E. I. du Pont de Nemours & Co.

Explosives Department

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By Authority of

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June 22, 1955.

This document consists of 3 pages.
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100 AREA WEEKLY REPORT - JUNE 22, 1955.

Assembly Area

Inspection of finished quatrefoil weldments at Alcoa's New Kensington, Pa., plant has been discontinued by the M&E Section of the Engineering Department. The complete inspection is now the responsibility of Alcoa, with a follow-up by the Quality Control Group at SRP. Actual change-over of this inspection was started some months ago, with the M&E Group remaining until recently as a planning and scheduling group.

Housing tube extrusions were the subject of discussions at Wilmington with a representative of the Harvey Machine Company. Recent shipments of spiral ribbed tubes are being evaluated at SRL. The spiral offset or "barber pole" effect has been reduced to approximately .015" but control of rib height continues to be a problem. Current production will produce a loose assembly. On straight rib tubes the rib height appears to be the major problem. However, a thorough examination of these tubes has not been completed and factual data is not yet available.

Harvey have not been successful in their efforts to produce the quatrefoil and are now attempting a change in basic method. In their attempts to extrude to size they have not been able to control wall thickness which in turn has had an adverse effect on other features of the tube. They will now introduce a drawing operation to produce final dimension.

Charge and Discharge Machines

Performance of these machines continues good in handling fuel tubes. As many as 135 per shift are being handled. The average performance for 1955 continues to exceed the goal set at the start of the year with 1954 performance as a base.

The cable handling conveyor in the X direction continues to be a problem and requires two observers at all times when the machines are in use. Three methods of correction have been tested, all with success. However, they do not offer equal safety and installation costs vary from \$2,000 to \$10,000 per machine. Final studies have been made and a recommendation by SRP is expected immediately.

DOES NOT CONTAIN the X direction was reduced during installation from 220 ft. per minute to approximately 170 ft. per minute. This was influenced primarily by the difficulties then being experienced with the cable slave.

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Recent test work in two areas indicates that corrections have been made to date which permit operation at speeds as high as 240 ft./min. with normal functioning of all controls. As a result, a recommendation will be made by SRP to retrim all units for the designed operating speed of 220 ft./min.

The real bottle-neck to increased speed of C&D machine performance is now in the discharge conveyor. The present operating cycle time on this conveyor was dictated by (1) the ability of the boom to withstand acceleration stresses and, (2) the ability of the control mechanism to land the machine within tolerable working limits at each end of its travel.

A study is just beginning at SRP to evaluate the present control principle. A basic change may be necessary to permit increased operating speeds.

Reactor Control

A new Fielden Bulb has been tested as a replacement for the trim panel bulbs which have proven unreliable due to variable ageing performance. Of 2000 new bulbs received, there were 9 with mechanical faults. Of 1178 placed in the trim panel at Building 105-C, 6 were removed due to a procedural error, 2 developed shorts within the bulb base, but no bulbs showed any sign of ageing drift in 29 days of operation.

To raise the shoulder of noisy monitor pins with respect to the top of the permanent tube, tests of soft rubber split gaskets will be made at the plant. The gasket material recommended by ESD was a 60 durometer rubber 1/16" thick, having a dovetail joint rather than a scarfed joint to join the split in the gasket. With the flange loading available, this material can be squeezed to 1/32" thick.

Reactor Complex

The leaking heat exchanger removed from 105-R was the first one fabricated. Difficulty was experienced in obtaining tight joints, and rerolling was required to obtain tight joints. Gaging after the unit was made tight revealed that about 150 tubes were overrolled. In addition to inexperience with the rolling equipment, the fact that one inner tube sheet was bowed may have contributed to the difficulty in obtaining tight joints. These conditions experienced on the first heat exchanger were not experienced on any of the succeeding units. The Works Technical and Reactor Departments are preparing procedures covering the inspection of all parts of the heat exchanger while it is being disassembled for repairs.

Discussions were held on larger moderator pumps with the Byron-Jackson Company to be sure that they were not offering a larger pump than was requested in the specifications. They will review their design and quotations. Their chief designer made the statement, however, that there would be noise and cavitation on the pump offered at the specified design point, and in a smaller pump this condition would be worse. Whether or not the noise and cavitation would be detrimental was a question that could not be answered, because there is little experience along these lines.

The second drop test of a loaded Q-foil was run dropping the foil through air. The foil had a flow guide type end fitting. The monitor pin was not moved, but the end fitting was shattered and the end of the Q-foil was enlarged such that its removal through the semi-permanent sleeve was difficult. A final test will be run dropping a Q-foil having a 3/4" thick aluminum plate welded to the bottom of the bottom fitting. This will impose the maximum force on the monitor pin.

Purification

Performance of the L Area distillation columns as tritium attenuators was reported at the Purification Sub-Committee Meeting on June 15. Although equilibrium conditions had not yet been established, an attenuation of 11 was being realized, compared with the forecast of 8. Since the overheads from the L columns has about four times the light water concentration of the normal column overheads, the amount of tritium sent to the 400 Area would be reduced about 40-fold. It appears practicable to operate the attenuator to produce a bottoms concentration of about 98%, suitable for introducing into the B column reboiler of areas operating in the normal manner.

Several of the 100 Areas have been experiencing trouble from collection of moderator in the 6" blanket gas line just ahead of the blowers. This is probably mostly condensation between the separator and the blower, with some entrainment from the separator. The line slopes back so as to drain to the separator, but the gas velocity and the presence of two valves in the horizontal run apparently prevent adequate backflow. Frequent manual draining is required to avoid blower shutdown from low suction pressure. Heating the line with infra-red lamps, as was done in L Area many months ago, improves the situation considerably. A 25% reduction of blanket gas flow is of only slight benefit. Study of the piping arrangement by Works Technical shows that with only slight modification in L, K and C the liquid can be drained continuously to the coolant return tank. The R and P arrangement is also being investigated, and can probably be similarly modified to drain to the surge tank.

Disassembly

An attempted functional test of the C Area scrap cask recently revealed certain deficiencies. The design was reviewed at the plant with representatives of the Design Division, the Reactor Department, and the Transportation Department. Changes agreed upon include (1) reinforcing the bolts at the bottom corners to permit dumping the cask; (2) bevelling the lid to help guide it into position during replacement at the burial ground. Also, it was found that the necessary yokes for the burial ground had not been fabricated. Design agreed to issue a DM for this work.

In connection with cask wall thickness for LM shipment, the Health Physics Department at SRP has made some measurements of surface radiation with present casks. For casks of the P-3 shipment, cooled about six months, the radiation was about 0.1 mr/hr. but highly variable and erratic and in many cases indistinguishable from background. For certain special shipments of K-2 slugs, aged only 10 days, the readings of 2 mr/hr. (and in one case 6 mr/hr.) are of more significance and are in agreement with calculation if a buildup factor of three is used. This improves our confidence in calculations of the required thickness for LM casks, where freight cost is a consideration. However, actual measurements with material cooled 100 days, through a thickness of lead that will give values of 10 to 1000 mr/hr., seem desirable. SRL is investigating the possibility of using a 53 cask for this purpose.

HWB/blt

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