(14)

Memorandum V

Ref: Difficulties encountered in the gas production since August 1942

Resulting from the alterations of the production methods which have been effective since the first days of August, the gas generating units had to furnish very high volumes of gas. In compliance with the Boshlon program 32,200 cu. m. of crude water gas per hour should be furnished, but beginning with August mostly 37,000 to 42,000 m^3/hr. water gas must be produced i.e. an overload of 15-31%. Such high outputs were associated with many difficulties which, even if they did not affect the motor fuel production, put a heavy burden on the gas manufacturing equipment. Especially the purification effect with respect to dust and sulfur was considerably lowered and many more repai were necessary. The following difficulties were encountered:

1. Both-filter-system

The system is overburdened by a production of more than 32,000 m^3/hr. watergas. With the large char consumption it is not possible t extract the dust from the conveying nitrogen because the quantity of dust which is deposited inside the filter bags is larger than the quantity which can be withdrawn from the bags. Continuous repairs are therefore necessary. A crude wet-dedusting-device serves for emergenc purposes but the waste gases from the bunkers are by no means in compliance with our demands. It happens that due to the choked apparatus the char is carried away by the conveying nitrogen. The char contains now a high percentage of dust (sometimes up to 85%). The filter syste is not supposed to extract such high amounts of dust. An improvement is possible by installing larger cyclones or multiclones.

2. Dust extraction from the gases

The purification of the gases from dust is very unsatisfactory. Formerly the dust content of the gases after the disintegrators was 2-5 mg/m^3 gas and after the crude gas blowers 0-2 mg/m^3 gas, but for the present time 40 mg are found after the disintegrators and 25 mg after the crude gas blowers. Such a high dust content of the gases affects the engines. One of the three disintegrators is always in repair whereas the remaining two must be operated continuously. Sometimes it happened that 2 disintegrators were broken down and that a non-revolving disintegrator had to be employed for the dust removal. The dust is even carried into the Alkazid solution thus deteriorating its absorptiveness. It was experienced that due to the dust content the Alkazid solution was carried over from the stripping column. The waste water treating system is heavily overburdened and must be improved.

3. Gas cooling system

The water gas leaves installation 3 with a temperature of 45-60°C. The gas condensers have a very poor efficiency and lower the temperature of the gas by only 5-10°. In addition they are choked by the high dust content of the gas, lowering the operating periods from ½ to ¼ year. During the cleaning period only 1 condenser is available to cool the gas causing even higher gas temperatures than before. For that reason it is suggested to install a 3rd gas cooler so that each producer unit has its own condenser. The gas temperatures after crude gas blowers were as high as 50-60°C. The gas entered the iron ore desulphurization system at such high temperatures which almost paralyze

the removal of the H_2S. Above 60°C. the reaction took another course. The oxygen which is present in the gas in order to refresh the spent ore reacted with the sulfur with the formation of SO_2. The iron ore did not reduce but increased the sulfur content of the gas. Due to the SO_2-formation the iron ore became ineffective. The S-content of the purified gas was increased to 1 g/m³ and today is still 300-500 mg S per m³ water gas. The high sulfur content of the gas is supposed to deteriorate the catalyst of the following conversion unit. During the month of September the water-gas-pre-desulphurization unit was put in operation and the warm gas entered cyanogen removal units with a temperature of 70°C. Due to the large volumes of water vapor which were condensed during the passage of the gas through the cyanogen absorption unit the efficiency of the removal was extremely low and unsatisfactory. The cyanogen is now carried into the Alkazid plant, thus spoiling the Alkazid-solution. The gas is now cooled to 45-55°C. during its passage through the cyanogen extraction unit and enters the Alkazid scrubber at almost the same temperature. Since the Alkazid solution leaves the scrubber with a temperature of 45-50°C., the scrubbing effect is very poor due to the high vapor pressure of the H_2S at elevated temperature. In order to improve the situation the installation of a final gas condenser and a guaranteed volume of suitable cooling water is necessary in order to secure a gas temperature of 30°C. before the Alkazid scrub