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MOUND LABORATORY

Operated By

MONSANTO CHEMICAL COMPANY

MIAMISBURG, OHIO

APR 16 1966

OSTI

M. M. Haring
Laboratory Director

ELECTRONICS ACCOMPLISHMENT REPORT

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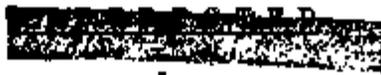
Steven Keyser (OSTI)
Authorizing Official

Date: 7-1-79

Date: August 31, 1949

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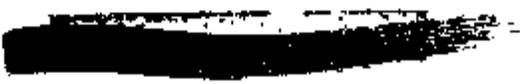
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ELECTRONICS SECTION

J. W. Heyd and F. E. Ohmart

ABSTRACTGroup 10STATUS OF CONSTRUCTION

	<u>Job Status</u>	<u>Per Cent</u>
6	Thyratron Heater Controls (Scioto Laboratory)	100
3	Two-input B-wall Mixers (Scioto Laboratory)	98
4	Nuclear Instrument and Chemical Corporation Model 161-G Scalers Modified for Use with Two-input B-wall Mixers (Scioto Laboratory)	100
10	Switch Boxes (Scioto Laboratory)	50
	Cables for "Y" Section Installation (Scioto Laboratory)	100
	Dial Plates, EO-437 (Group 1)	100
2	Pulse Generators (Scioto Laboratory)	90
1	Underwater Electrometer (Scioto Laboratory)	10
1	Regulation Checker (Scioto Laboratory)	Started
6	Pulse Generators for Health Instrument Section (EO-508)	Started

The Thyratron heater controls have been completed and tested.

The two-input B-wall mixers have been calibrated and tested with their respective Nuclear Instrument and Chemical Corporation Model 161-G scalars with one Model 161-G for use as a spare.

The pulse generator design has been changed to incorporate another range in the output voltage indicator.

The scaler-multiplier (SM-1) has been modified to eliminate spurious counts when the stop-count mechanism operated.

Group 11

The modified Beckman spectrophotometer was drifting when measuring low light intensities, the amount and speed of the drift being independent of the wave length. The dark current was quite stable. The trouble was cleared up after changing the phototube twice.

A list of the required type of pH electrodes with suggested stock levels was submitted to the "E" Building stockroom. This will assure that adequate stock is on hand for replacements.

The flow meters in the "WD" Building have been giving some erroneous readings. Considerable sand has been found in some of the pumps, and it is felt that such foreign material is causing the flow meters to indicate improperly. This is being checked.

The level alarm systems in the "WD" Building have not been used for some time and many of the electrodes were shorted and had to be repaired before the systems could be placed in operation.

The Standard Electric Time battery control panel has been installed between E-106 and E-107 and is now in use.

Installation of the Model PC-1 proportional counter was completed and checked. Plateaus agree quite closely to claims made by the manufacturer. Some troubles have occurred but nothing unusual.

A Westinghouse engineer has been here on four occasions in an effort to get in service a 5 kw. R.F. generator belonging to Group 34. This generator has not functioned properly since it was installed, but

to date, the Westinghouse engineering department has been unable to correct the difficulty.

Group 12

The Operations gamma counters in T-267 and T-270 which were calibrated against the low geometry alpha counters have been giving very satisfactory results.

A bleeder resistor (5,500 ohms, 10 watts) was replaced in the Speedomax Type A recorder used with the densitometer in T-233.

The cables connecting a temperature recorder to a remote control unit for Group 33 have been completed.

The 10 ampere circuit breaker on the Standard Time panel in T-80 has been thrown several times. This overload cuts all 6 volt D.C. to the Operations Area. The cause for the overload is under investigation.

Routine maintenance was continued on all automatic potential controls and gamma counters.

Group 14

The counting load this period totaled 7639 counts.

DETAILED REPORT

Group 10 - W. B. Adams, M. D. Birkhold, H. L. Cook, Jr.*, A. D. Flaugher, J. L. Gregg, Jr.**, C. E. Hites***, M. B. Lambert****, G. A. Preston, and D. Santi

* Vacation August 12-15, 1949.

** On loan to Seiko Laboratory. Vacation August 1-15, 1949.

*** Vacation August 22 - September 6, 1949.

**** Vacation August 29 - September 13, 1949.

	<u>Job Status</u>	<u>Per Cent</u>
6	Thyratron Heater Controls (Scioto Laboratory)	100
3	Two-Input B-wall Mixers (Scioto Laboratory)	98
4	Nuclear Instrument and Chemical Corporation Model 161-G Sealers Modified for Use with Two-Input B-wall Mixers (Scioto Laboratory)	100
10	Switch Boxes (Scioto Laboratory)	50
	Dial Plates, EO-437 (Group 1)	100
	Cables for "Y" Section Installation (Scioto Laboratory)	100
2	Pulse Generators (Scioto Laboratory)	90
1	Underwater Electrometer (Scioto Laboratory)	10
1	Regulation Checker (Scioto Laboratory)	Started
6	Pulse Generators for Health Instrument Section (EO-508)	Started

The six Thyratron heater controls have been completed, given operational and shakedown tests and are ready to be sent to Scioto Laboratory.

The three two-input B-wall mixers have been calibrated and given a shakedown test with their respective Model 161-G scalars. These scalars were sent from Scioto Laboratory for modification and tests. One other Model 161-G was modified and tested for use as a spare. The necessary brackets for installing the B-wall mixers and scalars in cabinets as a single unit are being awaited from the Machine Shop where they are on order.

It was noticed in the calibration of the two-input B-wall mixers that the high voltage could not be accurately calibrated because the 22 megohm plate load resistor of the 6AG5 regulator tube was too large and

[REDACTED]

the 6AG5 tubes used in the circuits had low G_m . By changing the 22 megohm resistor to a 1.5 megohm and using a 6AG5 tube with a G_m of approximately 5000, it was easier to calibrate the high voltage, and the high-voltage-adjust control was smoother in operation.

In the production of pulse generators, it was found that the B- potential varied considerably due to variation of component values in the voltage network and variation of the regulation voltage of VT-2 (OA2). This could not be tolerated as it affected the calibration of the pulse amplitude indicator. Each instrument required a different meter calibration.

To remedy this situation, a potentiometer was added in the divider network so that any of the above mentioned variations can be compensated for and the B- potential can be set to a predetermined value.

The front panel output voltage indicator was also changed. This scale now reads from 0.5 mv. to 6 mv. instead of 0.5 mv. to 5 mv. This provides overlap on all ranges.

These modifications necessitate a revised calibration procedure which has been written and submitted for approval.

Trouble developed in the scaler multiplier (SM-1) in that spurious counts were recorded when the automatic stop-count mechanism operated. By properly modifying the equipment, no spurious counts are recorded for an input sensitivity of 0.7 mv. which is somewhat greater than the operating sensitivity.

The suggested modifications are as follows:

1. Shield the Time-It microswitch of L-100 located on the Model 162 chassis.
- [REDACTED]

2. As an added precaution, shield the coil of L-100.
3. Place a 0.01 mfd. capacitor in series with a 100 ohm, 1/2 watt resistor across the contacts of the Time-It microswitch of L-100. This should be done directly at the switch using short leads.
4. Place a 0.1 mfd. capacitor between ground and the B+ side of the 91 kilohm resistor which is in series with the coil of L-100.
5. The armature of L-100 opens two microswitches; one stops the Time-It, the other controls the automatic stop-count switch. The spring arms of the microswitches should be bent so that when L-100 is energized, the automatic stop-count microswitch is opened before the Time-It microswitch so that the counter will not be operating when large transients resulting from the Time-It circuit being broken appear on the line.

Group 11 - L. B. Gnagey, E. H. Daggett, K. J. Gregersen, and F. M. Teetzl*

* Returned from Scioto Laboratory August 29, 1949.

E. H. Daggett - "R" Building

The modified Beckman spectrophotometer was drifting when measuring low light intensities. The amount and speed of the drift was independent of the wave length and was not apparent when measuring intensities above about 60 per cent transmission. The dark current was quite stable. The phototube and electrometer tubes were replaced, all circuit components were carefully checked, and the electronic unit was operated with the optical system of another Beckman instrument. None of these changes appreciably corrected the situation. A second phototube was tried and the trouble ceased. In addition to being quite stable, this tube is much more sensitive than the original, allowing the instrument

[REDACTED]

to be used at a narrower slit width. This was the first time that a trouble of this nature has been encountered with the phototube (Type 1P28) since the instrument was modified over three years ago.

A survey of all pH meters was made to determine a satisfactory stock level of the various required types of electrodes. This list, with suggested maximum and minimum stock levels, was given to the "E" Building stockroom personnel so that sufficient electrodes will be on hand for replacement.

The distribution panel in the battery room (R-107) has been installed by the electricians and is available for use. A room by room check will be made to assure that the panel and the outlets are properly wired.

There is no progress to report concerning the B-wall tube job.

A pulse generator which had a known, variable separation between pulses would be a very useful tool in rapidly determining the resolving time of a scaling instrument. The design of such a generator is being undertaken by Group 11. At the present, such design is still in the "thinking" stage.

Group 6 has requested that some thought be given to a B-wall rate meter whose response is expressed by $1/\log n$ where n is the number of neutrons counted. Such an instrument may be needed for some special future counting.

"WD" Building

The influent flow meter on Clarifloculator A was giving an erratic reading on the chart. The normal discharge rate of 40 gallons

[REDACTED]

per minute was increased to 100 gpm. to see if the increased flow would clear out the diaphragm orifice. This increased flow apparently cleared up the trouble since the following week's record showed a smooth line on the chart.

In a discussion with personnel of Group 19, it was brought out that the readings of the influent flow meters do not agree with the actual amount of liquid processed as determined by the amount of effluent in the tanks at the end of a day. A close check is to be made by Group 19 to see just what discrepancies occur. It is felt that the flow meter equipment may contain a considerable amount of sand since quite a bit of sand has been found in pumps and other apparatus. Another difficulty may be that the flow meters are working near the lower limit of their range and are none too accurate at this point. It has been noted that increasing the flow for a short period in the mornings seems to better the situation, and it is felt that such an increased flow would flush away any material such as sand or lint which might tend to collect on the upstream side of the orifice plate.

The pH recorder on Clariflocculator A was erratic due to a plugged potassium chloride reservoir. This was cleared and a few crystals of potassium chloride were also added to the solution to keep it saturated. Similar erratic readings on Clariflocculator B cleared up before the source of trouble could be located.

The level alarm systems have not been used for some time and upon being returned to service, considerable difficulty was encountered. Contacts on two relays were welded together shorting the A.C. line feeding

[REDACTED]

the equipment. The high level electrodes in Tanks A, C, and D were shorted, giving false readings. The electrodes were decontaminated and reinsulated by countersinking the polystyrene electrode holder to obtain a better seal.

It was determined that the welded relay contacts may have resulted from throwing the "Day-Night" switch while a "High Level" indicator lamp was on. It was recommended that under such conditions, the A.C. line switch be turned off prior to throwing the "Day-Night" switch.

K. J. Gregersen

The DuMont Type 248A oscilloscope belonging to the Electronics Section has not been functioning satisfactorily, due primarily to improper focussing and nonlinear "X" gain. All tubes were checked, and eight which were bad or doubtful were replaced. Many resistors were found whose values had changed considerably. For example, several 820 kilohm resistors had changed to 20 megohms or more. These were IRC resistors. All defective ones were replaced with Allen Bradleys. This is a common occurrence with IRC resistors and the Electronics Section does not use carbon resistors of that manufacturer.

The Standard Electric Time battery charging panel was installed between Rooms E-106 and E-107 and is now being used. A suitable trickle charger for the spare two-volt cell was incorporated on the six-volt battery charger in E-106. The battery control board and trickle charger which had been in use were dismantled.

L. B. Gnagay, K. J. Gregersen, M. L. Curtis (Group 13)

The Model PC-1 proportional counter (commonly referred to as the Bradley counter) was installed, and considerable counting checks have been

made preliminary to actual sample counting. Plateaus taken agree quite closely to those claimed by the manufacturer, and it seems evident that this instrument will be a very useful tool in the analysis of low activity beta samples. A more complete report, showing actual plateaus, will be included in the next Quarterly Report.

Some troubles have occurred with the Bradley, but none that are not common to any scaling instrument. The high voltage transformer had corona discharges in the winding causing apparent high background. While the transformer was being replaced, the 2X2 high voltage rectifier was replaced by a 1B3. A leaky glasslike high voltage filter condenser and a 6SN7 which would not scale were changed. There is also some difficulty in the output circuit which has not been located. All components seem to be in order, but there is considerably less voltage across the register than is indicated in the instruction book. This low voltage causes the register occasionally to miss a count.

Groups 11 and 12

The Westinghouse 5 kw. R.F. generator which was purchased by Group 34 has not operated properly since it was installed. One of the rectifier tubes was defective, and the grid coil coupling to the tank circuit burned out after a few minutes operation. A replacement tube was obtained and the coil which was wound to replace the original heated up to the point of smoking. Voltages and current checks were made but nothing was found which indicated any expected trouble. It was the opinion of this section that parasitic oscillations were causing the excess plate current readings under no load.

At the request of Group 34, a Westinghouse engineer came out to check the generator. He installed a new grid coil and parasitic suppressing resistors, but the no load plate current was still excessive. The engineer has been here on four occasions but the generator is still not functioning properly. We are now awaiting a visit from a second Westinghouse engineer.

Group 12 - W. L. Mead, W. A. Dean*, E. C. Hoelzle**, and T. L. Zinn***

* Vacation August 26 - September 9, 1949.

** Vacation August 15 - August 26, 1949.

*** Vacation August 1 - August 10, 1949.

E. C. Hoelzle

The Operations gamma counters in T-267 and T-270, which were calibrated last month, have been cross checked against the low geometry alpha counters. Results of such cross checks agreed quite closely with those reported in the Electronics Accomplishment Report, MLM-340, July 31, 1949.

T. L. Zinn, W. L. Mead, and E. H. Daggett (Group 11)

The failure of the densitometer in T-323 was traced to an open bleeder resistor in the power supply for the 24-A control tubes of the Speedomax Type A recorder. R-12, a 5,500 ohm, 10 watt resistor, was replaced with a 25 watt dividohm resistor adjusted to 5,500 ohms. This unit is important to the Operations Groups and "down time" was held to a minimum.

W. L. Mead

Laboratory Equipment Order No. 435 has been completed. This work involved the wiring of a Speedomax Type G recorder and temperature

controller to a remote control panel. The remote control (Drawing No. ED-364) is necessary due to the physical location of the recorder. The recorder and panel will be installed in T-270, line No. 4.

T. L. Zinn

The 10 ampere instantaneous circuit breaker has been found thrown on the 6 volt D.C. distribution panel in T-80. The circuit breakers between the instruments using the 6 volts and the panel were found to be rated at 15 amperes. The cause and location of the overload is being investigated. The 15 ampere breakers will probably be replaced with some of lower rating.

W. A. Dean

Routine maintenance was continued on the automatic potential controls and the gamma counters in the Operations Area. Nothing unusual occurred during this period.

Group 14 - A. C. Brennan, D. M. Barkalow, M. A. Glaze, J. F. Hunt, E. L. Hysco, and G. L. Wright

The counting load this period was as follows:

<u>Instrument</u>	<u>No. of Chemist's Samples</u>	<u>Counts on Chemist's Samples</u>	<u>No. of Standard Counts</u>	<u>No. of Background Counts</u>	<u>Total Counts</u>
Logac-S (3)	1839	1868	278	279	2425
Simpsons (3)			214	15	229
Nucleometer (1)	140	479	160	69	708
Bradley (1)			424	87	511
Beta (2)	475	1694	191	268	2153
Alpha Monitor (1)	44	44			44
Parallel Plate Alpha (3)	<u>596</u>	<u>1036</u>	<u>467</u>	<u>66</u>	<u>1569</u>
Totals	3094	5121	1734	784	7639