expected from the Xe^{135} hypothesis is modified by the power level and the tube loading due to the destruction of the poison when it absorbs neutrons. With 1500 tubes the poison is at about 90% of the equilibrium value in 36 hrs. In general, the observed reactivity change as a function of time has followed the expected behavior. A number of periods have been carefully analyzed taking into account the interruptions due to rod releases. Some unexplained minor deviations from the expected behavior were uncovered. For example, in the 1128 tube run, the agreement was good until 100 inhours of reactivity were consumed and then the calculated curve fell below the experimental curve. At the end of this run, the increase in reactivity was followed for 5 hours with the pile running at low power permitting the poison to decay. In this case the calculated and observed behavior showed considerable disagreement.

Control Rod Calibration

A procedure for calibrating the control rods has been given considerable attention. The shadowing effect of one rod on another, the reactivity temperature coefficients associated with a change in the temperature of the metal and of the graphite, and the change in reactivity as the poison decays or grows introduced complications. A procedure taking these complications into account has been developed. When applied to the run with 1300 tubes, the excess reactivity based on rod calibrations following this procedure was estimated as 30% inhours which compares favorably with the calculated value of 29% based on the critical size and the added tubes.

Reactivity Temperature Coefficient

During a number of abrupt power level changes, the change of graphite temperature and of reactivity were followed as a function of time. After allowing for the change in reactivity resulting from changes in the poison, the graphite temperature and the reactivity were found to follow a time exponential curve with the same period. It seems reasonable to assume the reactivity change results from the change in graphite temperature. The following table summarizes these observations.

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Physics Section - Continued

Date	No. Tubes	Power, MW	Period		Reactivity*Change Graphite-Reactivity Per °C Graphite	Reactivity* Used by Poison
10/12	1128	30	15	15	+ 1.0	about 200
10/15	1300	35	9	8	1.0	0
10/16	1300	50	12	10	0.8	195
10/17	1300	50	15	15	0.8	240
10/19	1300	59.8	14	14	0.82	290

* Reactivity in inhour units

With all temperatures at equilibrium, the positive graphite temperature coefficient is almost cancelled by a negative metal temperature coefficient. The temperature of the metal is unknown. The overall temperature coefficient for the unit can be expressed in terms of the power level. It was estimated as ± 0.056 inhours per megawatt power for the Oct. 19 observations.

Monitoring Exit Water for Slug Coating Failure

The exit water monitoring system was initially used with the equipment of each sampling room as an independent unit in order to determine the extent and variation of the background water activity with power and control rod movement. Although it was found that rod movement would cause large changes in the activity as measured in a single room, the effect was satisfactorily reduced when the output of the chambers sampling pairs of groups of headers were placed in opposition. At present, these pairs are A vs. C, E vs. Y and X vs. Z, (A, E, C and X, Y, Z being the lower, middle and upper groups of headers of the north and south side, respectively) is estimated on the basis of Clinton experience that a break in the slug jacket of 8-120 sq. mm., depending on its position in the pile, would disturb the balance by one micro-microampere (about one inch on the Beckman scale when set for that range) when the unit is operating at 100 MW.

It was discovered that pile operation resulted in the formation of an active deposit in the monitoring chamber which is in addition to the background activity of the water. This deposit appears to have decay properties very similar to that of the activated water itself. Considerable evidence for active deposit formation in the overall discharge system, including the pile discharge face piping, and retention basin monitoring equipment was also found. The nature of this deposit is being studied in cooperation with the Instrument Department. The activation of the rear face as measured after the shutdown prior to charging to 1500 tubes produced a general radiation on the elevator of about 1 μ r/h for several hours after the shutdown.

Recommendations for changes in the exit water monitoring systems of 105B and 105F were made to the Instrument Development Group.

Activity of Pile Discharge Water

With increase in pile power level, the activity of the pile discharge water has disclosed longer half-lived activities than previously reported. The beta activity with a tentative assignment of the half-lives and elements responsible is approximately as follows:

<u>Beta Activity</u>		<u>Activity at Pile Face</u> <u>Dis/cc/sec/ml</u>
²⁴ Na	8-sec.	ca. 2000
¹²⁸ I	2.4-min.	5
(Mg?)	15-min.	0.35
(Mn)	2.5-h	0.35
(Ca? Na?)	ca.10-h	0.05

Although preliminary indications are that the corrosion of aluminum with its attendant impurities or neutron reactions with aluminum might furnish the active constituents found in the water, the possibility of some fission product activities, arising from heavy metal contamination in the slugs, is not entirely excluded.

As a result of the presence of the long-lived constituents, the activity of the water in the retention basin approaches nearer to the tolerance level of 0.1r/24 hours than was anticipated. If the 2.5 hour activity has a disintegration energy of 4 Mev, the factor of safety for one half of the basin is approximately two, assuming that the basin effluent must be at tolerance level. Comparison of the decay curve of water sampled at the pile face and at the retention basin exit, indicates that the effective hold-up time of one half of the basin is approximately 2 hours.

Scrubbing of the active discharge water in the downcomer by means of the air which enters through the atmospheric vent above the economizer removes an activated gas which passes out of the sewer through the vents and also backs up through a number of untrapped drains. The decay curve of the gas shows the presence of activities with half-lives of 38 minutes and 124 minutes in approximately equal amounts, and an additional shorter half-life of about 5 minutes in a smaller amount. The 38-minute activity is tentatively ascribed to activated free chlorine while the 154 and 5-minute activities may be due to argon contained in the dissolved air.

Graphite Monitoring and Effect of Pile Operation on Storage of Energy in the Graphite

Irradiated test hole samples were removed on October 12 and 20 and fresh samples were recharged into the test hole B. At that time, these irradiated samples had received exposure equivalent to approximately 1.1 and 2.1 W days, respectively. On the first date, samples of both pre-irradiated graphite from Clinton and previously fresh material were discharged. Only previously fresh W material was discharged on October 20. The change in the thermal and electrical conductivity produced by the exposures, additional exposure in the case of the Clinton samples, was found to be as follows:

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Effect of Graphite Irradiation

Source of sample	W	X	W
Irradiation in 10^{20} n, W days	1.1	1.1	2.1
Previous exposure, W days (Clinton)	0	3.5(90°)	0
% Change, thermal conductivity	57	16	63
% Change, electrical conductivity	51	15	61

It was found that for EC Green graphite having thermal conductivity (k) in the range of 0.13 to 0.56 cal/(sq.cm)(sec)(°C/cm), and electrical resistivity (R) in the range 5.4×10^{-4} to 2.2×10^{-3} ohms per centimeter cube, the relation between these properties is expressed by $k \approx 2.8 \times 10^{-4}$ (1/R). Changes in mechanical strength of the irradiated samples were not measured.

Experiments by the Technical Division show that the energy due to neutron bombardment that is stored in the graphite when at a temperature of 175°C is but 1/5 that stored when the temperature is 90°C. This conclusion is based on tests made on Site X graphite exposed for 1400 equivalent MW days at 175°C (2.8 cal./gr.) compared with graphite exposed at 90°C for 700 equivalent MW days (6.0 cal./gr.). This result is quite encouraging since the graphite of the 105 piles may eventually run at a temperature of 175°C, or even higher. Measurements made on graphite exposed for 700 MW days at Site X followed by 200 MW days at 105-B (30°C) gave a stored energy of 6.2 cal./gr. and 5.3 cal./gr. These values are actually no higher than obtained from samples exposed only at Site X without the additional exposure at 105-B. It cannot be stated that saturation has been reached because of the high uncertainty of the experimental result (±1 cal./gr.). The samples which are to be withdrawn from the pile on about November 5 should have had sufficient bombardment so that a more precise estimation of the saturation value can be obtained.

Some work was done on a method of observing the rate of change in the number of atomic dislocations by following the changes in electrical resistance upon rapid heating of an irradiated sample.

Test Hole B was modified by addition of a thermocouple imbedded in a sample of graphite and a thermometer in the exit water line. At 90 MW the temperature of the samples is maintained at about 30°C. Capsules for possible irradiation of small quantities of product in test hole B have been designed.

Considerable difficulty in obtaining a gas tight system has prevented use of the helium thermometer for following pile graphite temperatures.

Engineering SectionMeasurements of Pile Deflections

Readings taken on the 105B pile, while operating at 90 MW, have been compared with readings taken before start up and the following conclusions drawn: (1) Movement of the top shield, as indicated by changes in elevation of seven reference points, is in the order of 1/32 inches which is about the limit of accuracy of the measurement. It is concluded therefore, that no significant change has occurred. (2) Deflections of the rear face tie straps, both vertically and horizontally, as indicated by the Brown Telometers, were less than 1/32 inch which is not significant since the accuracy of the instruments is not better than $\pm 1/16$ inches due to play in the linkages. Measurement at the top center of the back face showed an upward movement of 1/32 inches. (3) Displacements of the front top corners of the pile, as indicated by plumb bobs, were less than 1/16 inches which again is not significant as readings are not accurate to better than $\pm 1/16$ inches.

The overall conclusion is that strains in the shields due to operating stresses are insignificant at a power level of 90 MW.

Air Suction in Downcomer Pipes

To reduce air pressure in the cushion chamber at 105B, due to air pumping in the downcomer, the top stop log of the water seal was removed to allow the air to pass freely into the process sewer. This was done before operating at 1500 active tubes. The vent on the near junction box was closed off to prevent escape of active gas near a working area. Average pressure in the cushion chamber due to this change dropped from about $\frac{1}{2}$ inches of mercury to about 1 inch of water. During the run, it was found that active gas was feeding back into the building through several sewer lines. When traps were placed in the lines, feed back of active gas was eliminated.

Since air pumping in the downcomer at 105F, which is not provided with a cushion chamber at the bottom, can conceivably interfere with water flow through the process sewer, a recommendation was made to install a smaller line parallel to the present downcomer and connected to it at the bottom to carry 90-95% of the total flow when running full. The balance of the flow would spill over a weir into the downcomer. A valve in the new line would permit adjustment for major changes in water flow through the unit. Design details for such an installation are being prepared.

Thermal Expansion Test on Aluminum Cooling Tubes

To check the effect of reported thermal cycles on necking of pile tubes at the Van Stone flanges, a test was made on two peripheral tubes (09-92, 09-96) in the 105B unit. Provision was made to pass alternately cold water (18°C) and hot water (65°C) through the two tubes, allowing temperature equilibrium to be reached each time. After 50 cycles in which the average tube temperature varied from 19°C to 55°C no necking of the tubes at the Van Stone

flanges could be detected. It was concluded that tube failure due to this cause should not be a serious problem, so long as soaking of the gun barrels due to thermal expansion of the shield does not result in binding sufficiently serious to prevent motion.

Thermocouple for Measuring Axial Metal Temperature

The first experimental heavy metal slug with an internally mounted thermocouple developed a slight blister near the weld end after an 80-hour steam autoclave test. Failure was due to unsecured welds. In order to eliminate troubles due to welding, a new design was worked up in which only compression fittings are used for making connections. An experimental unit based on this design was fabricated and successfully passed an 80-hour steam autoclave test. This equipment is now suitable for measuring the axial metal temperature in the 105 units.

Measurement of Tube Deflections due to Structural Changes

Design was completed and detailed drawings were prepared for an experimental piece of equipment intended to show the magnitude and direction of deflections of an individual peripheral pile tube due to volume changes of the graphite. The device consists of an axial tight wire which can be moved up or down to make electrical contact with fixed reference points inside the air filled tube. The vertical movement of the wire required to just make contact can be accurately measured, and relative bowing of the tube can therefore be determined.

Tool for Removing "Paposes" from Active Slugs

In order to remove paposes from active slugs soon after discharge from the unit, it is necessary to work on the pieces under 16-18 feet of water. The papose must not be damaged in the process and must be easily recoverable after separation from the slug. Preliminary experiments were made and a tool designed which should function satisfactorily. Performance tests are scheduled for as soon as fabrication of the unit has been completed.

Lubrication of Slugs during Pile Charging

Based on tests conducted at SSK, a recommendation was made that lubrication of slugs during charging would materially reduce slug and rib wear. Experience at 105B indicated that small quantities of lubricant in the water of the transfer area produced a cloudiness which was very objectionable. For this reason, experiments were conducted at Building 145 to determine a procedure for lubricating slugs during charging which would be effective and will not result in contamination of the transfer area water. Preliminary tests indicate a satisfactory solution to the problem.

Detecting a Water Leak in an Individual Pile Tube

Following preliminary designs worked up at Chicago and SSK for a test unit to detect leaky pile tubes an adaptation for plant use was drawn up in cooperation with the Project Engineering Group. A compact portable

unit was constructed and given preliminary tests on a mock-up tube at Building 145. A tight system showed no leak under a pressure of 300 lbs./sq.in., and a leak of 0.5 lbs/hr. was easily measured by the test apparatus. Following a satisfactory test on an actual pile tube, the unit should be ready to turn over to Maintenance for regular plant service.

Temperature and Power Measurements

Performance of the graphite and shield thermocouples has been erratic since start up of the 105B pile. Attempts to eliminate the cause of this behavior have not been entirely successful. However, indications are now that most of the thermocouples are recording approximately accurate temperatures and are showing general trends. Calculations on graphite temperature, taking into account indicated changes in graphite conductivity, give results which are in agreement with those measured. The measured temperature difference of about 8° C between the outside of the thermal shield and the adjacent face of the "B" block on the discharge face, with the pile operating at a level of 90 MW is about what is expected on the basis of the design. At the 90 MW level, maximum graphite temperature is about 50° C, maximum water temperature rise for a central tube is 21.3° C which gives an outlet temperature of about 39° C, and the average temperature rise for a total water flow of about 29,000 gals./min. is 11.2° C.

Ventilation in Building 115B

At the request of the P department, a survey was made of the distribution of ventilating air to the various rooms of Bldg. 115B. It was found that air flows through the several cells were in good agreement with those recommended. Details of the measurements were presented in a special memorandum.

Agitators in Lime Feed Bins - Buildings 185 and 108.

At the request of the Power Dept. an investigation was made to determine the cause of recurring mechanical failure of agitators in the lime feed bins. Several modifications were recommended which should eliminate the trouble, and a program was set up for following field tests on the charged equipment.

Helium Circulation System

Helium loss from the 100B circulating system is in the range of 2000 to 3000 cu.ft./day. Making up with 98 to 99.5% helium, the purity of the circulating gas has now increased to 96%.

The orifice originally installed in the main circulating line has been replaced with a larger size. With a circulation of 2700 to 2900 cu.ft./min. the pressure drop across the pile is 0.8 inches of water.

The silica gel dryers are maintaining a moisture content below 0.05%

by volume in the gas going to the pile. The returning gas contains about 0.15% moisture by volume.

Helium Purification

In the purification units, the refrigeration systems have not operated satisfactorily to date. The units have produced gas of better than 99.5% purity, but on all runs to date, the refrigeration systems have been controlled by hand and have given very erratic gas temperatures. Technical Department recommendations were presented in two parts. Part one provides for equipping all units with new refrigeration compressors and boilers of proven design. However, since the procurement of these may take several months, part two provides for the temporary rearrangement of refrigeration equipment in B area to permit it to operate on a stop-gap basis until the new equipment arrives. According to this latter plan, the present two boilers would be connected together with adequate vapor and liquid equalizing lines so that they will operate together as a single boiler. It was also recommended that the entire refrigeration system be thoroughly cleaned before reassembling. Revision of the No. 1 purification unit in the B area according to the second plan is now approximately one-half completed. Also in 100B area, it has been agreed to make the same revisions in the initial installation.

On October 14th while 100B purification unit No.2 was operating on gas which two days previously had been exposed to radiation in the pile, a heating effect was noted during the pressure letdown at the start of a regeneration cycle. Due to erratic operating conditions of the purification unit, the exact conditions under which this effect was obtained cannot be established. However, circumstances were such that it is reasonably certain that the heat was generated by oxidation of combustible materials present in the adsorbers. The specific combustible materials and the mechanism of igniting them have not been determined to date. It appears that the oxygen concentration necessary for combustion was built up by inadequate purging on previous regenerations, and resultant recycling of impurities containing appreciable oxygen. The combustible material may have been activated carbon dust, oil from the vacuum pump or compressor, combustible gases present in the 97 to 98% helium as received, or decomposition products picked up by the gas in passing through the pile. This is being carefully checked by analysis.

When the heating effect was observed, it was stopped by discontinuing the let-down, introducing 90% helium into the adsorbers, and then releasing the pressure slowly while maintaining a flow of 90% helium through the activated charcoal. In this manner, the oxygen concentration was maintained below the combustible limit while the pressure was reduced.

In consideration of the possibility of obtaining a combustion reaction of explosive violence, calculations were made on the quantities of heat released by oxygen in combining with all possible combustible materials. It appears that the maximum heat, which can be released by combustion of all the oxygen adsorbed from gas containing 10% impurity as air, will

raise the temperature of the gases plus the activated carbon in the adsorbers less than 300° C.

Water and Corrosion Section

Examination of Slugs

Approximately 1000 slugs discharged at the Oct. 12 shutdown were examined at close range in air and no trace of film was observed. This confirmed data taken in the flow laboratory and on eight selected tubes of the unit which had indicated that no film was to be expected. Current results continue to indicate absence of film.

Pressure Drop Data

Although pressure drop data taken both in the flow lab and across tubes of the unit indicate no film formation, a number of the Fanalit readings have fallen off a few pounds. This is not attributed to film because of the random distribution of the tubes exhibiting this phenomenon. Investigation as to the cause of this is scheduled for the first shutdown.

Slug Examination Equipment

The underwater viewer and microscope and slug manipulator have been received. The telescope has been used and found to be a satisfactory instrument for examining slugs under water. However, as the image is not clear, it is not suitable for detailed examination. For example, it can not be used to detect slight amounts of film on slugs. The microscope for examining active tubes has been received, tested and found to be satisfactory.

Changes in Water Composition in Bldg. 105

Dichromate reduction in the central tubes at power levels up to 90 MW has been found to be less than 0.01 ppm. Cr.

No change in the free chlorine content of the water has been observed at power levels up to 90 MW.

Hydrogen peroxide formation increases with increasing power level although the rate of increase becomes less. 3.2×10^{-2} M H_2O_2 has been found in the effluent water from the central tubes of a 1500 tube pile operating at 90 MW. Insufficient data have been obtained to predict what the concentration would be at rated power.

Ultramicroscopic examinations of tube inlet and outlet water in Bldg. 105 during operation at 90 MW has shown no change in the electrophoretic charge on the suspended particles.

Iron Content of Process Water

The iron content of the process water has been consistently low during the month. Average concentration at the tube inlet has been 0.05 ppm.

200 AREA

Plant Assistance

The principal activities have been concerned with:

- 1) Assistance on various equipment design problems encountered during the equipment checking program in the T-Area.
- 2) Preparation of revised piping diagrams for the T-Area.
- 3) Checking tentative operating procedures prepared by operating department.
- 4) Assisting in tests and preparation of procedures for checking equipment performance.
- 5) Following progress of construction.

Equipment Design Problems

The program on the replacement of G-9 with G-X gaskets in most of the connectors in the cells and pipe trench has been completed. The only G-X gaskets remaining in Building 221 are in the lubrication, instrument, and hydraulic lines. An experimental program on gasket testing has been prepared to obtain information concerning the comparative behavior of various gasket materials for specific services in the cells and pipe trench, and to set up specifications insuring greater uniformity in the quality of the gasket materials obtained.

It has been found almost impossible to eliminate leaks in the hydraulic system used for centrifuge skimmer control. A revised design is being tested by the operating department in 272 Building. Experiments are also being carried out on one of the head-end centrifuges in 221 Building to develop a more satisfactory procedure for eliminating air from the hydraulic system.

A modified drainage system is being considered for segregating hot waste materials discharge to the sinks in the 222 building.

Other design problems follow and include modifications to the 1 1/2-inch gang valves used in the jet line from the precipitators to the centrifuges, trials of a slow speed (600 rpm) impact wrench, and investigation of the jetting operation between the precipitator and the centrifuge. The use of contact microphones does not appear suitable for this purpose on the basis of tests made up to the present time. Alternative means for detecting the completion of the jetting operation are being investigated.

Revised Process Piping Diagrams

These are complete except for a small amount of work to be done in connection with the piping in 271 and 211 Buildings. Piping diagrams for "T"-Area have not been issued.

Equipment Performance Tests

Tests made on the 3-5-L, 3-5-R and 4-5-L dissolvers revealed that operation was satisfactory except for excessive air leakage around the covers. An excessive pressure drop through the 3-5-L column was also noted. Further investigation is contemplated after the covers have been properly sealed to reduce air leakage.

At the request of the operating department, procedures have been drawn up for use in testing dissolver performance.

In cooperation with the operating group, tests are being made in Section 13 to determine jet transfer rates, dilution, and temperature rise at various liquid temperatures and jet pressures. Tests on heating by steam sparging are also being made. It is intended that the information developed in these tests will serve as a basis for a standard testing procedure to be used on other similar sections in both 221 and 224 Bldgs.

A proposal has been made to determine the optimum conditions for dissolving product cake. It is considered that the equipment in Cell B, when available, would be most suitable for this purpose.

The ion analyses required for the 221 Buildings have been outlined and routine procedures for taking samples have been prepared. The sampling device used in the 221 Buildings is being redesigned.

Start-Up Procedures

Tentative start-up procedures for the 221 and 224-F buildings have been prepared by Operations. These are being checked by members of this group, and a list of comments and suggested revisions will be submitted shortly.

Semi-WorksBuilding 221-F - Head End

The functional checking and calibration of the equipment in this area has continued throughout the month on a two shift basis. All tanks have been calibrated with checks showing 1% maximum variation. Thermocouples have been checked to within $\pm 2^{\circ}$ C of the temperature shown by a mercury thermometer. Heating and cooling rates have been checked for all vessels and appear satisfactory. A number of minor changes have been made to improve the performance of the equipment and there are still a few changes required before chemical runs are started. The chief changes that have been made are:

- 1) All gaskets on connections handling chemicals or steam in the cells have been changed to G-9.
- 2) Air-bleed holes were drilled in suction legs on samplers to give an air lift effect necessary for satisfactory operation.
- 3) The suction legs on four transfer jets were lengthened to decrease the heel left after certain transfers where completeness of transfer is of great importance to the accuracy of results.

- 4) The short dip-pipes used on density measuring instruments were lengthened in four cases where the volumes of solution in tanks was small and the original pipe did not reach the liquid surface at times when a density measurement was desirable.

During the period October 20 - 31st, the equipment has been operated using water only, but simulating actual operation as nearly as possible. The necessity for some of the above changes, as well as the desirability of certain changes in proposed operating procedure, was shown by this work.

Proposed operating procedures and log sheets have been completely revised and the log sheets put into a form similar to that used by the operating department.

G-9 and G-1 gasketing materials were soaked in lubricating oil and in hydraulic fluid for approximately two weeks. The G-9 did not appear to have been appreciably affected but the G-1 softened seriously.

Building 321

During the month Building 321 construction progress installation was followed and arrangements made for minor variations in design as shown desirable by the work in Building 221-E, Head End. All equipment is set, the piping in Cell A is essentially complete, and the piping in Cell B is proceeding rapidly. The work remaining to be done is largely cell piping, electrical work, and putting instruments into operation.

A procedure has been outlined for operating Building 321 when running two decontamination cycles and a cross-over. It is proposed to use 48% HF (or possibly 60% HF if there are procurement advantages) rather than anhydrous HF in this procedure. The procedure requires cleaning of three rows of equipment after the decontamination cycles and running the cross-over in this equipment. Only minor piping changes are required and it is proposed that the plant maintenance force will make these changes at a later date when and if the occasion demands.

Process Chemistry

During the month, the installation of the special stainless steel hoods has been completed and the laboratories have been turned over to the Technical Department. Laboratory rules designed to insure safety in the handling of product and by-product have been drawn up and a mechanism for periodic laboratory surveys and periodic appraisal of the effectiveness of the rules has been arranged.

All the men in the section are now assigned to problems designed to back up 200 Area operations. These problems have been chosen on the basis of the needs indicated by bi-weekly Operations-Technical conferences. These problems on which significant progress has already been made are discussed below.

Slow Addition of NaOH as a means of Controlling Reaction Rate During Coating Removal

Laboratory experiments over a range of NaOH and Al concentrations indicate that the rate of reaction during removal of Al slug jacket in the dissolver can be controlled by slow addition of the caustic. The insoluble aluminate precipitates, which sometimes form when high Al concentrations or low NaOH/Al ratios are used, are not observed when the time of addition of caustic is extended to one hour while maintaining other variables as indicated in the flow sheet. When such precipitates are formed under extreme conditions, they redissolve on addition of more caustic and should therefore, give no trouble in the process.

Effect of NaNO₂ Concentration on Rate of Dissolution of Tin Alloy Spots During Coating Removal

In the course of reject slug recovery work in the canning area, it has been observed that following treatment of such slugs with 10% NaOH - 20% NaNO₂ solution, residual spots of scale are sometimes left on the metal slugs. These spots contain high percentages of tin and heavy metal and smaller amounts of other metals. The slug recovery process has been changed to the use of 15% NaOH - 13% NaNO₂ and these spots of scale are no longer observed. This may be due to the change in NaOH/NaNO₂ composition, or may possibly be due to some change in the slug coating procedure. It has been suggested that high NaNO₂ concentrations may inhibit the dissolving of these tin alloy spots. For this reason, laboratory tests have been made on the rate of dissolution of tin and of typical samples of the tin alloy scale by 10% NaOH containing different amounts of NaNO₂. The results indicate that, in the range of 0% to 20% NaNO₂, metallic tin and some samples of the tin alloy scale dissolve more rapidly the higher the NaNO₂ concentration and other samples of the tin alloy scale dissolve more slowly the higher the NaNO₂ concentration. Samples of the two types of scale have been submitted for analysis and further work is in progress on the effect of the 15/13 mixture upon them.

Reduction of Waste Volumes

Consideration is being given to methods of reducing waste volumes in the 200 Area. Experimental work is in progress on the following:

- 1) Reduction of the volume of Na₂CO₃ used to neutralize the metal waste.
- 2) Metathesis of the bismuth phosphate product precipitates with the result that less acid is required for dissolution and lower volume on multiple batch operation is used.

Effect of H₂H₄ on Extraction Step Yields

Evidence from Site X indicates that H₂H₄ is produced in the plant dissolver during the metal dissolving step and that this compound may interfere with

carrying of product in the extraction step. Poor carrying has been observed in the Clinton plant in cases where NaNO_2 or HCOOH , both of which destroy N_2H_4 , was not used. Laboratory results from Site C and Site X indicate that the variables effecting this source of product results are not sufficiently understood to establish a sound basis for dealing with the problem. Preliminary experiments here indicate that the hydrazine is not decomposed by several hours heating at 70% in extraction step solutions even in the presence of laboratory surface to volume ratios. Further work is now under way to determine the conditions which favor the N_2H_4 formation in the dissolver, the optimum conditions for the reaction product of N_2H_4 and NaNO_2 , the possibility of destroying hydrazine by the use of an oxidizing agent, and the possibility that hydrazine is destroyed by $\text{H}_2\text{E.N.}$ concentrations of product in HNO_3 solution.

Conditions for Addition of Zr Scavengers

It is known that the ionic and colloidal states of Zr in solution is conditioned by past history of the Zr solutions and that conversion from one to another is sometimes slow. No adequate data are at present available to allow a decision as to whether the Zr reagent used in the scavenging procedure is added under optimum conditions. The effect of decontamination may well depend upon complete exchange between the added Zr scavenger and Zr tracer in solution. Experiments are now starting to give a basis for specified optimum conditions of operation in this respect.

Safety of Addition of $\text{K}_2\text{Cr}_2\text{O}_7$ Centrifuge Wash to H_2O_2 Solution in Catch Tank

The removal of the scavenger by-product cake from centrifuge bowl involves the use of H_2O_2 . The bowl is finally washed with $\text{K}_2\text{Cr}_2\text{O}_7$. The operating department has asked that tests be made to determine whether an excessive rate of reaction is observed when these two reagents are mixed. Laboratory tests indicated several times that peroxide concentration give only an effervescence. No excessive foam is observed.

Use of Single Oxidant in Cross-over Cycle

At the present time three oxidizing agents (NaBiO_3 , $\text{Na}_2\text{Cr}_2\text{O}_7$, KMnO_4) are planned for use as initial and holding oxidants in the cross-over cycle. Laboratory experiments indicate that KMnO_4 could be used for the primary oxidation and as a holding oxidant through the bisulfite phosphate and lanthanum fluoride precipitations. However, MnO_2 precipitates out to a considerable extent during oxidation in 5N or 3N HNO_3 , and therefore, might be undesirable for this step. It may be satisfactory as a replacement for the $\text{Na}_2\text{Cr}_2\text{O}_7$ holding oxidant, which is used in 1N HNO_3 solution.

Problem of 39 during Early Operation

At cooling times of 25 days or so, such as are contemplated during start-up operation in the 200 area, element 39 will probably interfere in the present method for analytical determination of gross decontamination. A method for separation has been developed at Site C. During the past month 39 tracer has been prepared by UNH exposure in the 305 pile. Samples of this tracer are to be used in placing the 39 separation on a routine basis.

300 AREAGeneral

Sub-surface canning was continued during the month with canning yields averaging around 95 to 98% with the production of Class III pieces averaging over 81%, with several shifts over 92%.

Percent failure in the plant steam autoclave test of 42,994 submerison canned III slugs was 0.053% at the end of the month as compared to 0.08% for 5,880 similar slugs at the end of the previous month. All failures except one have been due to failure of the top closure.

Development Line

The work of improving the brase line quality by compressing the top cap has continued during the month and is now ready for a test in the plant. Metallographic examination of slugs assembled by compressing the top cap 0.050, 0.001, 0.150 and 0.200 inches indicated that a compression of 0.150 inches gave a brase line which was either absent or extremely thin. On the basis of this study, 0.150 inches was adopted as the amount of compression to apply to the cap. When using steel sleeves having an I.D. of 1.455 to 1.460 inches (plant sleeves) and compressing the cap 0.150 inches, about 10% of the slugs produced (400) were rejected because of dimensions (warp). Experiments with smaller sleeves having an I.D. of 1.450 \pm 0.005 inches yielded slugs (300) that were dimensionally satisfactory. These steel sleeves have been used as many as 30 times and are still satisfactory for reuse. No weld or autoclave failures have been obtained to date on slugs prepared with compressed top caps. In addition, 180 pieces prepared with compressed top caps have been autoclaved prior to welding and no failure has occurred. No further work is contemplated until sufficient steel sleeves are available for a large scale plant test.

Plant Assistance

A new top cap design for aiding the control of top cap thickness, by making machining to the telltale easier, has been tried and found successful. The new top cap differs from the old one only in having 1/16 inch hole drilled down 0.015 inches from the base of the 1/4 inch hole still maintaining a bridge thickness of 0.335 inches from the bottom of the smaller hole to the bottom of the cap. The plant is adopting this cap design.

One complete production shift was carried out with boss type caps, 1-3/8 inches in length and 1.360 inches in diameter, and a second complete shift with boss type caps 1-3/8 inches in length and 1.370 inches in diameter. The welding rejects were 0.8% for the former and 0.7% for the latter as compared to 1% for regular production. The differences are not considered significant. However, since the use of these caps present some advantages in canning and machining technique, the 1.37 inch diameter cap is being accepted for use.

Considerable work has been done during the month on trying to improve the degree of wetting of drawn cans so that they can be used in the present process. To date the only method showing any promise involves brushing the inside of the can just prior to slug insertion. Work is continuing.

The average weight of a cast and an extruded slug was obtained by weighing, in batches of 24, 300 cast and 504 extruded slugs. The extruded slug weighed on the average 7.912 lbs, and the cast slug weighed 7.910 lbs. The weight of a rolled slug will be determined in the same manner whenever such slugs are available.

Radiographs of five groups of 50 slugs have shown average voided area per group of 0.12% to 0.23% compared to 0.2% to 0.4% for groups of 50 tested last month. The effect of chlorine treatment of Al-Si baths upon the average voided area is being investigated. Results to date indicate that chlorine treatment cannot be expected to reduce the percent voided area currently being obtained.

Twelve submerison canned slugs graded 5 in the frost test, with melted bands 1/2 to 1-1/2 inches wide around the tops of the slugs, were found to have had the aluminum can cracked from the slug in the frost test melted area. The aluminum can and slug were perfectly wet with Al-Si indicating that the fracture occurred sometime in the finishing of the slug after the canning operation.

Cross-sectioning of slugs canned in drawn thick bottom cans has revealed the presence of debris (probably drawing compound, oxide, etc.) worked into the inside surface of the can to a depth of approximately 1 mil. This appears to be the cause for failure of Al-Si to wet the aluminum can. The layer of oxide and dirt has also been located in the can wall before canning the slug so that there can be no question with regard to the occurrence of the contamination in the can. Methods are being investigated to obtain satisfactory wetting of these cans by Al-Si. However, the supplier may be able to correct this condition.

Slugs stripped by chiseling and recanned by the sub-surface method as many as three times showed no abnormalities in the appearance of the compound layer. The compound layer adhering to the slug after removing the can sloughed off, apparently, in the dipping baths.

Examination of cast pieces rejected for surface defects showed these defects to be superficial. The cast material, proper, was found to be of good quality as regards density.

Metallographic examination of assembled pieces with cans having a wall of 0.018 - 0.030 inches in thickness showed an unpenetrated thickness comparable with that normally obtained. The minimum wall thickness found was 0.009 inches.

Slug Recovery

The hydrofluoric acid process of slug recovery was put into effect in the plant on October 15. Since that time approximately 34,000 slugs have been processed. The average weight of "Z" slugs (first reclaiming of "A" slugs by the hydrofluoric acid process) is 7.845 lbs.

In addition to providing recovered slugs with smaller weight loss, this new process gives pieces with an excellent finish and very little porosity. The amount of brushing required to remove last traces of alloy layer is greatly reduced from that required by any of the previous recovery methods.

With fresh nitric acid in the final step of the process, the slugs have a high luster. As the nitric acid bath is used, however, the slugs become dark. Since this dark layer is completely removed in the pickle bath prior to canning, it was not considered serious, but it does interfere with slug inspection. Investigation of this condition showed that either the addition of an oxidizing agent such as hydrogen peroxide, or the bubbling of air through the nitric acid bath, eliminated this trouble. An air sparger has been installed in the nitric tank, greatly reducing this condition and increasing the life of the nitric acid bath about five-fold.

An alternate process of slug recovery, in which the can was removed from the slug mechanically and the slug then sent direct to canning without chemical treatment, was tried. Slugs handled in this way do not wet in the canning bath consistently and mechanical removal of the can by existing equipment on the plant has proved difficult. Since the new HF process is giving satisfactory results, this alternate process has been dropped.

Neutralized spent acid containing heavy metal has been concentrated by the following process: It is pumped into two 1200-gallon tanks and allowed to settle over night. The clear solution above the precipitate is decanted off and additional neutralized solution added to keep the tank full. This process is continued for approximately a week at which time the amount of settling which takes place over night is small and continuation of this process is unprofitable. Steam is then applied to the tank jackets, further concentrating the solution until it becomes a very thick slurry. This slurry is pumped into 5 gallon shipping pails. One batch of acid has been processed by this method and is now ready for shipment. Before evaporation, this bath analyzed 12.2% heavy metal and 35% total solids. Analysis of the final concentrated solution has

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not yet been completed by the laboratory, but will of course be somewhat higher than the above figure. A check on the heavy metal content of the decanted clear liquor showed 0.023%.

A re-check of waste caustic from the sling recovery process confirmed earlier results in showing no detectable amount of heavy metal present.

Testing

1050 unbanded slings graded as satisfactory by the "sniffer" test gave no failures in an 80-hour steam autoclave test, while 90 pieces indicated as leakers showed 12 failures. Results of the test indicate that slugs passing the "sniffer" test have sound welds as judged by the autoclave test and since all slugs failing to pass the "sniffer" did not fail in the autoclave test, a margin of safety is indicated.

338 slugs rejected at 100-B area because of warp, surface, etc. passed 80 hours in the steam autoclave without failure. 113 of the 338 slugs were rejected because of warp. Repeat frost testing of all the slugs showed no change from the original frost test maps.

Ten slugs earned by the submerison process on the development line, filling the top of the can with Al-Si in the dipping operation and machining the Al-Si to form a cap of the required thickness, were exposed to water at 170°C and 100 lbs./sq. in. pressure for 36 days without failure.

The special water corrosion test at 50, 75 and 95°C of slugs with twenty 1/16 inch holes per slug drilled to the base metal has been conducted for 90 days. The results of the test are tabulated below:

<u>Temp. C.M.I. Water</u>	<u>No. Slugs Tested</u>	<u>No. of Failures</u>
50°C	25	None
75°C	26	1 (at 42 days)
95°C	25	21 Total *

* Distribution of failures: one at 24 days, three at 40 days, twelve at 47 days, one at 54 days, one at 61 days, and three at 68 days.

set for 3760 collection

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The test in C.H.X. water at 95°C and 250 lbs./sq. in. pressure of 200 autoclaved and 200 non-autoclaved slugs has been discontinued at the end of 1412 hours. Two sidewall failures occurred among the autoclaved pieces and 3 top cap failures among the non-autoclaved pieces. The failures among the former pieces occurred in penetrated areas at 812 and 1244 hours. The top cap failures among the latter pieces occurred at 80, 452 and 548 hours.

Within the past few days, a number of autoclave failures were experienced in contrast to a previous period of approximately 10 days during which no failures occurred. Four of the top caps from these failures were secured and subjected to the vacuum bubble test. All of them showed a hole near the center of the top cap apparently due to a pipe or flaw in the aluminum bar from which the top caps were machined.

Tin Content of Coating

Specimen Holders

An additional number of specimen holders for experimental work in the 100 area have been requested. The necessary pieces have all been canned and machined. Some trouble is being experienced in welding them as was the case with the first group of holders. This work is almost complete.

Active graphite is being machined in the 300 area also for use in the 100 area. The Health Instruments group is following this work to insure that adequate precautions are taken in handling this material.

STATISTICSMetal Reactivity Testing

Routine tests in 305 have continued to yield results consistent with those to be expected from the various recovery procedures used on the slugs.

Tests on Rod Drillings from 105-D

Samples of drillings from the boron-steel rods at 105-D were found, by tests in 305, to have cross-sections consistent with the presence of 1.3% boron.

Autoclave Tests

Submersion canning was used exclusively during the month. For this production, the average number of failures has been 0.52 per 1000, with recent lots showing lower figures.

Canning Yield

Yields of 111 slugs canned by the submarine process have been approximately 85% with occasional shifts showing yields over 90%. The principal remaining causes of rejection remaining at the end of the month were mis-welding and surface defects.

Graphite Quality

The previously reported graphite tests were combined with the allocation reports to estimate the contribution of the graphite to the k of the three 105 piles. The mean dk% for the several zones was:

<u>Pile</u>	<u>105B</u>	<u>105D</u>	<u>105F</u>
Green Zone	+ 0.216	↓ 0.299	↓ 0.303
White Zone	+ 0.007	+ 0.084	+ 0.431

Using weighting factors for the green, white, and blue zones respectively of 0.5379, 0.3819, and 0.0802, as computed by Gast and assuming the dk% of the blue zone to be essentially zero in all cases, the net values for the three units were:

<u>Unit</u>	<u>dk%</u>	<u>Improvement Relative to 105B</u>
105B	+ 0.114	—
105D	+ 0.204	+ 0.060
105F	+ 0.339	+ 0.195

Slug Forecast for 105D

A forecast of slugs to be available for charging 105-D and extending 105-B was prepared during the month.

INSTRUMENT DEVELOPMENT

100 Area

Improvement of the indication of the 105-B pile power levels has been obtained by the construction and installation of differential neutron ion chambers in the test holes. A single differential unit was built which reduced the ion current resulting from gamma radiation to within 1.5% of its original value. Since it is difficult to improve further the balance in a single unit, a gamma chamber similar to the neutron chamber in Hole A was built to operate differentially with the neutron unit. Balance to about 1/4 of 1% was obtained by adjusting the gamma chamber in Hole B. This arrangement, therefore, was used in preference to the single differential chamber. Still further improvement in the operation of this equipment is anticipated by putting shield plugs in front of the chambers and by altering the wiring to reduce leakage in the collecting system.

A mass spectrograph for analysis of impurities in the helium gas has been installed in sampling room X in Building 105-B by two men from Chicago. Assembling the equipment and running sampling lines has consumed the major portion of the time to date. First analysis of the gas have not been fruitful because of leaks in the sampling lines; however, work in the last few days indicates that impurities can be determined to within 0.1% with the present equipment. Further increase in sensitivity is contemplated.

Pneumatic collars for the aluminum traverse have been built and have successfully undergone laboratory tests. These collars, the aluminum tube, and neutron thermopile are ready for installation in the traverse mechanism. Further studies on the neutron thermopile show that the boron coatings on the hot junctions make the device somewhat dependent on changes in ambient temperature. However, it has been established that changes of less than 2.5° C. per minute are negligible. Two additional chopper amplifiers have been received from Chicago. A test set for calibrating these units has been designed and is being built.

A portable air monitor was built and put in operation in 105-B. The design consists of a vacuum cleaner, Beckman amplifier, and air chamber mounted on a laboratory dolly. The simplicity of the unit has contributed to its utility in 105-B since it is much lighter and easier to handle than earlier designs. Studies with this equipment and the stack and exhaust air monitors show that reliable operation of these air monitors requires that the air flow be less than 2 cu.ft./min.

Wiring diagrams for the complete beta water-monitoring system as installed at 105-B have been finished and are to be used in wiring 100-B. The first stainless steel skin stock chamber for use in this system has performed satisfactorily in tests with active aluminum chloride.

The delayed neutron jacket failure water monitors rendered the following data during this period:

1. Neutrons in center water headers resulting in 300 counts/min/MW at the end of September have consistently decreased in intensity to give 20 counts/min. now. Since six counter sets all showed this trend, it is unlikely that it is due to gradual changing of the counters.
2. Approximately 2% of the neutrons measured leak from the pile face or from adjacent headers. New units to be installed at the next shut down are more elaborately shielded to reduce this effect.
3. Variation of 100% in the dichromate content of the water does not affect the neutron count.
4. The number of neutrons in uncharged header O1 is nearly twice as large as in header O2 1/2 which has some charged tubes. Although this can be explained by the fact that the water flow in O1 header is much slower than in O2 1/2, further investigation of this apparent discrepancy is under way.

This data can be explained on the basis of heavy metal contamination in both active and dummy slugs. Experimental work on this possibility is being pushed.

The fission counter has not operated successfully yet because of difficulty in obtaining proper amplifiers. New equipment is expected to overcome this obstacle. Revision of the design of the BF_3 proportional counting equipment for 100-B is being made in order to profit by experience obtained at 100-B.

The underwater microscope for the 105-B inspection pit was fabricated this month. The periscope for the cutoff machine has been built and installed. An underwater telescope embodying an automatic focusing feature and a magnification range of 15 to 120 is under design. Assistance was rendered in the installation of fly eyes at 105-B and 105-F.

Additional measurements have been made of vibrations in the pump system in Building 190 and a report on the entire investigation has been written.

The problem of low pile power determination by the measurement of the temperature rise of processed water is being pursued. Start-up equipment for use in 105-B capable of measuring a water temperature rise of the order of $1/10^{\circ}$ C. is desired.

200 Area

Aluminum radiation shields for the Thermocouples used in air temperature measurements on the meteorological tower were designed. These have been built by the Construction Division and are ready for installation. Tests have shown that the proposed air aspiration rate of about 10 cu.ft./min. will be sufficient to eliminate effects due to radiation eight times as strong as the strongest sunlight. Assistance was also given in specifying

Additional equipment for measuring extremely small temperature differences in the air at various heights.

Vibration measurements were made of various points of the Building 221-F process tanks in an effort to uncover an explanation for the seemingly unsatisfactory performance of the contact microphones. It was found that microphones mounted in the head of the connectors were subjected to small vibrations because of the use of gaskets in the assembly of the connectors. Removal of the gaskets in some instances improved the output as did the increase of amplifier gain. Location of the microphones in the pull-boxes instead of the connectors is more convenient and gives somewhat more sensitivity. Experimentation with the method of mounting the microphone has revealed no simple method which is significantly superior to the spring clip method now in use providing the clip holds the microphone in the proper position with respect to the surface.

An optical viewer for observing the interiors of the 26 and 40-inch centrifuges was constructed and tested. Another viewer for the 12-inch centrifuge is under construction. When this is complete, an additional instrument with a scanning head is contemplated.

The construction of five proportional alpha counters was completed by the Instrument Department during the month. Considerable difficulty in their initial operation was experienced because of impure methane. The insertion of glass wool or cotton filters in the gas line to remove suspended matter has prevented poisoning, but the impure gas (94% methane) shifts the high voltage plateau so that the high voltage supply of the Giffner scaler can just reach the edge of the plateau. The sets are barely satisfactory under the present conditions and efforts should be continued to develop a supply of 99% methane.

The model of the low geometry vacuum alpha sets was completed and tested. Two additional units have been built by the Instrument Department. Sketches of aluminum and lead absorber sets and tube setting slides for use with mica window GM sets were made and are under construction by the Instrument Department. Five mica window tubes manufactured by Cyclotron Specialties Company were tested. Only two were reasonably good, but these had a tendency to "tire" after prolonged use. Assistance was rendered in assembling an F.P. 54 chamber set for use in Building 3706.

Health Instruments

The Health Instrument Section has requested that equipment be designed to monitor the exit water from the retention basin in 100-B Area. The equipment will include:

- (a) mica window beta counters for measuring beta water activity. Two will be used; one for continuous records, and the other for stand-by and for taking decay curves.
- (b) Two gamma sensitive G.M. tube units consisting of spherical water chambers 14" and 7" in diameter containing G. M. tubes at their centers.

- (c) One water sphere for intermediate monitoring to give comparative readings with one of the gamma units at the basin exit.

Models of all of these units are being built. The development work has been complicated by the discovery of the precipitation of active material from the water in the existing counting equipment. Methods of preventing the contamination of these instruments must be found before the equipment can be considered successful.

Two laundry units are complete. One incorporates sealers while the other utilizes a counting rate meter to indicate laundry contamination. A four-fold laundry unit is under construction to improve further the operation of this type of equipment.

Some difficulty is being had obtaining proper operation of the new English type alpha hand counter. The initial model still requires further work to improve its operation to a point where it is considered satisfactory.

A model of an Intergram chamber, which has a thin window to make it beta sensitive, is complete. Provision is being made to indicate whether or not the beta window is covered by using a 2-point Micromax in which one point records the position of the cover.

The portable G.M. tube survey unit, an initial model of a frisking meter, and a "giant pail" monitor are going through final stages of construction.

Aid has been given to the Health Instrument Section in calibrating pencils. Jigs for the safe handling of bugs both in the Building 3745 and in the field are now on hand for calibration of instruments. 200 KV Westinghouse X-ray equipment has just arrived which should augment this program by making it possible to calibrate instruments with radiation of various energies.

A model of the Lucite-walled H.M. chamber was completed and given to the Construction Division for guidance in building 100 of these for monitoring purposes. A modified design is now being developed which will permit monitoring of beta rays as well as gamma rays.

Building 221 stack monitor (Bldg. 292) has been put in operating order and partially calibrated. The iodine activity calibration is awaiting receipt of a standard iodine sample from Site X.

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LABORATORIES

Bath Control

Issuance of a daily report showing analyses made by the bath control group each day was initiated October 23.

807 routine samples and 39 special samples were analyzed during the month, resulting in a total of 1,358 routine determinations and 52 determinations of a special nature. A breakdown of the routine determinations is as follows:

222-T Laboratory

Ion Analyses

Standard and reagent solutions have been prepared, balances set up, weights checked and various other preparations made for making ion analyses. Tests of several ion analysis methods are now being made.

Product Analyses

The analytical methods have been reviewed and revised where necessary. Abstracts of the methods have been prepared which can be used with a "restricted" classification. However, the detailed methods also will be available under a higher classification.

Methods are being investigated for determining product in the presence of 39 in greater quantities than were encountered at site "X".

Assays

One B-O counter, one standard, and one magnetic alpha counter are now in operating condition in 222-T. Two Simpson alpha counters are also in operating condition but are not entirely satisfactory, apparently due to impure methans.

706 and 271 Laboratories

Total number of samples analyzed during the month was as follows:

	<u>706 Lab.</u>	<u>271 Lab.</u>
Essential Materials	62	3
Water	67	
Miscellaneous and Special	23	20

Development and Special Analysis

Development of the following analytical procedures for use in control work was completed:

- U - Colorimetric, high range
Total acid in presence of UH
- La - High range (for use on chemical runs)
- OH - In presence of Al (for use on chemical runs)
- F - High range (for use on chemical runs)
- Bi - Micro (for use on process solutions)

Several methods for analysis of essential materials were also prepared for the laboratory manual. These included assay methods for oxalic acid, potassium permanganate and potassium carbonate.

Spectrographic analyses of 69 samples were made during the month.

The second L. & N. Electrochromograph (polarograph) was set up and placed in operation.

Considerable equipment for microscopy was set up and calibrated, including the petrographic microscope, refractometer and accessory equipment.

Special analyses made during the month included the following:

- (a) Four samples of gases from above the caustic bath used in the slag recovery process were analyzed.
- (b) Gases evolved from the 10% HF bath used in the slag recovery process were analyzed. Sludge from this bath was analyzed also.
- (c) Work was done in connection with the determination of the iodine content of dissolver fumes.
- (d) Forty samples of heavy metal have been analyzed for hydrogen to date. The laboratory is equipped to make four determinations daily.
- (e) Six samples of Al-Si bond were analyzed for hydrogen using the same method as is used for hydrogen in heavy metal.
- (f) Two samples of flux from the canning process were analyzed for fluoride; less than 0.01% (if any) was present.

POWER DEPARTMENTOCTOBER 1944100-B AREA

This area passed from the preliminary test and start-up stage to a normal operating plant. Area personnel was reduced from a start-up organization to a standard operating crew. While we continue to have trouble with certain pieces of equipment, it is indicated that the major difficulties have been overcome. Uninterrupted power services were maintained throughout the month.

In Building 184 trouble developed with the grates sticking in the open position when ashes were being dumped; also some of the grate bars have broken. It appears that during light load conditions, there is an uneven distribution of air which causes the grates to overheat and bind at the bearings. Combustion Engineering has recommended changes which will probably eliminate this condition.

The Milton-Roy acid pump discharge lines in Building 105 valve pit were replaced with stainless steel due to excessive leakage. Also the discharge lines from these pumps were switched in the headers in order to make the pumps in the same relative position as the headers.

On October 6 a section of the 20" export water line broke at the south high tank near 105 Building. No unusual conditions were found to explain the reason for breaking. Repairs were made in approximately twenty-four hours. Operations continued during this outage. There was also an outage on this line on October 25 to repack a leaking joint near the filter plant. Both sides of the reservoir at Building 182 were lowered, during a period of low process requirements, to kill algae growing on the concrete walls. This method seems fairly successful and reduces the quantity of chlorine used to control algae growth.

100-D AREA

The power house was completed and turned over to operations on October 30. One boiler was kept in operation to blow outside steam lines and supply steam for turbine driven equipment. All pumps in Buildings 181, 182 and 183 have been "run in" except the process pumps in Building 183.

Start-up of the filter plant was delayed until October 30 due to serious leaks in the reservoir at Building 182 and flumes at Building 183.

Flushing of underground emergency water lines to high tanks and internal inspection of process piping in Building 186 is now in progress.

Training school for both supervision and operators in this area was started on October 16 and is making satisfactory progress to date.

200-V AREA

Operating conditions were normal with a very light load carried on boilers in Building 284 the entire month. Automatic boiler controls have not been set to date pending the arrival of a Hagan Service Engineer.

200-B AREA

Cleaning and sterilization of reservoir, Building 282, is complete and a leakage test is now in progress. Raw water pump suction lines have been flushed. In Building 284 the flushing of water lines is now in progress. One boiler feed pump has been run in with steam from a portable boiler. No. 1 boiler is scheduled to start November 1.

200-N AREA

No. 1 well pump was started on October 6. It was later necessary to dismantle pump because of excessive vibration. Operation of the 1000 GPM pump is held up pending receipt of a discharge check valve.

POWER STATISTICS

<u>100 Areas</u>	<u>Units</u>	<u>Total for Month</u>		<u>Average Load</u>
		<u>100-B</u>	<u>100-D</u>	<u>100-B</u>
River Water	Mil. Gals.	1,558		34,893 GPM
Filtered Water	Mil. Gals.	1,292		28,946 GPM
Process Water	Mil. Gals.	1,114		24,960 GPM
Steam @ 225 lbs.	M Lbs.	82,679		111,100 #/hr.
Ferrisul	Lbs.	225,274		24 PPM
Dichromate	Lbs.	18,650		1.98 PPM
Sodium Silicate	Lbs.	376,506		13.7 PPM
Sulphuric Acid	Lbs.			
Coal in Storage	Tons	22,291	19,322	
<u>200 Areas</u>				
			<u>West</u>	<u>West</u>
Steam @ 225 lbs.	M Lbs.		19,024	25,570 #/hr.
Filtered Water	Mil. Gals.		12.5	280 GPM
Coal in Storage	Tons		21,308	

MAINTENANCE DEPARTMENTOCTOBER 1944GENERAL

A supervisory training program was instituted by the Department and twenty meetings have been held. All Maintenance Supervision will be covered by the training courses. The key subjects are: (1) Leadership Lectures, (2) Safety Training and Guidance, (3) Functions of the Maintenance Department and (4) Maintenance of Basic Equipment.

100-B AREA

Considerable work of a safety nature was carried out in the various buildings. A gas analyzer, designed to analyze small quantities of gases that may be in the tunnel between the 105 and 115 Buildings, was installed in the "X" sample room. A tube tester, developed by the Project Group, was fabricated and has given satisfactory service. Work was continued on the purifier room refrigeration system and indications are that the unit, as now designed, is mechanically workable and our trouble is due to the presence of water in the refrigerant, resulting in freezing of the float valves. Attempts to prevent freezing of the float valves by drying and by adding anti-freeze to the refrigerant have been unsuccessful to date, but efforts to overcome this difficulty are continuing.

The twenty-inch export water line, supplying emergency water to the process unit, ruptured during the month and was repaired. Seepage developed at another location in this same line and was repaired.

100-D AREA

The Maintenance Area Engineer and his group followed Construction and made inspections of Building 182-D, 184-D and the 1700 group of buildings.

200-W AREA

The only major job encountered during the month was the changing of all gaskets in the process lines of Building 221-T Canyon from G1 to G-9, which was found necessary due to the excessive flowing of G1 gaskets under impact pressure. Considerable difficulty was encountered with leaks at the threaded joints of the hydraulic lines of the 40" centrifuges and Wilmington Design representatives are working on this problem.

300 AREA

Presses were put in stand-by condition. Additional development work on the "submarine canning line" was continued and three new dipping mechanisms are now working satisfactorily.

The overhaul program on the Gisholt Lathes continued and eleven lathes have been completed.

The inspection and cleaning of No. 2 boiler was completed and both boilers are ready for winter service.

Test runs conducted on No. 1 and No. 2 walls indicate sufficient capacity for present needs.

PROJECT ENGINEERING

The following is an estimate of the design and engineering studies which the Project Group now has as a backlog:

AREA	PROJECT	FIELD CHANGE REQUEST	WILMINGTON DESIGN	WORK ORDER 0 - \$100	WORK ORDER \$100 - \$500	TOTALS
100	\$14,430	\$ 13,500	\$24,640	\$ 50	\$ 3,400	\$ 56,020
200		52,200		3,540	4,720	60,460
300	1,000	15,000	30,000	350	4,700	51,050
700 & 1100	1,500	74,920			300	76,720
Multi- title		<u>206,940</u>			<u>1,000</u>	<u>207,940</u>
	\$16,930	\$362,560	\$54,640	\$3,940	\$14,120	\$452,190

	<u>Started</u>	<u>Completed</u>
Engineering Studies	8	
Drawings	95	49
Sketches	12	4

The downcomer problem in the 105 Buildings was given attention. Wilmington Design was advised of the inadequacy of the anchors on "F" Area downcomer.

Equipment for conversion to the HF slug recovery process has been designed and installed in Building 314. The recovery equipment will be moved to Building 313.

The volume of village work increased sharply, due to the fact that engineering formerly handled by Village Engineering has been turned over to the Project Group.

The prints handled by our Blueprint Files Group are:

New and Revised Prints received from Hanford and Wilmington	8,100
Prints turned out by the reproduction room	<u>9,152</u>
Total	17,252

ELECTRICAL DEPARTMENTOCTOBER 1944GENERAL

Formal procedures for the operation of the B.P.A. 230 KV system during and after various types of system emergencies have been developed in their final form after a series of discussions with B.P.A. representatives. The final procedure is scheduled to be issued by B.P.A. Management to their dispatching unit within the first week of November. Similar procedures for H.E.N. Project operations during and after power supply disturbances have been completed and will be released to the H.E.N. dispatching group immediately.

Dispatching communication has been satisfactorily established and placed in operation during the month.

B.P.A. system tests to check new carrier relaying and protective equipment are now scheduled for November 26, 1944. The tests will be very comprehensive and supplying also a large quantity of by-product information on system performance. It is planned that they will be conducted with system loads and generation maintained at normal levels.

A survey of the 66 KV line between Hanford and Richland and an analysis of pole card records was completed. The survey indicated the line needed considerable maintenance work and reconstruction of several structures to provide adequate service for a two-year period. Arrangements have been made whereby the Construction Division will perform the necessary work.

The Electrical Department was assigned the responsibility for operation and maintenance work on all outside lines in the 700 and 1100 Areas. The greater portion of the facilities will be taken over during November. Arrangements have been made for the necessary office and line crew headquarters.

100-B AREA

The month was spent in making several changes and additions to existing installations which were deemed expedient to successful operation of the area.

The following electrical maintenance procedures were completed and put into effect:

- (a) Motor Lubrication
- (b) Fire Alarm Testing
- (c) Area Emergency Generator and Associated Circuit Switching.

100-D AREA

Operations assumed responsibility for the electrical maintenance of Building 184-D and the 1700 Group on October 30, 1944.

200 AREAS

Maintenance of the electrical equipment in the "Restricted" Area, including Power and T Buildings, was taken over by Operations on October 9, 1944.

Trolley conductors were installed for communication to the 75-ton crane in the 221-T Building. After the substitution of shoes for the wheels on the trolley collector assembly, this arrangement has proved satisfactory.

Tests were made on impact wrenches with different motor speeds, and it is expected that a lower speed will be adopted to prevent tearing of gaskets.

During the month a training program for electricians was initiated. This program is being conducted three forenoons a week for a period of four months.

Various maintenance procedures - such as, lubrication, locking and tagging, and switching - were put into effect.

300 AREA

During the month there were five bronze furnace failures due to corrosion of the element at the terminal stem. This corrosion is caused by the flux which leaks through the Tercod pots and attacks the nichrome. The use of graphite pots is expected to eliminate this trouble. One aluminum silicon furnace also failed.

DISTRIBUTION

Initial inspection reports were made on the overhead distribution lines and substations in the 100-D Area.

Substation operators have been hired for 151-D Substation and are now being trained to take over this Substation in the near future.

Inspection was made of all overhead lines and substations in the 200-W Area in preparation for taking them over from Construction.

Routine inspection of the 230 KV line has been started. The line is in good operating condition with the exception of the following:

1. Loose Hardware
2. Dead end structures to be bonded in the branch lines to Substations A-2, 4, 6 and 8.

Bonding of the remaining dead end structures and tightening of hardware will be done whenever it is possible to split the loop and so clear a section of the line for men to work on it.

H.E.W. ELECTRIC POWER STATISTICS

(All figures except percentages to be multiplied by 1,000)

	<u>Power</u>		<u>Reactive</u>		<u>Average</u>		<u>Maximum</u>		<u>Load Factor</u>	
	<u>KWH</u>		<u>RKVAH</u>		<u>Power Factor</u>		<u>Demand</u>		<u>%</u>	
	<u>Sept.</u>	<u>Oct.</u>	<u>Sept.</u>	<u>Oct.</u>	<u>Sept.</u>	<u>Oct.</u>	<u>Sept.</u>	<u>Oct.</u>	<u>Sept.</u>	<u>Oct.</u>
Midway Sub. (Loop)	5390	8510	119	20	99.98	100.0	14.4	15.6	51.99	73.4
Hanford Sub. (Constr.)	7844	4609	-	-	-	-	14.5	8.9	75.13	69.6
Pasco Sub. (Richland and 300 Area)	<u>295*</u>	<u>4066</u>	131	1465	91.00	94.1	6.96	9.6	70.04	56.9
H.E.W. (Total)	13529	17185	-	-	-	-	28.42	30.9**	66.12	74.7

*Represents only last 2-1/2 days of September.

**Maximum coincidental demand for H.E.W.

LOOP SUBSTATIONS

	<u>Power</u>		<u>Maximum Demand</u>		<u>Load Factor</u>	
	<u>KWH</u>		<u>KW</u>		<u>%</u>	
	<u>Sept.</u>	<u>Oct.</u>	<u>Sept.</u>	<u>Oct.</u>	<u>Sept.</u>	<u>Oct.</u>
100-B	3730	6430	-	-	-	-
100-D	420	960	-	-	-	-
100-P	-	-	-	-	-	-
251	450	750	-	-	-	-
Village	2004.5	3494	-	-	-	-
300 Area	439.2	442.4	1.01	*	60.5	-

*Figure not available due to removal of demand meter for repair.

INSTRUMENT DEPARTMENT

OCTOBER 1944

100 AREAS

During the month, a number of revisions and new installations were made in the 100-B Area. These include:

1. Installation of permanent measuring equipment in loading tube 0453.
2. Installation of differential tube system for galvanometer level indicator in test holes A and D.
3. New level indicating tube installed in 42" downcomer room.
4. New thermocouple controller system installed in place of bi-metal strips on 115 building purification heaters.
5. Bailey KV calculator system provided with adjustable range.
6. Revision of temperature monitor system to reduce cold junction errors.
7. Revision of chemical feed controls.

Other problems which have been encountered are:

1. Measurement of PH in the valve pit. Two methods of improving performance of present recording equipment are under study.
2. Deposition of materials from the water at the 107 exit have been causing false high readings in the measuring equipment. The Technical Department is assisting in the development of methods of periodic removal of contamination.

In the 100-D Area, our men are working in cooperation with the Construction Instrument Department. Checking and calibration of instruments is nearly complete in Buildings 181, 182, 183 and 184.

Personnel in the 100 Areas is now distributed as follows:

	<u>100-B</u>	<u>100-D</u>
Assistant Area Engineer	1	1
Shift Supervisors	4	0
Day Supervisors	1	0
Engineers on Assignment	9	1
Acting Foremen	0	1
Mechanics	16	12
Helpers	22	8

200 AREA

In preparation for start-up of 221-T, a shift supervisor and three mechanics have been assigned to each shift. Five special start-up crews, working on day shift, have each been assigned a specific responsibility for start-up.

Major difficulties have been encountered as follows:

1. Contact microphones and associated amplifiers required extensive rebuilding.
2. Water leakage into junction boxes on G.E. tube installations has required unexpected repair work.
3. Re-calibration of Ring Balance meters has required much attention.

We expect, however, to complete all work in the canyon by November 5, and all work in the instrument gallery by November 15.

Total personnel assigned to the 200-7 Area includes 12 supervisors and 35 mechanics and helpers.

300 AREA

Industrial instrument maintenance in this area is now operating with Building 3717-A as its headquarters. Thirty-nine furnace thermocouples were replaced this month, and a number of changes in timing controls were made.

In the machine shop, 3717, we now have a backlog of 1300 man-hours, or two and one-half weeks' work. The majority of this work consists of special jobs for Technical and Health Instrument groups. One thousand five hundred and ninety-nine badges were drilled and 292 inventory tags engraved. Two special optical instruments were built for service in 105-B and 221-T.

The backlog of work in the electronic shop is 1200 man-hours. Forty-nine items of electronic equipment were built this month. Part of this was equipment originally required for H.E.7. while the remainder was needed for new requirements.

Absenteeism averaged 1.1 per cent, and minor injuries 0.42 per 1000 man-hours in Building 3717. Additional space, provided by 3717-A and improved storage facilities, has decreased the congestion.

700 AREA

One thousand four hundred and three pocket pencils were processed this month. Twenty-three Victoreen amplifiers, 8 Beckman amplifiers, 4 Beckman switches and 6 Beckman controllers were also tested and serviced for the Construction Instrument Department. Part of this work was done in the 717 circuit room and the remainder in 717-A.

The 717-A shop is now in operation. Two vacuum lines are in service and a third is under construction. Seven mica window tubes were placed in service.

Industrial instrument maintenance is being provided in the Well Pump House, City Pump House, Booster Pump House, and Power House. Odd jobs have been done for the 706 laboratory, the hospital and the sewage disposal plant. A survey of 700 Area and village instrument installations is being made so that we may get a better idea of routine maintenance requirements.

Plans for a machine shop in 717 and expansion of the electronic stockroom are in progress.

TRAINING SCHOOL

Training is being continued with the same basic course as has been in use. Eighty-six men have been through training school during the month. Of these, twenty-one are still in process. Several men are being returned from the field for supplementary training regarding instruments not previously covered.

Anticipated requirements for new personnel, as well as supplementary training of present personnel, are creating a pressing problem with regard to space and facilities since locations such as 717 and 722 shops are no longer fully available.

The training course includes regular weekly safety meetings at which the groundwork for safety consciousness in the field is laid.

VILLAGE ENGINEERING

HW-7-870-Del

OCTOBER 1944

POWER OPERATIONS

Pumps and Wells

Water pumped during the month averaged 1,995,570 gallons per day, representing 178 gallons per capita per day.

Sewage Disposal Plant

Sewage flow during the month averaged 980,000 g.p.d., or an average of 90 gallons per capita per day.

All tests as required by the State Department of Health are being run.

WORK ORDER CONTROL

Work Orders outstanding October 1.....	1,023
" " received during October.....	1,453
" " completed during October.....	1,752
" " outstanding October 31.....	724

A break-down of outstanding work orders is as follows:

Prepare houses for occupancy.....	12%
Repairs to personal furniture damaged in transit.....	23%
Furniture deliveries.....	6%
Renovation of Village houses for reoccupancy.....	11%
Repairs to Village houses.....	38%
Repairs to Commercial and Community Buildings.....	10%

HW-7-870-De1

PROTECTION DEPARTMENT

OCTOBER 1944

INVESTIGATION

The following summary reflects the progress made by the Investigation Division during the month of October:

Number of investigation (Personnel) cases received	1411
Number of cases closed	814
Number of employees approved for clearance	788
Construction personnel files reviewed for transfers	839
Number found unsatisfactory for employment	216
Commercial facilities investigated	6

The number of new cases received in October represents an increase of 336 cases over those received during the month of September. At the present time the volume of work in the Investigation Division is still on the increase.

During the past month practically all Patrolmen's files have been transferred from Construction to Operations. These files are presently in the process of being reviewed for clearance in classified areas, and it is anticipated that the review of all Patrolmen's files will be completed within the next 10 to 14 days.

PATROL

Reports and Records

Force Report

	<u>Entire Patrol</u> <u>September 30</u>	<u>Entire Patrol</u> <u>October 31</u>	<u>Hanford and</u> <u>Pasco Areas</u> <u>October 31</u>
Patrol Supervisor	1	1	-
Ass't. Division Supervisor	1	1	-
Captains	8	8	3
Lieutenants	23	23	6
Sergeants	80	78	19
Instructors	2	2	-
Patrolmen	913	1008	238
Patrolwomen	13	12	10
Radio Operators	30	30	4
Clerks	4	4	2
Steno-Typists	19	16	5
Messengers	3	3	2
Seamstresses	2	2	-
Office Helpers	5	5	3
Total	1104	1193	292

General Incident Reports

Checking unauthorized persons in areas	18
Stolen property reported	23
Traffic violations	117
Fires	18
Utility failures	13
Drunk and disorderly conduct	20
Lost and found property reported	13
Ambulance runs	19
Damaged Government equipment and property	11
Accidents	27
Missing persons reported	3
Assault	1
Investigations (Miscellaneous and unfounded)	25
Fire hazards reported	4
Unlocked or open windows, doors and files	49
Persons bitten by dogs	4
Contraband articles picked up	3
Routine checks	6
Safety hazards	3
Mental cases apprehended	2
Airplanes reported flying over reservation	1
Escorts	7
Total	387

Communications Section

The radio receiver and transmitter was removed from the old Richland Area Patrol Headquarters and installed in the 720 Building Patrol Headquarters, where it was combined with WJNH to give the Richland Area better radio coverage.

Training School

Trainees reported for duty	247
Qualified to carry firearms	244
Unqualified	0
Being qualified at present time	27

All men entering training school were given an examination for Driver's license.

Men in training are assigned to the Pistol Range for three days for instruction in safe and proper handling of firearms. Men are qualified to carry sidearms.

Three days of classroom instruction are given after which all men spend one week in various areas, where they receive instruction and practical experience in shift routine, badge checking and various other plant protection procedures.

Special Duty

Forty-six special armed escorts were furnished for classified material transfers during the month.

Master Key System

Patrol has received the Master Key System for 200-West, 100-B, and 300 Areas.

Combination-lock filing cabinets have been set up with hooks for each key.

The 200-West system has been partially set up and forms ordered to complete the system.

The Patrol will have control of all keys and will issue them only to those who present proper authorization forms.

100-B Area

A temporary fence was installed surrounding the 184 and 1700 buildings within this Area on October 30 and a special pass procedure was set up for admission.

700 Area

This Area was closed on October 2 and a special pass procedure established for admittance.

SECURITY

Number of employees cleared	673
Number of visitors for classified areas	15
Employee permanent badges issued for Operations	
Classified Buildings	
100-B ..	157
200-W ..	993
300 Area ..	999
	<u>2149</u>
 Employee badges issued for Construction	
Classified Buildings	
221-U ..	8
200-E ..	21
100-D ..	191
100-F ..	56
	<u>186</u>
 Employee Authorization Cards issued	70

Arrangements were made with the Industrial Relations and Training Group to give security talks to all new employees and to obtain the Declaration of Secrecy.

Visits were made to Hanford Engineer Works by the following persons during the month of October:

J. Bernacchi - Chicago
Mrs. L. Tracy *
J. M. Bandino *
A. H. Compton *
Enrico Fermi *
J. A. Simpson *
W. P. Jesse *
Eugene Wigner *
J. R. Van Horn *
L. G. Lewis *
W. H. McCortle *
G. S. Monk *
R. S. Stone *
S. K. Allison *

H. M. Sawyer - Am Pent
F. S. Chambers *
R. B. De Right *

Mildred Wardlow - I.B.M.
Hyde Forbes (Engineer)
E. L. Hankison - Regan Corp.
O. Vetter - Ring Balance Co.
Comm. C. Chaluk - Selective Service
H. V. Kramer - H. D. Fowler Co.

The double-pass system and other protective measures, as outlined in inter-office memoranda of October 6 and 20, were installed in the Operations Section of the 200-4 Area on October 9 and the 300 Area on October 26.

Operations assumed responsibility for the protection of certain buildings in the 100-0 Area. These buildings were separated from the rest of the area by a fence and only persons with Operations badges, Government badges, or a green tag pass issued by supervision within the area are given access.

The subject of plant protection was discussed at a Plant Staff meeting at which time the Plant Manager stressed that the Department Superintendents were responsible for the protection and security of their personnel and the buildings under their supervision. Also, that the Protection Department was available and ready to assist them in such matters. As a result, assistance has been given several of the Departments in improving the security of buildings and the education of personnel in safeguarding project information.

A letter dated October 14, 1944, cautioning employees against negligent and careless talk, was sent to each employee for signature and return to the Security Office.

SERVICE DEPARTMENT

OCTOBER 1944

PERSONNEL

<u>Department</u>	<u>Additions During October</u>	<u>Intra-Plant Transfers</u>		<u>Terminations</u>	<u>Net Change</u>
		<u>In</u>	<u>Out</u>		
Management	-	1	-	1	-
P Department	13	21	47	3	- 16
S Department	35	19	5	10	+ 39
Technical	56	-	6	10	+ 40
Power	45	12	4	9	+ 44
Maintenance	64	1	2	10	+ 53
Electrical	23	-	-	6	+ 17
Instrument	11	-	-	5	+ 6
Village	1	4	-	-	+ 5
Village Eng.	36	6	1	-	+ 41
Service	38	1	5	7	+ 27
Transportation	104	3	-	4	+ 103
Traffic	2	-	-	-	+ 2
Medical	68	2	2	12	+ 56
Accounting	122	2	10	37	+ 77
Protection	253	10	-	164	+ 99
Sub-Totals	<u>871</u>	<u>82</u>	<u>82</u>	<u>278</u>	<u>+ 593</u>
Payroll Exchanges*	-11	-	-	-11	-
Totals	<u>860</u>	<u>82</u>	<u>82</u>	<u>267</u>	<u>593</u>

*Additions to exempt roll and terminations from non-exempt roll.

Additions to roll in October..... 860

	<u>Exempt</u>	<u>Non-Exempt</u>	<u>Total</u>
New Hires	23	370	393
Re-employs	-	38	38
Reinstates	15	281	296
Construction Transfers	39	59	98
Other Plant Transfers	28	7	35
Sub-Totals	<u>105</u>	<u>755</u>	<u>860</u>
Payroll Exchanges	11	-	11
Totals	<u>116</u>	<u>755</u>	<u>871</u>

Terminations in October..... 267

	<u>Exempt</u>	<u>Non-Exempt</u>	<u>Total</u>
Voluntary Quits	1	200	201
Military Service	1	4	5
Discharge	-	15	15
Transfer to Construction	-	1	1

continued -	<u>Exempt</u>	<u>Non-Exempt</u>	<u>Total</u>
Medical/Inves. Rejects	1	30	31
No Work	3	3	6
Trans. to Other Plants	4	4	8
Sub-Totals	<u>10</u>	<u>257</u>	<u>267</u>
Payroll Exchanges	-	11	11
Totals	<u>10</u>	<u>268</u>	<u>278</u>

Breakdown of Terminations by Causes:

Personal Illness.....	37
Another Job.....	15
Voluntary (Personal & Family Reasons).....	59
Illness in Family.....	36
Return to School.....	4
Personal Business.....	10
Dissatisfied with Work.....	25
Misconduct.....	11
Medical/Investigation Rejects.....	31
Released for Cause.....	7
Housing.....	4
Household duties.....	7
Getting Married.....	3
Military Service.....	5
Transportation.....	1
Transfer to Other Plants.....	9
No Work.....	<u>3</u>
Total.....	267

Labor Turnover - Exclusive of Military Service Terminations..... 5.48%

Total Labor Turnover..... 5.58%

Plant Absenteeism - October 1944:

Male.....	3.78%
Female.....	<u>4.11%</u>
Total Plant Average.....	3.98%

Status of Transfers and Hires from Construction (Non-Exempt)

Construction Employees Interviewed..... 1,273

Accepted.....	662
Rejected.....	460
Considering.....	151

Placed on Roll..... 321

Total Placed on Roll Since 6/24/44..... 898

Distribution of Non-Exempt Construction Transfers and Hires

P Department.....	30
S Department.....	5
Technical.....	3
Power.....	20
Maintenance.....	21
Electrical.....	3
Instrument.....	5
Village.....	-
Village Eng.	31
Service.....	29
Transportation.....	87
Traffic.....	-
Medical.....	36
Accounting.....	47
Protection.....	1
Total.....	321

Status of Non-Exempt Gate Interviews

Number Interviewed.....	926
Accepted.....	509
Considering.....	48
Rejected.....	81
Construction Inquiries.....	69
Medical/Investigation Rejects...	18
Miscellaneous.....	201
Total Placed on Roll.....	315

Approximately 60% of the terminations for the month of October occurred in the Protection Department.

H. P. Shirrefs, Division Supervisor - Personnel, was transferred to the Medical Department on October 30, 1944.

SELECTIVE SERVICE

Following are the numbers and percentages of various age groups of male Operations employes as of October 31, 1944:

	<u>Total</u>	<u>Percent</u>
Number of male employes, 38 years of age and older, including LP's and LC's.....	1,085	33%
Number of male employes under 38 years of age including LP's and LC's.....	<u>2,186</u>	<u>67%</u>
Total number of male employes.....	3,271	100%

	<u>Total</u>	<u>Percent</u>
Number of 4F's.....	306	9%
Number of 4C's.....	98	3%
Number of male employees, 30-38, excluding 4F's and 4C's.....	1,078	34%
Number of male employees, 26-29, excluding 4F's and 4C's.....	503	15%
Number of male employees, 18-25, excluding 4F's and 4C's.....	<u>201</u>	<u>6%</u>
Total number male employees under 38.....	2,186	67%
Total male employees under 30, excluding 4F's and 4C's.....	704	21.5%

During the month there was processed thirty-eight 42A Specials, twenty-six 42A's, fifty-five 42A's accompanied by 401A's and two hundred twenty-one 42B's.

Many of the local boards have been requesting 42B's on men over 38 years of age and in classifications 4F and 4C. Although compliance with some of these requests would not be considered strictly necessary, we have made it a policy to file 42B's on these men in order to maintain the good will of the local boards.

CLASSIFIED FILES

Statistics relating to the handling of classified material are as follows:

	<u>October</u>	<u>September</u>	<u>August</u>
Incoming Mail	8,468	8,399	7,635
Outgoing Mail	3,056	2,610	3,820
Inter-area Transfer	5,760	5,627	6,767
Routed	5,367	4,962	5,726
Requests	1,478	1,529	1,646
Technical Library	481	339	689

Daily classified messenger service to the 100-B and 200-W Areas was put into effect on October 6, 1944.

SAFETY AND FIRE PROTECTION

Safety

Plant Safety Record - 24 days.

Injury Statistics

	<u>October</u>	<u>September</u>	<u>To Date</u>
Major Injuries	1	0	2
Non-Fab. Major Injuries	0	0	2



continued -

	<u>October</u>	<u>September</u>	<u>To Date</u>
Sub-Major Injuries	1	2	9
Minor Injuries	303	273	1,420

Major Injury P.I. #1

On October 6, 1944, Maintenance Department Foreman, sustained linear fracture of left tibia head and severe strain of left knee. Employee fell, causing injury, when he caught his left foot in the grating over a coal hopper at the coal unloading spot in 100-B Area.

Sub-Major Injury SM #9

On October 7, 1944, Production Department operator, sustained a fracture of the left index finger. Material which he was handling slipped from his grasp and as he reached to grab it, his finger was caught between the falling material and a machine.

A total of 99 Safety Meetings were held during the month, with a total attendance of 1,391.

Fire Protection

<u>Fires</u>	<u>Operations</u>	<u>Construction</u>	<u>Estimated Damage</u>
Inside Village	12	4	\$83.50
Outside Village	9	-	-

Inside Village - Operations

- October 1, 1944 - Spontaneous combustion in manure pile south of park. No damage.
- October 1, 1944 - Spontaneous combustion in manure pile south of park.
- October 2, 1944 - Cigarette started fire in waste basket in janitor's closet in Administration Building.
- October 3, 1944 - Spontaneous combustion in manure pile south of park.
- August 4, 1944 - Occupant of house at 1004 Torbett St., rendering fats which ignited. Ceiling and walls were smoked. Damage \$35.00. Knowledge of fire came from occupant's request for repairs - it was not reported.
- October 7, 1944 - Spontaneous combustion in manure pile one-half mile north of Jefferson School.
- October 11, 1944 - Grass fire near Jadwin & Van Giesen.
- October 11, 1944 - Same fire - false run by #2 Company.
- October 12, 1944 - Grease fire in house at 1205 Symons Street.
- October 27, 1944 - Smoke from furnace - no fire - 1107 Merrill Street
- October 27, 1944 - False alarm - Transient Quarters.
- October 31, 1944 - Paint and upholstery on corner of chair, 1312 Potter Street. Damage \$3.50. Cause unknown.

Inside Village - Construction

- October 10, 1944 - Grass fire at rear of Tract House 14-4.
 October 20, 1944 - Boiler insulation in Tract House L-906 ignited by electric grid. Damage \$45.00.
 October 22, 1944 - Incendiary origin - locker doors, S.H. & Wright Barracks.
 October 25, 1944 - Controlled burning, Putnam & Perkins Street - Construction.

Outside Village - Operations

- October 3, 1944 - Material burned one-half mile east and one-half mile north of 100-B Area.
 October 6, 1944 - Spontaneous ignition in coal bunker, Riverland.
 October 10, 1944 - Short circuit in wiring of weapon carrier, 100-B Area.
 October 11, 1944 - Tar pot burned north of Bldg. 3701, 300 Area.
 October 13, 1944 - Oil burned in pot outside Bldg. 321, 300 Area.
 October 13, 1944 - Responded to drill, 300 Area.
 October 26, 1944 - Short circuit in wiring of Patrol Car, 100-B Area.
 October 22, 1944 - Short circuit private auto near 1814 Hunt Avenue.
 October 30, 1944 - Short circuit private auto near Hospital Bldg.

The program developed for observing Fire Prevention Week in the Village and Areas was carried out as planned from October 8 to 14. A very effective display was set up in the Fire Hall of the Municipal Building and was well received by employees.

INDUSTRIAL RELATIONS & TRAINING

Status of Contacts during the month of October read as follows:

Military Service	3
Housing	753
Transportation (inc. gas rationing)	335
Miscellaneous	201
Personal	283
Insurance	34
War Bonds	55
Exit Interviews	2
Expense Reports and Salary Advances	310
Travel Agreements	60
Total	2,041

The National War Fund Drive netted \$16,663.81 or 326% of the quota set for the Operations' share of the Project drive.

Training

A summary of Training activities for the month of October is as follows:

<u>Group</u>	<u>Sessions</u>	<u>Persons</u>	<u>Man Hours</u>
Orientation	52	960	1,152
Safety Meeting Training	2	12	48
Operations Analysis	8	15	240
Industrial Relations	2	40	40
Leadership	20	21	840
Public Relations (Hospital)	2	30	60
Training Contacts (Advise and Counseling)	150	150	75
Totals	236	1,228	2,455

A personal rating form was developed and distributed to Superintendents for individual rating.

GENERAL

During the month of October the following volume of clothing was laundered:

2723-W Laundry

Coveralls	5,041 Pieces	12,603 Lbs.
Towels	1,850 "	925 "
Aprons	853 "	640 "
Caps	2,711	122 "
Total	10,455 Pieces	14,290 Lbs.

723 Laundry

Sheets	955 Pieces	1,815 Lbs.
Pillow Cases	476 "	162 "
Sacks	20 "	30 "
Total	1,451 Pieces	2,007 Lbs.

The Laundry located in the 700 Area went into operation as of October 24, 1944.

During the month janitor service expanded to take over Operations' portion of the 200-W Area, 300 Area and 700 Area.

MONTHLY INJURY ANALYSIS

October, 1944

Minor Injuries

	Misc. Burns	Abrasions	Contusions	Lacerations	Punctures	Splinters	Strains & Sprains	Foreign Body	Unclassified	TOTALS	
										October	Last Month
Accounting	1		3	1			1	1	1	8	12
Electrical	1	2		5	3	2	1		2	16	7
Instrument	4	2		9		1			3	19	13
Power	4	1	1	2		1		7	2	18	17
Maintenance	8	19	4	36	7	4	4	3	3	88	79
Production	24	14	7	11	4	4	1	1	5	71	86
Service	3	1		3				1		8	4
Medical	1	3	2	7		1	1			15	6
Technical	10	2	1	8	3	1		1	1	27	16
Protection	1	6	1	5	2	1	4	1		21	27
Transportation		1		2	1		3		3	10	4
Village Eng.	1	1								2	2
Traffic	0	0	0	0	0	0	0	0	0	0	0
Totals	58	52	19	89	20	15	15	15	20	303	273

Major Injury

10-6-44 - Maintenance Department Foreman sustained linear fracture of left tibia head and severe strain of left knee.

Sub-Major Injury

10-7-44 - Production Department Operator sustained a fracture of the left index finger.

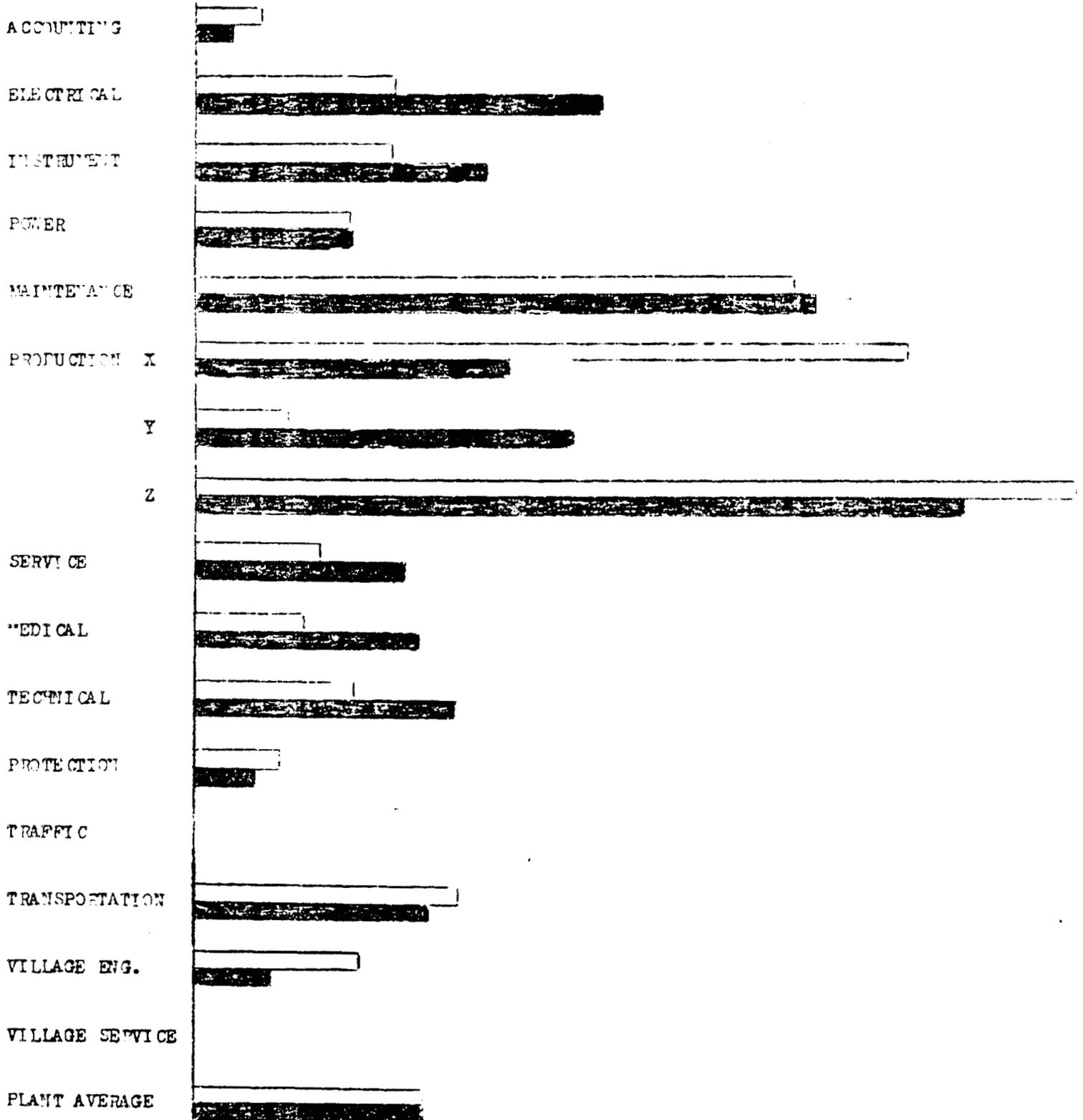
OCTOBER

FREQUENCY RATE CHART

Minor Injuries

This Month 

Last Month 



VILLAGE ADMINISTRATION

OCTOBER 1944

HW-7-870-Do.1

HOUSING

Village Houses

Permanent Houses

	<u>Houses Accepted</u>		<u>Houses Occupied</u>	
	<u>October</u>	<u>To-Date</u>	<u>October</u>	<u>To-Date</u>
Operations	174	1,473 *	181	1,142
Construction	-	619 *	-52	619
Government	-	204 *	9	179 **
	174	2,296	138	1,940

* Operations quota increased by 67 during October at expense of 64 from Construction quota and 3 from Government quota.

** Adjusted to include all Government houses where lease has been delivered to Du Pont Company plus 32 authorized rent free houses.

Summary:

Houses occupied by family groups	1,940
Safety House	1
Houses in use as temporary dormitories	55
Nursery School	2
Houses assigned but unoccupied pending arrival and installation of furniture	141
Houses in process of assignment	96
Houses retained for personnel from Sites G and X	36
Government houses without leases in Du Pont possession exclusive of authorized rent free houses	25
Total houses accepted	2,296

Prefabricated Houses

	<u>Houses Accepted</u>		<u>Houses Occupied</u>	
	<u>October</u>	<u>To-Date</u>	<u>October</u>	<u>To-Date</u>
Operations	185	1,060 *	239	981
Construction	-	127 *	-8	127
Government	1	34	10	20
	186	1,221	241	1,128

* Operations quota increased by 10 during October at expense of Construction quota.

Summary:

Houses occupied by family groups	1,128
Unoccupied pending installation of effects and arrival of families	11
Houses in process of assignment	68
Government houses without lease in Du Pont possession	14
Total houses accepted	1,221

Federal Public Housing Units

Construction of all units of the various F.P.H.A. projects has been completed and accepted.

Sunnyside

Units accepted	300	
Units available	246	(30 loaned until February 1, 1945) (24 turned back at request of F.P.H.A.)
Units occupied	169	Subcontractors 21 Government 2 Fire Department 14 Construction 76 Operations 56 Occupied 169
Units vacant	77	
Units certified	19	

Kennewick

Units accepted	200	
Units available	175	(25 turned back at request of F.P.H.A.)
Units occupied	146	Subcontractors 8 Government 18 Construction 41 Operations 45 Concessionaires 34 Occupied 146
Units vacant	29	
Units certified	23	

Grandview

Units accepted	40	
Units available	36	(4 turned back at request of F.P.H.A.)
Units occupied	7	(Includes 1 Construction on loan from Operations)
Units vacant	29	
Units certified	3	

Prosser

Units accepted	60	
Units occupied	26	(Includes 7 Construction on loan from Operations)
Units vacant	34	
Units certified	5	

Pasco

Units accepted	25	
Units occupied	20	(All Construction occupancy)
Units vacant	5	
Units certified	1	

Tract Houses

Considered rentable	147	
Occupied	112	(Included occupancy by Government, Sub-contractors, Construction, Operations and Concessionaires)
Vacant	35	

Five tract houses were condemned during the month.

Dormitories

Occupied by men	8
Occupied by women	12

The 25th of October, one new dormitory, J-15, was opened for women. Fourteen dormitory houses were used for women during the month. Five of the men's dormitory houses were closed and the houses turned back for re-allocation as family residences. There are 41 houses that are still used as dormitories for men.

There are approximately 30 people living in their own homes with loaned bedroom furniture, paying dormitory rental, pending arrival of personal furniture and families.

Resettlement

Movement of Household Effects

Lots of furniture received by rail from east of the Mississippi	122
Lots of furniture received by van from east of the Mississippi	0
Lots of furniture received by rail from west of the Mississippi	103
Lots of furniture received by van from west of the Mississippi	<u>31</u>
Total	256

Total authorizations now being processed for shipment to Richland	141
Total furniture authorizations submitted to Traffic during month	214
Total automobile authorizations submitted to Traffic during month	39
Total automobiles received for delivery during October	60

Movement of Families

Railroad reservations for families from all points to Pasco	118
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COMMERCIAL FACILITIES

Procurement

During the month, field trips were made to Pendleton, Oregon; Spokane, Washington and Wallace, Idaho, for the purpose of investigating applicants for commercial facilities.

Variety Store

Bids on the Variety Store were opened on October 18, 1944. Diamond's 5¢ to \$1.00 Store of Seattle, Washington, owned by R. S. Robinson, has been selected as the operator of this facility.

Electrical Appliance and Repair Shop

Invitations to bid on the Electrical Appliance and Repair Shop were opened on October 21, 1944. The selection of the operator is awaiting the approval of the Area Engineer. The old Patrol Building has been vacated by Patrol, and the remodeling of the building for this facility should begin in the very near future.

Men's Apparel Shop

Invitations to bid on this facility were extended on October 13, 1944, to the six most qualified applicants. Bids will be opened on November 1, 1944. Plans for this facility have been approved and the contract should be let in the very near future.

Shoe Store

Bids on this facility were opened on October 20, 1944. The recommendation for the selection of the operator of this facility has been submitted for approval.

Community Service Station #2

The manager of this station, which was awarded to Tide Water Associated Oil Company, has established residence in the Village. Pumps and other necessary equipment to be furnished by the operator are being installed. The station will open as soon as grading and surfacing have been completed.

Dog Hospital and Pound

Not much success has been experienced to date in arousing interest in the subject facility. One applicant indicated that he would submit a proposal in the very near future.

Hardware Store

Invitations to bid are being held up pending approval by the Area Engineer of the plans for this facility.

Lending Library and Book Store

This facility has been cancelled.

Bus Depot

Inviting of bids on this facility has been delayed pending clarification of discrepancies which exist between the approved plans and the specifications for bidding on this facility.

Food Store "D"

Bids on this facility were opened on October 28, 1944.

Optical Shop

Invitations to bid on this shop have been extended to the three most qualified applicants. Bids will be opened on November 6, 1944.

Railway Express Agency

Area Engineer's approval has been obtained covering rental arrangements and alterations to the 700 - 1100 warehouse building, part of which is to be fitted up for use by the Railway Express Agency.

Recreation Building

Final determination of specifications for bidding is awaiting receipt of approved plans for the proposed tavern and restaurant additions to this building.

OperationProgressive Cafeterias

Cafeteria meals decreased 8.9% over the previous month, number of Coffee Shop meals increased approximately 2.9%; and Transient Quarters room occupancy increased approximately 4.2%.

Cafeteria (9/28 through 10/27)	101,238 meal customers
Coffee Shop (9/28 through 10/27)	15,079 meal customers
Transient Quarters Room Statistics (9/28 through 10/27)	

Number guests	3,701
Number room-days available	3,390
Number room-days occupied	2,646
Percent of room-day occupancy	78.1

Morning Milk Company

Sales (9/28 through 10/27)

Milk	(quarts)	134,064
Milk	(half-pints)	76,200
Cream	(quarts)	306
Cream	(half-pints)	8,700
Milk	(bulk-gallons)	1,702
Cream	(bulk-gallons)	770

Richland Theatre

Total customers (9/28 through 10/27) 31,011

Standard Oil Company of California

Total gasoline sales (September) 41,424 gallons

Richland Motor Company

Total gasoline sales (September) 10,219.4 gallons

Post Office

Four additional house-to-house mail delivery routes were started during the month of October.

Women's and Children's Apparel Shop

This facility formally opened for business on October 23, 1944, under the management of Rodney and Wyman Cox.

Richland Thrifty Drug

The addition to this building, providing increased storage and kitchen space, was approved and released to the contractor for construction on October 24, 1944.

Barber Shop and Beauty Parlor

Temporary stove heat has been installed and Field Change Request initiated for installation of permanent heating equipment.

General Merchandise Store

Field Change Request has been initiated and approved by the Area Engineer covering additional electrical work and other items necessary for the completion of this facility.

Richland Laundry and Cleaners

Laundry bundles are now being finished in less than two weeks, and dry cleaning in less than one week.

Sanitation Program

General improvement in the sanitary condition of food stores and eating establishments has been noted during the month as indicated by the weekly reports of the Inspection Committee.

A meeting was held with Drs. Norwood and Sachs and Mr. Hostetter of the Area Engineer's office for a general review of the sanitation program. The general opinion of the meeting was that a good deal could be accomplished by the development of a proper educational program to be offered to employees of these establishments. In this connection, a meeting has been arranged with Miss Brownell of the Public Health Section, for the purpose of presenting such a program to the managers of these establishments and requesting their cooperation in seeing that all of their employees participate.

General

A visit was made in company with H. A. Andrews to the War Production Board in Seattle for the purpose of establishing contacts with this office relative to the handling of priority and procurement problems which will shortly be taken over by Operations.

During the month, 47 newly arrived families were visited by a Village representative in line with the program of providing information concerning the community to new arrivals.

A check of drug store prices was made on October 12, covering the two Richland drug stores and Brown's Pharmacy in Yakima. This check revealed Richland prices to be generally equal to or lower than the Yakima operation. The prices offered by the Drug Center are, in many cases, lower than the Richland Thrifty Drug prices.

A check on the OPA listings covering the Cafeteria, Coffee Shop and drug stores was made and revised price schedules were placed in effect at the Coffee Shop, in accordance with OPA requirements.

Merchandise offerings and prices at the General Merchandise Store were checked with similar operations in Walla Walla. The check indicated a generally better assortment and supply of all types of merchandise in the Richland store, with prices generally in line with those charged in Walla Walla.

COMMUNITY ACTIVITIESChurches

United Protestant Church Extension Sunday School was started in the Jefferson Grade School on Sunday, October 29, to eliminate the overcrowded condition at the Sacajawea Grade School.

Schools

Temporary provisions were made for operation of boilers in school buildings during non-school days, namely, Saturday and Sunday.

Pending completion of the permanent nursery school, an additional house has been assigned for temporary nursery school use at 421 Callum Avenue.

Installation of additional new furniture on order was delayed because of shipping difficulties. The next group of 300 chair desks will be installed on November 4.

Use of buildings by non-school groups is increasing.

An inspection procedure has been established for both housekeeping and safety, including the listing of new repairs needed and followups of repairs requested. These inspections will take place each Saturday morning.

General

The finals in the three flights of the golf tournament were played on October 8 at the Kennewick course. The final matches in the Richland tennis championships were also completed in the early part of October.

A fall playground program for grade school boys and girls has been worked out in collaboration with the school authorities.

Basketball league organization meetings were held on October 9 and 26. Indications are that twelve teams will play. The tentative date for the league opening is set for November 13. It is planned to play two nights each week at two school gyms. A committee of three managers was picked to draw up league rules and policies, payment of officials, etc.

Publicity was arranged for two specially arranged baseball games and for the sale of tickets for the Columbia Concert Series.

Touch football competition for high school boys not on the Columbia High School football squad is being conducted on a temporary field north of the park on three nights each week.

Assistance was rendered the girls' dormitory group in arranging for a gym night at the Lewis and Clark Grade School on Wednesday nights during the winter season.

New Brownie and Intermediate Girl Scout groups were organized during October, and several new leaders volunteered to assist with the program. Miss Frances Christianson, Girl Scout Field Director from the Portland, Oregon office, spent four days with the local Girl Scout officers, outlining training procedures for the new leaders.

Saturday night dances of the Sand Bar Club (Teen Age) were attended, and two meetings were held with the club leaders.

TRANSPORTATION DEPARTMENTOCTOBER 1944AUTOMOTIVE

Initial issue of Operations Bus Schedules was distributed October 31.

Inter-area passenger shuttles continue. Two 14-passenger stretchout busses are in this service on a daily basis.

Inter-area trucking service has been established to serve all areas, requiring the use of five trucks.

Off-plant freight trips made by Operations equipment and personnel include five trips during the month to Pendleton and Walla Walla to haul laundry. In addition, daily trips are made to Pasco and Kennewick to haul freight and express for the plant and for village residents.

Off-plant passenger car trips arranged with Construction for Operating personnel and visitors totalled 37.

Safety rules for Bus Operations have been published and are incorporated in the departmental training program.

Summary of equipment received to date by the department:

Sedans	105
Pickups	45
Carryalls and Station Wagons	25
Trucks	79

In addition, nineteen pieces of heavy equipment have been received, including cranes, tractors, scrapers, roller, etc.

REPAIRS

Garage Building 716 has been activated during the month and is now equipped to handle maintenance and repair work. The service station at the garage is in operation. Car washing and complete lubrication service is now available on the day shift.

Shop work done during the month:

Lubrication and Oil changes	104
Service Inspections	46
Repair Orders	66
Inspection	112

LABOR (VILLAGE)

The division has taken over the handling of freight and express between Richland and Pasco-Kennewick shipping points.

Twenty thousand pounds of grass seed were distributed to village residents during the month. This concludes the distribution of this material for the season.

TRAFFIC DEPARTMENT

OCTOBER 1944

STATISTICS

	<u>October</u>			<u>To Date</u>
	<u>Plant</u>	<u>Chicago</u>	<u>Total</u>	
Household Movements Arranged	212	24	236	2494
Household Movements Traced	49	29	78	2269
Automobile Shipments Arranged	35	12	47	592
Automobile Shipments Traced	16	5	21	932
Truck Bills Approved	599		599	2841
Railroad Bills Approved	50		50	281
Household Goods Claims Filed	191		191	539
Household Goods Claims Collected (No.)	174		174	358
Household Goods Claims Collected (Amt.)	\$1704.53		\$1704.53	\$6500.35
Work Orders Issued (RHG Repairs)	146		146	636
Insurance Riders Issued	301		301	1071
Requests for Billings	322		322	531
Ticket Orders Placed	166		166	2278
Rail Reservations Made	-	-	362	3463
(a) Personal	59	20		
(b) Business	124	159		
Air Reservations Made	-	-	31	106
(a) Personal	31			
(b) Business	0			
Reservations Cancelled	19	12	31	382
Passengers Accommodated at Chicago				
Union Station		237	237	1768
Ticket Refund Claims Filed	175	-	175	1147
Ticket Refund Claims - No. of Tickets	430	-	430	2284
Ticket Refund Claims Collected (No.)	129	-	129	1111
Ticket Refund Claims Collected (Amt.)	\$8812.85		\$8812.85	\$116,093.60
Ticket Order Bills Checked and Approved	331		331	3518
Freight Shipments Traced	30	24	54	223
Express Shipments Traced	3	0	3	43
Carload Shipments Received	487		487	1390
Hotel Reservations		9	9	50
Reservations - Construction Engineers		58	58	58
Expense Accounts Checked	189		189	

CARLOADS RECEIVED

	<u>October</u>	<u>To Date</u>
Automobiles	8	69
Activated Carbon	1	2
Ammonium Sulphate Ferron	0	1
Aluminum Silicon	0	3
Aluminum Sulphate	1	2
Caustic Soda	2	3
Coal	420	1902
Chlorine	1	3
Carbonated Potash	1	1

CARLOADS RECEIVED (Cont.)

	<u>October</u>	<u>To Date</u>
Copper	1	1
Dummies	1	1
Express	1	1
Ferric Sulphate (Ferrisul)	9	14
Household Goods	20	144
Helium	2	3
Hydrogen Peroxide	1	2
Hydrogen Fluoride	0	1
Insoluble Solid	0	3
Lead	1	6
Nitric Acid	5	11
Oxalic Acid	1	3
Phosphoric Acid	0	3
Potassium Hydroxide	0	1
Rock Salt	1	7
Sulphuric Acid	0	12
Sodium Bicromate	1	2
Soda Ash	1	3
Sodium Hydroxide	0	6
Steel Tubing	0	1
Sodium Silicate	6	12
Sodium Nitrate	1	2
Sodium Nitrite	0	1
Tin	1	3

HOUSEHOLD EFFECTSMovements Pending

Following is a list of the household goods moves at various points on which we have releases as of October 31:

Denver	18	Chicago	15	Kansas City	1
Salt Lake City	1	Charleston, W. Va., and vicinity	13	Miscellaneous	8

A large portion of these shipments will move by van, and we anticipate no difficulty in obtaining this type of equipment for remaining shipments.

Plans are now in preparation for moving the household effects of Engineering Department employees. This movement will begin early in November and continue through April, 1945. We believe it will be possible to handle all shipments from Richland by van.

CHICAGO, ILLINOIS, OFFICE

The reception lounge quarters at the Chicago Union Station were closed on October 31. Notice of this change was mailed on October 3 to all concerned with this arrangement. The Area Engineer has approved continuance of one male representative at the Traffic Office in the McCormick Building to coordinate the handling of household effects, passenger reservations, and general traffic work, and this service will be maintained as long as there is a definite need for it.

RAILWAY EXPRESS - RICHLAND

A site for location of the Railway Express Agency's express office in Richland has been allocated and we are now awaiting floor plans for the preparation of these quarters. It is believed that they will be placed in operation some time during the month of November. The service will provide delivery to residential as well as business districts.

PLANT RAILROAD

Plans are being formulated for the operation of the locomotive shop and yard office at Riverland Yard. Furniture has been placed in the Yard office, and representatives for Operations Traffic have established their headquarters.

In order that persons concerned with the distribution and unloading of cars arriving on the Plant may be kept informed, we have prepared a statement, "Cars in Yard Report," to be issued daily. This report will show all pertinent information - viz., car number, origin, vendor, contents and date demurrage begins. We believe this will assist in overcoming some of the difficulties we have experienced in getting cars unloaded within the "Free Time" period allowed for this service. Considerable demurrage has accrued during the past few months and every effort is being made to unload cars promptly and return them to the carrier to avoid payment of demurrage charges.

DEMURRAGE

Effective October 19, the Office of Defense Transportation increased the demurrage charges for holding box car equipment beyond the free-time period to a maximum of \$16.50 per day. This new ruling provides for a charge of \$2.20 per day for the first two days, the third day \$5.50, fourth day \$11.00 and \$16.50 for the fifth and all succeeding days held. A general office letter advising of this charge was distributed to all concerned on October 17.

MEDICAL DEPARTMENT

OCTOBER 1944

VILLAGE MEDICAL SERVICE

Clinic

	<u>Men</u>	<u>Women</u>	<u>Children</u>	<u>October</u>	<u>To Date</u>
First Visits	266	355	303	924	2,796
Retreatments	432	944	297	1,673	5,026
				2,597	7,822

There are seven doctors and eleven nurses working in the clinic at this time.

There has been a marked increase in Clinic visits in all categories. The number of women visiting the Clinic has increased more than the men or children.

There have been no outstanding illnesses for this month. A great deal of ring-worm of the body and scalp of school age children has been seen in the Clinic, and a few cases of mumps have been seen in the homes.

The 84 new obstetric patients is a high figure for the Village and forecasts a higher delivery rate of infants in the next few months. These patients are still being cared for by two doctors.

The number of venereal cases is still light with a total of 41 treatments for the month.

There were 136 surgical patients seen during the month. This figure is lighter than last month due to the fact that the surgeon was on vacation.

The total of 294 patients seen after Clinic hours indicate the need for a full time Clinic doctor on the 4:00 to 12:00 shift. This had been anticipated and plans were made to provide this service during November. Sixty-one of these Clinic patients were medical, forty-seven surgical, one hundred and two pediatrics, three ear, nose, and throat, and eighty-one hypodermics. The increase in home calls indicate that the Clinic is heavily loaded. There were a total of 53 home calls made for October.

Kadlec Hospital Section

<u>Census</u>	<u>October</u>	<u>To Date</u>
Admissions	248	801
Discharges	241	737
Patient Days	1,434	3,806
<u>Operations</u>		
HEMT	49	205
Majors	20	57
Minors	20	96

<u>Operations</u>	<u>October</u>	<u>To Date</u>
Transfusions	2	22
Dental	2	5
Casts	5	11
Deaths	1	5
Deliveries	25	44
Stillborn	0	1

The hospital census at midnight, September 28, 1944, was 40; at midnight, October 28, 1944, it was 47. The average daily census increased from 40.8 to 47.3. There were 167 more patient days this month than last; there were 48 more infant days this month than last.

There was a decrease in the total number of operations from 154 last month to 98 this month. This was probably due to the absence of the Chief Surgeon while on vacation the last two weeks of this month.

On October 6, three scrub nurses were added to the surgery personnel. This eliminates the necessity for the same group being placed on constant 24 hour call. Increase of the nursing staff has improved the hospital services and also increased group-morale in the hospital.

Red Cross Aides began assisting the hospital staff, October 9. They are very willing and have been of considerable benefit to all concerned. These people work as unpaid volunteers.

Hospital Dietitians Report

<u>Patients Meals</u>	<u>October</u>	<u>To Date</u>
Regulars	1,437	2,918
Lights	239	628
Softs	969	1,576
Liquids	349	554
Surgical Liquids	122	301
F & I	125	354
Special diet	176	333
Total	3,417	6,664
 <u>Cafeteria Meals</u>		
Noon Meals	2,996	5,442
Night Meals	405	701
Total	3,101	6,143

The total number of meals served from October 1 to October 31, inclusive, was 6518. The average number of meals served per day was 200.

DENTAL HEALTH CENTER

The Dental Department has added another dentist and dental assistant to its staff. The dental laboratory has now become a reality and on October 21, the first gold inlay was cast. A dental laboratory technician will join the staff November 1, and will then be in a position to make dentures and bridges. During the week of October 23 to 28, inclusive, 286 patients were treated. Dental appointments are being made six weeks in advance.

PUBLIC HEALTH SECTION

During the month of October, the communicable diseases reported were as follows:

Chickenpox	4
Mumps	13
Whooping Cough	2

There was a rise in the number of mumps cases, necessitating thirty-nine visits by a Public Health Nurse to carry out control measures. There were twenty-one visits to other cases of communicable diseases giving a total of sixty visits for the month.

One hundred and seven children were registered in the Child Health Conference. Of these, fifty were infants and fifty-seven pre-school children.

An immunization program was carried on at all schools during the month. By raising the immunization level of the child population in Richland, it is hoped to prevent such communicable diseases as smallpox, diphtheria, and whooping cough. It is our endeavor to have as many children as possible immunized so that if we should have an outbreak of these diseases, we should not have children in the area who are susceptible. This level approximates 80% at the present time.

Immunizations completed are as follows:

Smallpox	410
Diphtheria	127
Typhoid	1
Whooping Cough	11
Tetanus	2

There were thirty-four cases admitted to nursing service because of illness, for which fifty home calls were made.

Thirty-seven instructive home visits were made to pre-natal cases, and thirty-five to post-natal cases.

For infants under one year of age, there were seventy-two visits.

Sixty field visits were made to food handling establishments. Some improvement has been forthcoming in the general housekeeping and sanitary operation of these facilities.

Additional refrigeration in the form of a 10' x 10' walk-in box and two reach-in boxes have been installed in the Coffee Shop of the Transient Quarters. This addition will materially aid the operator of this concession.

Thirty-four water samples were taken from the public wells in the Richland area, of which thirty-two met the U.S. Public Health Service standards for drinking water. Two samples from the No. 1 well, serving the 3000 Area barracks did not meet the above standards. However, seven samples of water from this latter source were taken after the chlorination process and all were satisfactory.

Seventy-six water samples were taken from Village houses and tract houses. Of this number, eighteen samples did not meet the U.S. Public Health Service standards for drinking water. These eighteen samples were all from tract houses and consequently the wells were condemned. As a substitute, the tract houses from which contaminated samples had been found, were delivered water from an approved source.

Four samples taken of the final effluent from the Richland sewage plant proved to be negative for B. coli. This indicates excellent operation insofar as bacteriological results are concerned.

During the past month, the 300 Area has been baited for rats on four occasions. Sufficient time has not elapsed as yet to determine the effectiveness of this program.

A meeting attended by the housing group controlling the facility operators, Dr. Norwood, and representatives from the Public Health Section discussed the operation of food handling establishments relative to sanitation.

A program was instigated for the education of food handlers in order to point out the proper procedures in handling food. This food handling course is being given by our Health Educator and will consist of the following topics:

Communicable Diseases Associated with Food Handling
Personal Hygiene and Sanitation
Food Spoilage, Refrigeration, and Preservation
Disinfection and Sterilization

No fumigations were executed during the past month, since this function was turned over to the Engineering Division of the Operations group.

In view of several complaints received relative to poor quality eggs, a Department of Agriculture representative was consulted. In collaboration with this Department, 115 dozen eggs at one of the grocery stores were condemned. Further investigations will be conducted along this vein in the future.

Of the twenty-one samples of pasteurized milk analyzed bacteriologically, three showed a bacterial count in excess of the allowable limits. These high counts were found on milk being held over night. This situation is being rectified as soon as possible through the cooperation of the pasteurization plant. Approximately one fourth of the forty-nine raw milk samples exceeded the allowable bacterial limit. However, pasteurization eliminates any possible source of danger by pathogenic organisms found in raw milk.

The educational program with producing dairies has been continued with forty-five dairy farm inspections being made. Seventeen new dairymen have expressed the desire to produce milk for bottling purposes, and a program has been instigated to acquaint them with all regulations, equipment, and sanitary procedures necessary toward the production of a high quality milk that will meet State requirements.

As a further measure in the determination of the milk quality, three chemical tests were made for proper pasteurization, butter fat, cleanliness, and possible adulteration.

As of the twenty-fifth of this month, all bottled milk delivered in Richland in the future will be provided with a hooded cap which will afford protection from external contamination and will eliminate numerous complaints of dirty milk.

The ice cream manufactured by the milk contractor and sold in Richland has been analyzed for bacteria and found to be very satisfactory. There being no frozen dessert regulations in the State, it is anticipated that this Department will make analyses of all frozen dessert products sold in the Village.

PLANT MEDICAL SECTION

Physical Examinations

	<u>October</u>	<u>To Date</u>
Employment Examinations.....	647	1,306
Transfer Examinations.....	540	2,746
Annuals.....	12	202
Sub-Contractor Examinations (food handlers, etc.).	34	402
Rechecks.....	331	866
Termination Examinations.....	188	455
Army and Government.....	48	82
Area Monthly Rechecks.....	151	2,329
Du Pont Construction Examinations.....	<u>0</u>	<u>71</u>
Total Examinations.....	1,951	8,459

Treatments

Operations

Occupational Treatments.....	335	1,397
Occupational Retreatments.....	1,135	4,306
Non-Occupational (Welfare) Treatments.....	2,263	5,725

Construction

Occupational Treatments.....	319	2,287
Occupational Retreatments.....	908	5,188
Non-Occupational (Welfare) Treatments.....	<u>673</u>	<u>4,808</u>
Total Treatments.....	5,633	23,801

Laboratory Examinations

	<u>October</u>	<u>To Date</u>
<u>Medical Laboratory</u>		
Pre-employment.....	7,051	21,935
Clinic.....	1,532	5,858
Hospital.....	781	3,195
First Aid.....	21	138
AnnuaIs.....	5	49
300 Area Rechecks.....	1,112	2,230
100-B Area Rechecks.....	459	1,052
200-W Area Rechecks.....	122	122
Total Examinations.....	11,083	34,579

X-Ray Laboratory

Pre-employment.....	1,257	4,161
Operations.....	16	128
Construction.....	28	224
Hospital.....	79	184
Out-Patient.....	166	533
AnnuaIs.....	0	45
Public Health.....	0	3
Total Examinations.....	1,546	5,278

Personnel

The shortage of trained medical technicians is acute. Plans are underway to start a training school in Richland to care for future needs, and every effort is being made to secure additional technicians for present needs.

Physicians

Two physicians were added to the Industrial Section during the month of October: Dr. M. C. Abney and Dr. D. H. Smith. Both are now working in pre-employment, and Dr. Smith is also covering Richland First Aid. Dr. Abney has spent considerable time in the Medical Clinic because of the illness of regular physicians assigned to that work.

Special Hazards

Work Permit

A member of the Industrial Medical and H.I. group cooperated with a committee appointed by the Production Superintendent to draw up a work permit

procedure to do work in hazardous zones. The procedure as outlined in "Special Hazards Bulletin No. 1" should greatly increase safety in that responsibilities and procedures are now formulated.

Special Incident

Overexposure to two individuals in 100-B Area occurred during the month. This incident formed the subject for a special investigation by a committee appointed by the management. No injury was sustained.

Area Clearance

In order to expedite area clearance from the medical point of view, and in relation to hazardous areas, we have agreed with Security and Management to adopt the following procedure:

A card showing the words "Passed for Areas" will be sent to Security on every employee given medical clearance for hazardous areas. When an employee's medical examination is made without all the tests required for hazardous areas, the card is marked "Passed" and forwarded to Security. If medical clearance is desired at a later date, Security must send through a request for area medical clearance.

Visitors from Clinton Laboratories and the Metallurgical Laboratory will bring with them a statement from the Medical Section of their originating site that they are medically cleared to enter the Areas here. This statement is submitted to Security here, who relay the information to Medical to obtain clearance, or the statement may come directly to Medical.

Visitors from locations, other than the above two, must have a blood count before Medical Clearance will be granted.

Interval Examinations in the Areas

Periodic re-examinations are going forward in 300 and 100-B Areas on a monthly interval for employees who in our opinion are in greatest need of them. The 200-West Area will be included November 15, 1944. As the force of technicians and physicians increases, we can then more adequately cover other groups which are not yet on a monthly schedule, or increase the thoroughness of examinations for those who are now on this schedule.

HEALTH INSTRUMENT GROUP

Survey Section

The group has been augmented to twenty-three by an influx of men with short term training from Clinton Laboratories, and by five untrained men transferred from the Technical Department.

100 Areas

The 100-B Area has operated with two Health Instrument men on each shift. Approximately 7 survey tasks per shift requiring special permits have been handled. Special investigations have been made as follows:

- (1) Active gas leakage from the unit.
- (2) Gas or vapor from the exit water system.
- (3) Activity of exit water.
- (4) Gamma rays through the biological shield.

Number 1 has been fully controlled. Number 2 has been provisionally controlled by the blocking of offending ducts. Proper solution of Number 3 depends on adequate design of monitoring equipment. Suitable devices have been designed by this group and are now being made by the Instrument Development Section. Readings above tolerance reported by other departments on the basis of the present inadequate equipment have been shown by the Health Instrument group to be due to contamination by active solid matter in the sampler. Intermittent samples indicate that the water will probably be safe at full power without counting on additional dilution from other sources. Number 4, in the form of a test for small apertures on the face of the unit, will proceed over a period of two or three months. Hand contamination has been observed on some instrument men. This was traced to water from a leak in the exit system. The whole question of contamination in 100 Areas may have to be reopened. Plans for 100-D work are under control.

200 Area

Preliminary stages of the Health Instrument set up in 200-W have been worked out. Insufficient manpower restricts the amount of rehearsal that should be performed.

300 Area

Protection for the laboratories in 3706 is just getting underway. Both manpower shortage and delayed delivery of instruments have given trouble.

Site Survey

The site survey crew is up to the strength currently needed. Work with the X22 chambers is progressing favorably. Background readings only are being obtained at this time. None of the perimeter Integrans (Benton City, Kennewick, and Pasco) are in operation but it is expected that they will be ready by the time the first 200 Area operation is started. A comprehensive emergency plan for major disasters has been completed.

Calibrations

The work of this group is in good shape. All Health Instruments have been checked once a week, and no deviations have been found to date.

Personnel Meters Section

The acute manpower shortage of this section has been relieved. The present staff is numerically adequate. Quarters in the 3700 Building are small to serve both as a training center for the pencil program and as the headquarters of the badge group.

Pencils

Twenty-three thousand pencil readings have been obtained in 100-B Area. Four pairs of readings represented overexposures. Three of these were satisfactorily explained. The fourth one, an exposure of 130 mr. was not traced to a specific cause. Such occurrences are to be expected, and so far, their frequency has been very low.

About twelve instances of both pencils reading off scale occurred during the month. This is a frequency of 1 in 2000 readings or 0.05%. This is somewhat better than the experience at Clinton Laboratories. Of the twelve instances, three were the known exposures confirmed by badges, and the remainder shown to be insignificant by badge check. One thousand two hundred pencils were read in the 300 Area.

Badges

Four thousand five hundred badge films were read in the month. Only 3 gave weekly totals greater than 100 mr. These were the 3 exposures mentioned above.

Laundry and Decontamination

Two counter units have been prepared for laundry operation. Temporary beta hand counters are in operation in 100-B and 200-N. A temporary alpha hand counter is in 3706. The new fourfold hand counters have arrived. Installation will be delayed pending the availability of G.M. tubes. It was pointed out in these reports two months ago that such a bottleneck could be anticipated.

Special

Special studies have been made of improved air-monitoring and water-monitoring procedure. The revised fast neutron meter has been held up by shop work on the amplifier circuit, which is now completed.