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This document contains

12-19

January 30, 1947

COPY 1 OF 1

HANFORD ENGINEER WORKS
TECHNICAL PROGRESS LETTER NO. 134

January 19 through January 25

~~7-5708~~
~~7-5710~~
~~7-5711~~
~~7-5712~~
~~7-5713~~
~~7-5714~~

Attachments from the following Technical Department
are attached and included in this
letter. Technical Progress Letter No. 134:

300
Chemical Development
Laboratory
Statistical Section

A. B. Greninger
A. B. GRENINGER
TECHNICAL SUPERINTENDENT

MASTER

ABG:jld

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11-21-91, CG PR-2

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NO RESTRICTIONS

January 30, 1947

100 AREAS

January 19 through January 25
(For Technical Progress Letter No. 134)

Physics

The control rod of the 305 Test Pile has been carefully calibrated, over a short range used for normal operation, by observing the effect on the critical position of the addition of a definite constant amount of poison to the test stringer. This test has revealed a series of 2-1/4 inch long ripples in the calibration curve. A recheck of several points on the curve gave excellent agreement with the first measurements. It is planned to recheck the entire series of measurements at the earliest opportunity. No cause for ripples of this length is known. The new curve has been furnished to the Statistics Group for use in analyzing the large stock of data now on hand.

Consideration has been given to a proposal to operate the piles at reduced power during a "Critical Y" electrical power condition rather than shutting down completely, in order to permit a return to normal power as soon as the critical condition is removed and to eliminate any need for charging temporary poison columns in cases where the condition lasts longer than 24 hours. If the operating power is 200 MW, the reduced level should be 120 MW for an original excess of 50 inhours in the rods. If 60 inhours excess are held in the rods the level may be reduced to 100 MW.

Engineering

Inspection of slugs discharged from six tubes in the D Pile and seven tubes in the F Pile, of which seven tubes contained extruded slugs and six contained cast slugs with exposures ranging from 25 to 56 MD, showed that the blistering of cast slugs is comparable to that of extruded slugs. For unknown reasons, cast slugs appeared to blister more heavily in the F Pile than in the D Pile. Blistering was noted in all slugs of a column which had been loaded with specially selected material of high density.

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Corrosion rates in Tubes 3992-D and 2494-F were found to be 0.02 mils/mo. average and 0.04 mils/mo. maximum. The latter tube had been exposed for 56 MD and contained three extensively blistered pieces.

Earlier observations which indicated that low water velocities accelerate the corrosion of Van Stone flanges were confirmed by the examination of one tube in each of the four orifice zones of the B Pile. The attack ranged from severe pitting and etching on both front and rear flanges in the 0.140 inch orifice zone to a minor amount of etch on the flanges in the 0.240 inch zone.

The borescoping of horizontal Thimble No. 2 of the F Pile showed that the kick-plate was quite rough from wear but had no unusual burrs or projections which might scratch the rod.

Push-pull tests for measurement of gun barrel run-clearance were repeated on 12 more tubes at the D Pile after an interval of 5 to 6 months in order to determine the rate of reduction of the clearance. One tube showed an increase of 1/32-inch in clearance; the others showed decreases ranging from 2/32 to 5/32 in. The observed changes were distributed in rather random manner in the pile and no general interpretation of the data has been found.

The previously reported high force required to move aluminum tube 4385-B was found to be caused by the rubber mandrel which expanded the aluminum tube tight against the gun barrel. These jacking tests were repeated from the rear face using a lower expanding force on the rubber mandrel. A force of about 500 lbs. was required to move the tube instead of more than 1000 lbs. as had been previously reported. After jacking the tube in and out 50 times, the nozzles were replaced and increasing tensile forces applied to the rear gun barrel. The front Van Stone ruptured at 4300 lb. tension with a total strain of 7/8 inch just before rupture.

On January 22 the spare thermocouple in Tube 1367-F was disconnected and the leads were re-attached to the slug thermocouple. The readings from this thermocouple were substantially unchanged from those noted a week previously.

C. W. J. Weide

C. W. J. WEIDE, CHIEF SUPVR.
100 - 300 TECHNICAL

CWJY:jd

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January 30, 1947

300 AREA

January 19 through January 25
(For Technical Progress Letter No. 134)

Two slugs, which showed very clearly the macroscopic grain pattern of the metal, were selected from the production line just after the pickling operation for metallographic and x-ray study. One of these was unusual in that it showed a coarse structure on one side and a fine structure on the other.

The experimental canning of four-inch bonded slugs of "A" diameter has shown that satisfactory wetting of the can wall is achieved and that rejects due to warping are not excessive.

The canning of 42 Myrmalloy slugs (Request 3-2) has been withheld pending arrival of further information on the quality of this batch of metal.

Two slugs of Request 28 (iron) and one piece of Request 30 (beryllium) arrived during the week and are scheduled for canning next week.

The failure of a standard slug in the autoclave test on January 16 has been traced to the slug's having been struck in such a way that the jacket was penetrated and the compound layer shattered.

C. W. J. Wende

C. W. J. WENDE, CHIEF SUVR.
100 - 300 TECHNICAL

CWJ:jd

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January 30, 1947

200 AREAS

January 19 through January 25
(For Technical Progress Letter No. 134)

Canyon Buildings

Acid wash T-7-01-A/-1 picked up normal amounts of product and by-products except in 14-1 Tank where 14% of a standard run was obtained. This hold-up was apparently due to functional failure of the spray distributor which was replaced.

Measurements of pH in second cycle waste tanks X-110T, -111T, -112T, and -105T by a portable pH meter gave satisfactory values ranging from 6.0 to 7.7. A sample of supernate from X-105T (currently used) was found to contain 100 alpha c/r/ml, 1800 beta c/r/ml, and no gammas with the pH being 7.4. This product content is about one per cent of the total sent to X-105T, indicating that 99% has settled out in sludge.

Contaminated areas have been discovered outside the base of both T and B stacks. Acid condensate from the stacks has either leaked from the drip pan (or drain line) or has overflowed the drip pan. The latter could have resulted from freezing of steam condensate in the sample trap of the drain line. The extent of damage to duct-work and concrete is being determined and corrective measures taken.

Concentration Buildings

Production Test 224-T-10 continues to furnish yield savings of the order of 0.25% at both T and B Plants.

A number of special samples are being taken to study orratic material balances. These include a sample from C-4 Tank to check the routine 17-4-P and one from E-1 Tank before reduction to check E-1-R (after reduction).

Isolation Building

Further data acquired by routine titration of eight P-1 solutions with sulfite solution have shown the present "standard" quantity of ammonium sulfite to be

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insufficient to reduce all oxidizing materials present. The Production Test to increase the quantity of ammonium sulfite has been typed for final approval signature.

A very thorough cleanout of Cell 4 equipment recovered only 25 grams of product in vessels used for peroxide cycles and 17 grams in the still and subsequent tanks. This recovery was only about 15% of the amount which material balance data indicated to be missing from Cell 4 since October. Since no large amounts of product have gone to the surp tank in this period and since no product was found in samples of mud and water taken from the cooling water ditch, it must be assumed that the disappearance is a paper loss. Attention is currently centered on the iron determination in P-1 solutions as a possible source of the difficulty.

J. B. Work

J. B. WORK, CHIEF SUPERVISOR
200 AREAS TECHNICAL

JBW:jd

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January 30, 1947

CHEMICAL DEVELOPMENT

January 19 through January 25
(For Technical Progress Letter No. 134)

Redox Process

Design activities have been concentrated on the completion of the details of construction and assembly of the columns for the demonstration apparatus. A Specifications Letter covering this last major design heading is to be issued shortly. A final list of special spring-wound recording instruments has been prepared for the receipt of bids and quotations by the Purchasing Department.

All concrete for curbing, wall foundations, and column footings has been poured and finished. The steelwork for the support of the transite walls for the solvent-handling rooms in the main canyon of the Semi-Works Building is 95% complete. The new locker room and decontamination room have been completed and in service. The shower room construction is approximately 90% completed and is expected to be finished during the week of January 27.

The Maintenance and Instrument Departments have been overhauling all operating gallery scale tank and control panel equipment for Cells D, D, E, and F. Overhauling of the corresponding cell process equipment is to be started during the coming week.

The acid flush of Cells A and B equipment, after picking up a total of 109 micrograms of product, was neutralized and sent to the 300 Area pond. Dilution to a product concentration of less than 0.1 microgram/liter was accomplished by adding water to the sewer line while jetting to the pond. A follow-up flush of all Cell A and B equipment with water picked up 55 micrograms of product. This was diluted and disposed of in the same manner.

A special hazards meeting was held with Maintenance Department personnel, in which Special Work Permit routine was carefully outlined. A series of meetings was held with Dr. Patnode and Schenectady visitors, Drs. Marshall, Marsden, and Rochow, during which extensive discussions of the Chelato and Redox processes were carried out.

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Approximately 100 "Class B" operators in the 200 Areas were interviewed during the past week, in line with the plan to transfer 12 to 18 to the Technical Department gradually during the next 6 to 12 months. A list of choices has been submitted to the "S" Department.

R. H. Beaton

R. H. BEATON, CHIEF SUPVR.
CHEMICAL DEVELOPMENT

RHB:jd

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January 30, 1947

LABORATORIES

January 19 through January 25
(For Technical Progress Letter No. 134)

Work Volume Statistics

The source and volume statistics for samples on which analyses were completed may be summarized as follows:

	<u>Samples</u>	<u>Determinations</u>
Routine Control, 200 Areas	321	514
Routine Control, 300 Area	324	1520
Water Control, 100 - 700 Areas	2310	4251
Process Reagents, 200 Areas	111	202
Essential Materials	33	217
Special Samples	148	394
	<u>3247</u>	<u>7098</u>

200 Area Process Control

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

<u>Laboratory</u>	<u>Geometry %</u>	<u>No. of Tests</u>
Isolation Building	50.49	10

Standard disc calibrations in the B Plant Laboratory have continued but the results are not available for this report.

Continued evaluation of the standard iron solution as a check on the plutonium assay procedure in the Isolation Building laboratory produced the following results:

- (1) The average value of thirty-eight titrations was 10.86 g/l of Fe, or 0.93% higher than the assigned value of 10.26 g/l of Fe.

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- (2) Of the thirty-eight titrations, fifteen results were within $\pm 1\%$, fourteen within $\pm 2\%$, and nine were outside of $\pm 2\%$.

The following tabulation indicates the precision values on routine analyses of the starting solution in the Canyon Buildings (sample 8-1-MR), the starting solution in the Isolation Building (sample P-1), and the final solution in the Isolation Building (sample AT):

<u>Sample</u>	<u>Last Period ($\pm\%$)</u>	<u>Present Period ($\pm\%$)</u>
8-1-MR	1.28	1.27
P-1	1.36	1.33
AT	1.12	1.12

Redox Control Studies

Work has continued on evaluating promising leads for the analysis of uranium in high and low concentrations, and on ammonium nitrate and acidity measurement techniques in Redox process solutions. No pertinent information is yet available.

R. E. Curtis
R. E. CURTIS, CHIEF SUPVR.
LABORATORIES

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January 30, 1947

STATISTICAL STUDIES

January 19 through January 25
(For Technical Progress Letter No. 134)

Test File Performance

It is generally agreed now that the day-to-day differences noted in Test File results are due to rod calibration. Within any given day the shifts in rod position are small, but the differences in rod position on different days may be relatively large depending upon differences in barometer readings. Three methods of attack have supported this conclusion: (1) A significant correlation was obtained between rod position and the daily di of bare standards vs. canned standards; (2) an actual plotting of daily results vs. rod setting showed a definite relationship; and (3) independent tests run by the Physics Section of 100 Area Technical indicated that the rod position could cause the day-to-day differences noted.

Two methods for obtaining an improved rod calibration have been undertaken: (1) The Physics Section has prepared a chart corrected to conform with the results of their preliminary test data, and (2) a chart corrected to conform with the results of the correlation between di of bare standards and rod position also has been prepared. These two charts are now being applied to previous test data to determine whether they eliminate day-to-day differences.

Blood Count Data

A series of chi-square tests have been applied to three different types of blood cells. From these tests it appears possible to set up limits within which the ratio of these different types of cells should be expected to fall in normal blood samples.

Chemical Development Division

Additional correlations and curve fitting applied to data submitted by the Chemical Development Division are nearing completion. Very high correlation coefficients are being obtained.

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Village Heating Problem

Charts have been prepared for the Electrical Department to show the variations in power demand that could be expected from two different proposed plans for heating conventional types of Village houses electrically. Further work on this problem is underway.

River Water Sampling

Seasonal trends in river water composition are apparent, and correlations are being made to measure the extent of this influence on analytical results.

B. F. Butler / S.D.

B. F. BUTLER, SR. SUPVR.
STATISTICAL STUDIES

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