

OPERATION OF THE NEW PLANT

Experimental charges were run in the new plant in February, 1951 with a production of 11,040#. As soon as yield and quality performance were found to be satisfactory, charges were started as rapidly as possible to obtain maximum production. March, the first full month of production, showed an attainment of 94% of rated capacity. In April, the rated capacity of 140,000# was reached. Curtailment of requirements has necessitated running this plant at a greatly reduced rate since that time.

In general, the equipment has performed as designed without undue difficulty. The principal exceptions have been the Powell Belloseal valves. The failure of the Belloseal valves has resulted in considerable contamination within the cell rooms. However, this contamination was so contained and removed that no known exposure to personnel has occurred. Where it has been necessary for men to work in protective clothing in contaminated areas, urine samples have been taken before and after the job. No absorption of beta naphthylamine has been noted in any of these cases. Air samples are being taken from the exhaust stack and from the operating floor. No abnormally high air samples have been obtained.

Routine urine samples of all personnel are taken once per week. Since the test used is not specific for beta naphthylamine, investigation of all high urine results showed exposure to medication or fumes from aromatic amines from other operations.

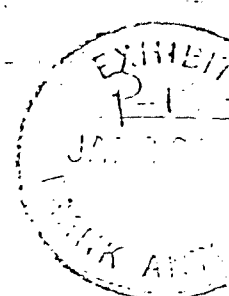
The plant has provided the anticipated protection of personnel. Yields have been somewhat better than expected. Should the demand for production increase, there seems to be no reason why a production rate equal to or better than rated production could not be maintained.

G. B. Otto


4/13/53
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CHRONOLOGICAL HISTORY

Manufacture of Beta Naphthylamine



1919



The manufacture of beta naphthylamine was started on the Chambers Works in the Low Pressure Autoclave House in 1919. Crude beta naphthylamine was cast in open pans and after it solidified, it was broken up with a pick and transferred by hand into barrels. From here it was sent to the Benzidine Distillation House where it was distilled and then again cast into open pans. This was in turn broken up and sent to the "Ceresan" Building where it was ground in an open mill and then the ground material transferred into open barrels. From the "Ceresan" Building, it was shipped to the Sulfonating House where it was shoveled into the sulfonators.

During 1919-1922, beta naphthylamine was also ground at G & M.

None of the above operations were provided with ventilation.

1932

In 1932, the occurrence of papilloma and its possible connection with the manufacture of beta naphthylamine was first recognized. At that time, a request was made for the distillation operation to be transferred to the Low Pressure Autoclave House so that the manufacture could be localized in one building. (For a period of one year, due to limited manufacturing capacity, beta naphthylamine was manufactured in the "Fonsol" Area.)

As noted above, the first precautions in handling beta were taken in 1932, as the recently discovered papilloma pointed to this compound as a suspect.

1933

Distillation equipment was installed in the Low Pressure Autoclave House during the year 1933. In the meantime, the Benzidine Distillation House continued to handle this end of beta production.

During 1933, a large number of bladder tumor cases were found and, as a result, changes were proposed in the operation which would minimize the possibilities of skin contact or ingestion of the material. Specific changes which were made were as follows:

(a) Still, flaker and grinder were installed in the Low Pressure Autoclave House.

(b) The ventilating fan and dust collection system were installed on all beta handling equipment.

In addition to the improvements noted in A & B, plans were made for entirely enclosing the flaker and grinder.

1934

During this year, the distillation and flaking of beta in the Low Pressure Autoclave House were started and an enclosed ventilated system was provided from the still to the barrel loading facilities. Also during this year, the Sulfonating House installed an experimental ventilated, suction, barrel unloading system which sucked the material from the barrels.

The casting and grinding of beta naphthylamine was discontinued entirely in 1934.

1935 All beta naphthylamine handling in the Low Pressure Autoclave House was now being handled in a closed and ventilated system.

1936 The experimental, suction, barrel unloading system on one sulfonator in the Sulfonating House (Draco System) was extended to all the other remaining sulfonators. With this additional installation in the Sulfonating House, it was thought at that time that all gross exposure possibilities had been corrected in both the Low Pressure Autoclave and Sulfonating Buildings.

1937 It had been found that the Draco System as installed required a certain amount of exposure to rod the beta to keep it moving through the system. In order to eliminate this exposure, small agitators were put in the Draco Units.

1938 Air sampling on a well organized basis was instituted in both the Low Pressure Autoclave and Sulfonating operations. In addition, the wearing of respirators was instituted in the beta section of the Low Pressure Autoclave House.

1939 No significant changes occurred during this year.

1940 No significant changes occurred in either operations during this year, but the idea of using molten beta naphthylamine was conceived.

1941

Considerable laboratory work was done on handling beta in the molten form and two charges were made on the plant. Both of these charges met expectations and a project request was prepared for handling beta in the molten form. It was necessary to suspend action on this request for the duration of the war.

1942

1943

1944

No significant changes occurred during this period.

1945

1946

1947

A large sulfonator was proposed for the Low Pressure Autoclave House. This would take the place of the small sulfonators in the Sulfonating House and would eliminate all beta exposure in this building.

A quantity of old equipment was dismantled in the Sulfonating House during this year.

1948

The large sulfonator was installed and started up in the Low Pressure Autoclave House and eliminated all beta exposure in the Sulfonating House for the first time.

An automatic packaging machine was installed and a flaker knife changer was provided to eliminate the handling of the knife while contaminated.

All possible leakage spots in autoclaves, separators and stills were provided with a separate ventilation system

which discharged into outside absorbers. (Water counter-current type)

A new beta naphthylamine manufacturing plant was proposed and design problems in conjunction with such a new plant were studied. In addition, a new flaker was being studied for installation in the Low Pressure Autoclave House.

1949

A sulfonator was installed in the Low Pressure Autoclave House in 1949 for the purpose of sulfonating still residues thus rendering them non-toxic. These residues were formerly taken out to the burning ground for disposal.

Work was started on the new Beta Naphthylamine Manufacturing Building during this year.

1951
~~1950~~

Work was continued on the new Beta Naphthylamine Manufacturing Plant and tentative start-up date of March 1 appeared feasible. Some of the outstanding health protection facilities to be incorporated in the new building are as follows:

- (1) Each piece of equipment handling beta naphthylamine is isolated in a cell of its own. The cells have stainless steel walls to facilitate cleaning and to reduce maintenance.
- (2) The Operating Section or Control Room is separated from the cells housing the equipment with the exception of

the flaker and the packaging machine, which is enclosed and ventilated. A slight positive air pressure will be kept on the control room and a slight negative pressure on the equipment cell rooms. Air discharged from the control and equipment rooms will pass through a 200' high stack before being dispersed into the atmosphere.

- (3) All waste liquors from the operations, and from drains, will first run to a storage tank and then to the ditches under controlled conditions.
- (4) All dust and air from the flaker and packaging units will pass through a combustion chamber on the first floor roof and the gases from this chamber will then pass out the 200' stack.
- (5) The equipment is so constructed that in case of motor or agitator failure, these pieces of equipment can be pulled straight up through the roof of each cell.
- (6) Sampling of air is provided for in the operating section and at the stack discharge. These samples will be taken on a periodic basis and reports issued.
- (7) Each cell can be decontaminated with steam.