

The History of KNZ (Royal Dutch Saltworks) 1918 - 1940

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Introduction

Since September 12, 1919 the Netherlands have been producing salt from its own soil at Boekelo (province of Overijssel). It originated from a series of salt strata which were brownish-red colored here and there, had a total thickness of well over 68 meters and were situated at a depth of 324 to 400m.

The permission to extract the salt was given, when in the Government Gazette Nr. 421 of June 18, 1918 it was published the Act on the exploitation of rock salt near Buurse. This act was granting to the State the ownership of the salt mine near Buurse, but at the same time the Minister of Agriculture, Trade and Industry was authorized by this act to assign the right of extraction to the Public Limited Company of "Royal Dutch Saltworks", then still being to be established. To meet objections raised, it was prescribed that for the draining of water polluting and harmful substances and constituents (waste water) a pipeline was to be laid, which would discharge into the IJssel river, while the polluted water to be drained through it might be led away into the IJssel river only in such condition, that no harm could be caused to public health, fish farming or any other interest. The above was a very early example of environmental legislation.

Because of the fact that laying the pipeline involved many problems, KNZ was by ministerial order of January 17, 1919 granted exemption from this obligation for the duration of five years, on the condition that it would collect the waste water in watertight basins and that this water would at specific times by means of iron drums be transported by rail and then be discharged into the IJssel river, provided that the salty water pumped from the boreholes was, as long as it did still contain little salt, allowed to be discharged on the

spot, however on the understanding that this was on the own site and in sufficiently deep pits.

According to the above-mentioned agreement the State granted KNZ until December 31, 1978 the

exclusive right of exploitation of the salt strata. Without any payment of money, the State received 150 KNZ shares, each of them to the amount of one thousand guilders and entitling to a share in the profits, as had been stipulated in the articles of association of KNZ, being part of the agreement. Moreover, the State was as from January 1, 1934 given the right to terminate the above-mentioned agreement by acquisition of KNZ's shares.

The first production process

As the site for the plant to be erected, KNZ chose a piece of land situated outside the proper brine field, at 2 km east of the first well, on the railway line Boekelo - Neede near the so-called "Trainstop Saltworks".

The brine from the first well was pumped to iron tanks, which were arranged on an artificial mound of approx. 6 meters height. The latter mound is still visible now in the scenery. From the tanks a cast iron pipeline of 2,200 m length was then laid to the receiving reservoirs of the plant.

During drilling of the first well, two favorable conditions did occur:

- At a depth of 103 m a spring was struck while drilling, delivering some 800 liters of pure clear water per minute; due to its natural pressure this water came to the surface of itself and was thereupon led into the borehole in order to allow leaching of the salt.

- On the advice of Dr. G. Palzer, managing director of "Vereinigte Schweizerische Rheinsalinen", a then new operating method (the so-called pressure system) was applied. It implies, that instead of using a suction pump through which the salt solution obtained is pumped up in the central tube, now a pressure pump is used, which forces the fresh water coming up from the spring between the lining tubes of 40 and 26 cm diameter respectively, at a pressure of 8 atmospheres down into the second salt stratum. Should owing to crystallisation in the central tube this tube get clogged up, the water course is simply reversed. When leaching was started, it appeared that, as could be expected, the brine obtained was too weak to be processed and this solution was discharged into shallow pits on KNZ's own site. After completion of the second borehole and leaching was started there, the initially weak brine procured was used as feed water for the first borehole.

The refined salt is obtained by evaporating the brine once, or if necessary twice after dissolving it again, in six iron lower boiler pans of 184 m² surface each, which are at the top provided with a slanting wooden lid or roof. The salt that has deposited in the liquor in finely divided condition, is by means of long wooden spatulas shoveled from the pans and laid on the roof to drain dry. Scooping the fine salt is taking place continuously around the clock. Work is done in 3 shifts of eight hours. As soon as the salt on the pan lids has had sufficient time to drain and to dry somewhat, it is conveyed to the silos by means of an overhead railway.

Behind the silos, the packaging room is situated, where the salt is put into bags and weighed. Along this packaging room there is the loading platform over the full length of the plant, where the railway wagons carrying the salt, are rolling.

In each pan some 20 tons of salt are produced in 24 hours. When all five pans are being operated (one of the six pans is always out of operation for cleaning or repair), production of refined salt is 100 tons a day or 30,000 tons a year.

As according to report, total annual consumption of refined salt, i.e. fine table salt, in the Netherlands in

1919 was 80,000 tons (yearly consumption in the Netherlands, of coarse salt for salting purposes, for chemical plants etc. being 70,000 tons in the same year), KNZ has in order not to make the living of the existing saltmakers impossible, entered into an agreement with them to limit its production at home to some extent. Of the salt produced, KNZ has to pay excise duty.

Initial growth

The first managing director, Jacob Pieter Vis, was a man full of vigour and perseverance. Besides that he had the ability and the experience to manage a salt company. He had owned already a company in the Zaandam region, while together with A.A. Kolff he was managing a flourishing salt plant in Rotterdam - Kralingse Veer.

In his capacity as managing director he proved excellently able to contact such different people like his co-saltmakers, government officials and technologists from abroad. With the latter he maintained correspondence on the vacuum process and the processing of salt into chemical products.

The ambition of Vis was to establish a large salina that could provide the whole of the Netherlands with salt and in addition could supply the raw material to chemical companies.

Water will evaporate more rapidly at low pressure. At the refining of salt, during which a lot of water is to be evaporated, very much fuel can be saved if pressure above the brine could be reduced. This is realized in a so-called vacuum installation. The company of Kolff & Vis in Rotterdam had such an installation already. In 1920 Vis tried to introduce the vacuum process also with KNZ. His attempt failed owing to opposition of co-saltmakers in the Supervisory Board. As a matter of fact, it had been agreed upon in 1918, that the vacuum process would exclusively be applied by the Kolff & Vis company. However, where Vis did not succeed, his successor G. de Haas did in 1927.

The major advantage of a vacuum installation is that at lower pressure water will boil sooner, and consequently less fuel is required for the evaporation of the brine. Moreover, we should still

consider also, that the steam is originating from the steam engines, by means of which electricity is generated for the electro-chemical plant. Thus it will be understandable, that compared to an open pan the vacuum installation has a much better efficiency. In the latter only 500 kcal is required for a ton of salt, against 3,000 to 3,500 kcal in an open pan. And because of the fact that the salt is removed mechanically, the number of man-hours needed per ton of salt is six times less also.

However, in evaporating the brine an unpleasant phenomenon did occur: a hard layer formed a deposit on the heating bodies, mainly consisting of gypsum and obstructing the heat transfer. Around the turn of the century much investigation has been made into this, in which Dr. C.N. Vis, brother of KNZ's first managing director participated among others. Said C.N. Vis was as a chemist employed at Saline Schweizerhalle and collaborated with the company of Kolff & Vis. C.N. Vis succeeded in chemically purifying the brine in a satisfactory way. This made the brine fit for being processed in a vacuum installation. When KNZ started its vacuum installation, it could make use of techniques already developed for brine purification. Since at every drilling location the impurities do occur in a different proportion, the process in Boekelo had to be adapted to the circumstances time and again.

Cost price of the vacuum salt was so low, that KNZ was now in the position to make its way to the export markets. This opened up the possibility to expand sales, but at the same time it appeared to be a very useful weapon in the struggle for the market in the Netherlands. In 1937 the cost price of KNZ's salt was Nlg. 0.74 per 100 kg, whereas the traditional saltmakers' price was Nlg. 2.00 to 3.00 for a similar quantity. Another element to sweep the Dutch market was the introduction of packaged salt. In the twenties packaged proprietary brands were increasingly brought in the market, which were advertised throughout the country. As from 1928 packaged salt was offered under the brandname of Nezo and Jozo respectively. The latter salt which a minor amount of iodine had been added to in order to prevent struma, became a great commercial success.

The construction of the electrolysis unit

The first managing director, J.P. Vis, had already made plans for a chemical plant, in which chlorine, caustic soda, hydrochloric acid and soda ash would be produced. In 1927 his successor, Ir. G. de Haas, presented the first proposals to the Supervisory Board for an electrolysis unit having a capacity of 5 tons of caustic soda per twenty-four hours. The Supervisory Board was not enthusiastic all at once, but De Haas persevered. In August 1930 he took on Ir. J.G. Hoogland, one of the few technologists having gained experience with electro-chemistry as a student in Delft and at Electro-Chemical Industry in Roermond. The electrolysis unit started production in October 1930 as a diaphragm electrolysis of the Billiter type (designed in cooperation with Siemens & Halske) which was able to manufacture bleaching liquor, chlorine and caustic soda. At first the unit suffered from many production troubles and it was only in 1936 that KNZ ventured to enlarge production now by a mercury electrolysis unit. In 1937 the chemical plant eventually began to make a profit.

The Twente-Rijn canal/Relocation to Hengelo

Even before the 1930s dawned, a development started, which would have very favourable consequences for KNZ: the plans to dig the Twente-Rijn canal reached a definite stage. Ir. G. de Haas worked out for the Supervisory Board members, that freight charges would be reduced from Nlg. 4.30 to Nlg. 1.00, if the salt could be conveyed by ship. This is why he suggested to them to propose to the government to dig a branch of the canal to Boekelo (length 6 km, investment Nlg. 1,000,000). However, this proved to be too optimistic, since in the same meeting it was already thought aloud to move the plant to a location on the canal at Hengelo. On October 20, 1930 KNZ was granted the concession for an area of 4,745 ha situated on the future Twente-Rijn canal. Plans were developed now for the erection of a salt plant with a capacity of 300 tons a day, together with a chemical plant of someone and a half times the capacity of the Boekelo plant. The Hengelo plant would be fully equipped with new machinery in view of the change from 23 to 35 atm steam

pressure. The pansalt production was to remain in Boekelo, whereas in Hengelo there would be vacuum installations only.

In 1936 the new salt- and electro-chemical plant was put into operation. The plant had been financed from capital reserved and constructed by own staff. Official inauguration is on April 23, 1937 by the Minister of Transport and Communication. Moreover, on August 26, 1937 KNZ is favoured with a visit by the Queen, certainly being a token of appreciation for a successful enterprise. Due to the brine purification method developed the vacuum salt was very pure, which appeared to be a good sales argument. Scandinavian paper industry consumed large quantities of sea salt as its raw material for the production of chlorine. In this event

it could be explained, that contrary to sea salt, vacuum salt did not require purification. Upon careful calculations, in which the experience with the own electrolysis unit was used, the vacuum salt thus proved yet to be much more advantageous despite its higher price.

Financial results

In 1938 KNZ had meanwhile expanded such that Ir. G. de Haas proposed to the Supervisory Board to appoint two vice-managing directors, i.e. P. Tazelaar who had begun as an assistant to J.P. Vis and in whose financial capacities De Haas had fullest confidence, together with Ir. J.G. Hoogland for the electro-chemical branch of KNZ. In the mean time the plant's production had increased

Table: Profit distribution of KNZ, without cash bonuses, reservations, etc.

Year	Share capital subscribed	Expansion and renovation fund	Reserve fund	Undistributed profit balance	Annual depreciation incl. of depreciation on tools, materials, stock and sites	Dividend in %
1918	Nlg 1,500,000.-	Nlg --	Nlg --	Nlg --	Nlg --	--
1919	2,000,000.-	100,000.-	Nlg --	9,240.11	Nlg --	--
1920	2,000,000.-	350,000.-	32,568.32	26,362.19½	103,188.07½	10
1921	2,000,000.-	425,000.-	49,041.19	20,223.30	104,593.48	6
1922	2,000,000.-	500,000.-	83,620.64	25,947.62	105,698.94	10.5
1923	2,000,000.-	515,000.-	106,757.74	47,439.56	114,662.87	6
1924	2,000,000.-	535,000.-	142,664.15	13,177.43	125,962.71	11
1925	2,000,000.-	555,000.-	192,909.33	15,183.99	98,170.54	12.5
1926	2,000,000.-	575,000.-	245,693.02	17,375.30	116,998.46	12.5
1927	2,000,000.-	579,310.-	296,899.23	9,230.67	210,003.96	12
1928	2,000,000.-	585,000.-	345,927.60	7,417.25	150,371.99	11
1929	2,000,000.-	590,000.-	394,479.94	4,220.99	152,931.70	10.5
1930	2,000,000.-	600,000.-	400,000.-	26,333.93	194,679.00	11
1931	2,000,000.-	600,000.-	400,000.-	30,005.14	250,196.30	11
1932	2,000,000.-	700,000.-	400,000.-	26,465.58	278,619.05	11
1933	2,000,000.-	700,000.-	400,000.-	26,924.60	444,360.82	11
1934	2,000,000.-	700,000.-	400,000.-	25,196.79	594,087.93	11
1935	2,000,000.-	700,000.-	400,000.-	22,883.29	506,319.74	11
1936	2,000,000.-	700,000.-	400,000.-	24,674.58	452,504.16	11
1937	2,000,000.-	700,000.-	400,000.-	26,260.60	551,786.22	12
1938	2,000,000.-	800,000.-	400,000.-	29,574.09	630,766.32	16
1939	2,000,000.-	900,000.-	400,000.-	10,343.94	643,310.24	28
1940	2,000,000.-	900,000.-	400,000.-	14,518.44	633,718.43	30

from 30,000 tons in 1919 to 200,000 tons in 1939, this being well over domestic salt consumption that amounted to 174,000 tons. The chemical plant saw its production grow from 4,035 tons in 1932 to 24,104 tons in 1939.

Dividend distributed in the period 1930 to 1936 had amounted to 11%, rose to 12% in 1937 and 16% in 1938, while it was 28% in 1939 and even 30% in 1940 (see table by R. Roordink).

Export

Towards the end of the 1920s the export of vacuum salt made great strides. Germany, but Scandinavia where no salt was found, in particular was an attractive market. However, KNZ did yet meet with a number of strong competitors, i.e. big syndicates like the English Salt Union and the German Siedesalz- and Steinsalzsyndikat. Mid 1930 a meeting was held with the Siedesalzsyndikat, two items appearing on the agenda: KNZ would like to export 10,000 tons of salt to Germany at a reasonable price. No agreement was accomplished, which was not a wise attitude by the Siedesalzsynikat. KNZ had built up a reserve for the objective and began to sell salt on the German market at a very low price. But an agreement was achieved as yet in February 1931: KNZ was allowed to export 6,000 tons, while the German saltmakers abandoned any export to the Netherlands. However, when the National Socialists had come to power, export to Germany and Scandinavia caused problems. In July 1933 it became known, that all German mines and salinas were to unite in a syndicate. It was demanded from KNZ, that it would limit its export to Scandinavia. Early 1934 a trade treaty was negotiated. Salt had been included in it: KNZ was allowed to continue exporting 6,250 tons into Germany at a reduced duty and would limit its export to Scandinavia.

A struggle similar to that against the German syndicates had to be entered against the English Salt Union. The main issue of the struggle was also the profitable Scandinavian market. The struggle lasted much longer and only in 1936 there was achieved an agreement: The Salt Union committed itself to limiting the exports to the Netherlands to 2,500 tons.

Explanation of the success

In 1918 the company of KNZ was established at Boekelo, which showed a tremendous growth in the period until 1940. In the 1930s an electro-chemical plant was to be added. And in Hengelo a quite new business would even be founded on the Twente-Rijn canal just dug. And all this at a moment, when both our country and a large part of our industrial business went under in an ever deepening crisis. In 1937 KNZ is on the verge of an even still greater expansion.

From 1926 onwards a major interference with growth could be eliminated: By the introduction of the vacuum process it became possible to strongly lower production prices, while at the same time product innovation was started by introducing packaged consumption salt in the market. Moreover, reduced production cost made it possible selling salt in bulk to the industry. In contacts with large-scale industrial customers it was gained experience with approaching them in a professional way based on sharp cost accounting. Substantial experiences were acquired likewise with the electro-chemical plant, which were very important to the future.

The decisive factor was the management of the young KNZ. The first managing director J.P. Vis was a manager of vision, who if he was convinced of it in his own opinion, worked on it with great perseverance. His successor, Ir. G. de Haas was a manager who was capable of realizing technical matters, but apart from that also had a good understanding of commercial ones. Besides they both wished to create a progressive social management policy and good labour relations. As a result it grew a company culture which was characterized by short communication lines, knowledge of facts and one single goal: making KNZ a prosperous business.

Salt was a very traditional product that around 1918 was usually still manufactured in a very traditional way. Vis and De Haas have recognized that also this traditional product had great innovative perspectives.

Almost all possibilities to profit from the above goal have been made use of, in particular by applying sophisticated technical, technological, organizational and commercial know-how. Of utmost importance it has also been the fact, that the innovation process did already start before the crisis, which allowed, too, to still make free also during the crisis years financial means to seize the opportunities offered by the Twenthe-Rijn canal with both hands. When in 1940 the war broke out, this did certainly not mean the end of a period, since it was for KNZ at the very most an inconvenient interruption of a growth that had already been impetuous for three years and would still be even more so after 1945.

Literature

In preparing this article, special use has been made of R. Roordink's publication:

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