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140 YEARS OF ACTIVITY AND TECHNOLOGICAL DEVELOPMENT OF THE NITROERG COMPANY

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On October 3, 2011 Nitroerg SA celebrated the 140th anniversary of the company. The ceremony took place in the Stanislaw Wyspianski Silesian Theatre in Katowice under the patronage of the Voivode of Silesia and Marshal of

Silesian Province. The guests of Nitroerg SA were among others: Director of Corporate Governance of KGHM Polish Copper Margaret Jawor, the Voivode of Silesia Zygmunt Lukaszczky, the General Secretary of the Federation of European Explosives Manufacturers, Hans Meyer, deputies to the Sejm Marek Wojcik and Tomasz Glogowski.

Opening the ceremony the President of Nitroerg SA Joseph Dulian welcomed guests from the country and numerous contractors who came from Austria, Bulgaria, Czech Republic, Finland, France, Germany, Nigeria, Norway, Russia, Slovakia, Switzerland and Sweden. In his speech he thanked the staff of Nitroerg for a commitment to business development, professionalism, and its success in the global market. Then the Voivode of

Silesia took the floor and expressed his appreciation to the company that in the difficult realities of the free market is expanding its manufacturing operations, gaining prestige and recognition. Hans Meyer was a special guest, who, handing the statuette of the Saint Barbara, the patron saint of not only the miners and artillerymen but also manufacturers of explosives, congratulated the magnificent 140 year history of the company, stressed that few companies in this sector has survived so long.

The anniversary celebration was marked by a gala concert of the Zabrze Philharmonic Orchestra led by a conductor Slawomir Chrzanowski. The orchestra performed among others. the works of J. Strauss, F. Lehar, A.L Webber.

After the official gala the president of Nitroerg SA invited guests to an official dinner to the restored to its former glory hotel Monopol located in Dworcowa street near the pre-war headquarters of the General Directorate of Lignoza Joint Stock Company, which in the interwar years of the last century was a place for meetings of the local bohemia of a bygone era.

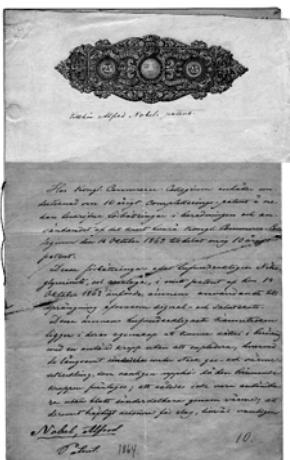
On the occasion of the jubilee it is worth recalling the origins and development of the Company from the KGHM Polish Copper Corporation.



The president of Nitroerg SA Józef Dulian



Joseph Dulian together with Hans Meyer



The first patent of Alfred Nobel

The history of a Nitroerg facility is associated with the second phase of the industrial revolution dated between 1870 and 1914. The development of the coal and steel industry and rail transport was the driving force behind the construction of explosives facilities.

The founder and major shareholder of these companies was Alfred Nobel, who in 1863 together with his father Immanuel mastered on an

industrial scale production of nitroglycerine in the factory built in Helsingborg near Stockholm. Method of manufacturing nitroglycerine, then called „blasting oil”, was patented by Alfred Nobel in Sweden and the year later in Finland „Tillverkning av nitroglycerin och andra analoga ämnen” FI 77 and on August 14, 1866 in the United States „Improved Explosive Compound” US 57175.

On September 3, 1864 the nitroglycerine production plant at Helsingborg went up, taking six employees and the Nobel younger brother Emil with it. The consequence of this accident was prohibition of construction of nitroglycerine production plants in Sweden within city limits, whereas Belgium and the United Kingdom introduced a total ban on the use and manufacture of nitroglycerine to the year 1870, recognizing this product as a very dangerous and in public opinion called; „diabolical compound”.

Nobel did not abandon further attempts to manufacture nitroglycerine and yet in 1864 set up the company Nitroglycerin Aktiebolaget AB and built a manufacturing facility in Vinterviken, about 10 km from Stockholm, and in 1865, another nitroglycerine production plant in Krümmel near Hamburg. In both plants he has about 50-percent share by virtue of a granted patent.

Further Nobel experiments on the safe use of nitroglycerine as the explosive and the work on a new kind of gunpowder led to patenting the manufacture of dynamite also called Nobel’s powder. The patent for the production of dynamite was first granted on May 7, 1867 in Great Britain GB 2538, then in Sweden on October 19, 1867, on February 7, 1868 in Finland „Blandingar av nitroglycerin med porösa icke exploderande ämnen FI 95 and on May 26, 1868 in the United States „Improved Explosive Compound” US 78317.

In 1869 Nobel together with Paul Barbe tried to start the production of dynamite in France. The same year they also founded the company in the vicinity of Bytom.

In 1871, after the repeal of the manufacture and use of nitroglycerine prohibition in the United Kingdom, Alfred Nobel licensed and established in Andeer (Scotland) a company under the name of the British Dynamite Company, manufacturing nitroglycerine and dynamite, which had the initial capital of £ 24,000.

AN OUTLINE OF THE HISTORY OF ZTS „ERG” IN BIERUN STARY

The factory of explosives near Bytom was destroyed in 1870 and Nobel probably sold his shares of the company stock to the chemist engineer Oscar Guttman known in an engineering circle as a „Sprengstoffchemiker”; and „dynamite chemist”, future creator of several inventions and the author of two monographs.

Oscar Guttman together with a group of shareholders of the damaged by the explosion of dynamite factory in the vicinity of Bytom got on July 1, 1871 the permit from the Office for Internal Affairs of the Royal Prussian Government in Opole for creation a dynamite factory. The factory „Schlesische Sprengstoff-Fabrik” (Silesian Factory of Explosives) began manufacturing dynamite already in the year of its establishment. The final product was dynamite mass cartridges wrapped in paper. In 1873, for unknown reasons, the factory was taken over by Erlich and Company, then by Koetz. Major changes occurred after the acquisition of the factory by heirs of renowned industrialist Georg von Giesche. In 1900 the factory changed its name to „Altberuner Sprengstoff-Fabrik Georg von Giesche’s Erben et Cot; (Starobieruńska Explosives Factory George von Giesche Heirs and Company). In 1919 the factory became a property of the company Lignose AG Berlin and in 1921 it became a subsidiary of the Lignose AG Company as „Aktiengesellschaft Lignose Ost” (Lignoza East Company). On March 7, 1925 Lignoza Poland Company in Katowice Branch Bierun Stary was created with eng. Janusz Barcikowski as Managing Director, who held this position until 1938. After him eng. Stanisław Kościukiewicz took the post and managed the company until the outbreak of World War II.

The years 1925–1939 were for the Lignoza Joint Stock Company a great period of innovation and technological development. The company, in addition to the production of nitroglycerine and dynamite, began to manufacture fuses, percussion caps, electric detonators as well as tetryl, lead azide and lead styphnate. In the years 1925–1939 the technology for these products was developed creatively by engineers Janusz Barcikowski, Edward Janczyk, Jerzy Kielczewski, Stanisław Kościukiewicz, Bronisław Zielinski.



Bierun staff, 1930

During this period Lignoza Co. acquired 24 patents in the United States, Britain, France, Germany, Belgium, Holland, Austria and Finland. Below you will find the full list of the patents, as they are quoted to this day in prior art of 52 foreign inventions, beginning from the fifties and ending with the U.S. patent applications of 2010, and PCT WO 2006. This list does not include Polish patents obtained in the Polish Patent Office in this period.

- 1) US 1959479 Jerzy Kiełczewski „Firing Device”
- 2) US 2111719 Bronisław Zieliński „Ignition Mixtures for Percussion Caps of All Kinds, Small Munitions, and Primers”
- 3) GB 313605 Lignoza S.A. „Method of Protecting Electric Blasting Fuses against the Action of Stray Currents”
- 4) GB 337837 Lignoza S.A. „Method of and Means for Protecting Electric Blasting Fuses against the Action of Stray or Undesired Electric Currents”
- 5) GB 375536 Lignoza S.A. „Improvements in or relating to the Circuit of Electric Blasting Fuses”
- 6) GB 388508 Lignoza S.A. „An Improved Process for Producing Explosives”
- 7) GB 393422 Lignoza S.A. „An Improved Process for Initiating Explosives with Maximum Efficiency”
- 8) GB 465768 Lignoza S.A. „Improvements in Ignition Mixtures for Percussion Caps of all kinds, Small Munitions and Primers”
- 9) GB 467143 Lignoza S.A. „Improvements in Casings for Mining Explosives”
- 10) GB 474495 Lignoza S.A. „Improvements in Detonators for Mining Cartridges”

11) FR 639938 Lignoza S.A. „Procédé pour augmenter la sécurité présentée par les produits tels que la poudre noire contre les coups de poussière et les coups de grisou”

12) FR 641442 Lignoza S.A. „Procédé pour la fabrication de produits tels que la poudre noire”

13) FR 680436 Lignoza S.A. „Dispositif pour la protection des lanternes électriques de mines”

14) FR 718686 Lignoza S.A. „Montage électrique pour allumeurs”

15) FR 737838 Janusz Barcikowski, Jerzy Kiełczewski „Procédé d'amorçage de matières explosives et d'agents explosifs”

16) DE 552415 Lignoza S.A. „Mit einem Widerstand versehener, streustromsicherer elektrischer Zünder”

17) DE 614204 Lignoza S.A. „Schaltung für Sprengzünder”

18) DE 639439 Janusz Barcikowski, Jerzy Kiełczewski „Sprengkapsel”

19) DE 724760 Stanisław Kościukiewicz, Edward Jańczyk „Verfahren zum Reinigen von 2-4-6-Trinitrophenyl-N-methylnitramin”

20) BE 388653 Janusz Barcikowski, Jerzy Kiełczewski „Procédé d'amorçage de matières explosives et d'agents explosifs”

21) BE 417730 Lignoza S.A. „Manchon de sécurité”



22) NL 32848 Janusz Barcikowski, Jerzy Kiełczewski „Springpatroon met initiaallading”

23) AT 139654 Lignoza S.A. „Schaltung für Zündmaschinen”

24) FI 17641 Janusz Barcikowski, Jerzy Kiełczewski „Räjäkdyskapseli”

Pre-war Lignoza Co. had also factories in Krywald, Pniowiec near Tarnowskie Gory and Pustkow near Debica which was built just before World War II in the Central Industrial District for the defence industry.

During the Nazi occupation Lignoza Co. returned under the Lignose AG Berlin company management and was named Lignose Aktiengesellschaft. As a result of political and social changes that took place in Poland after 1945, the factory was nationalized and adopted the name: Wytwórnia Chemiczna Nr. 1 (Chemical Factory No.1).

The name Chemical Factory No.1 was amended in 1960 to Zaklady Chemiczne „Erg” (Chemical Plant „Erg”); expanding the production profile for plastics processing, and since 1972 into Zaklady Tworzyw Sztucznych „Erg”. (Plastics Works „Erg”). In 1996, ZTS „Erg” transformed into a state-owned Joint Stock Company - ZTS „Erg-Bierun SA”; and on 01.12.2006 Nitroerg Corporation was created by combining ZTS „Erg-Bierun SA” and „Nitron SA” Krupski Mlyn.

AN OUTLINE OF THE HISTORY OF ZTS „NITRON-ERG” IN KRUPSKI MLYN

In the spring of 1870 before the outbreak of the Franco-Prussian War, the Berlin company called Industrial Lignose Sprengstoffwerke Gesellschaft mit beschränkter Haftung decided to buy from the count

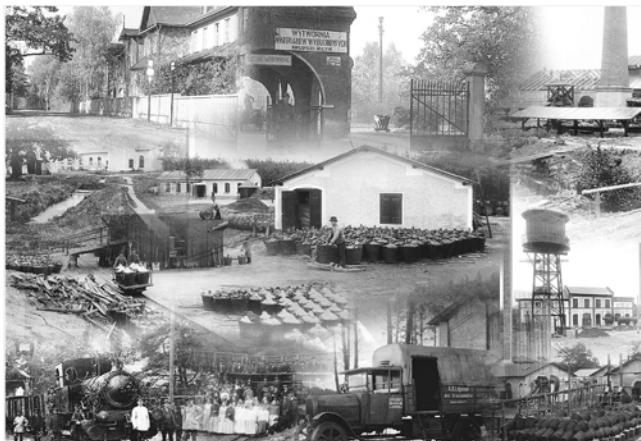
Thiele-Winekler large areas of land in the regency of Opole bordering Mala Panew river. The obstacle to this transaction was a small estate of the old miller Krupa, located in the middle of the count property, which the miller did not want to get rid of. As a result of lengthy negotiations the miller Krupa relented, providing himself with a lifehold in the sale and purchase agreement.

In 1872 in place of the old mill they began to build a plant named Oberschlesische Actien-Gesellschaft für Fabrikation von Lignose Schiesswollfabrick für Armee und Marine in Kruppmühle (Upper Silesia Join-Stock Company for Production Lignoses – Gun Cotton for the Army and Navy in Krupski Mlyn). In 1874 the factory reached the planned production capacity and in the first phase of its existence produced a gun cotton and gun powder. After the former mill remained a name that over time became common for the Prussian munitions factories officially as Krupski Mlyn.

After explosion in a division of gun powder production at the factory, this shop was closed down and in 1888 a branch of nitroglycerine, and the next dynamite was set up. In the years 1903–1904, during the Russo-Japanese War, the factory exported large quantities of gun cotton for the tsarist army and was the only supplier of pressed gun cotton for the German Navy. Until World War I it was one of the largest and most versatile explosives factories grouped into Lignose Joint Stock Company, which consisted of 10 plants with this production profile. During World War I the factory produced mainly trotyl and hexyl (hexanitrodiphenylamine) for military purposes.



140 Years of Activity and Technological Development of the Nitroerg Company



Production of trinitrotoluene was protected by the following patents obtained in the UK, Austria, France and Germany:

- 1) GB 17003 „A Process for the Manufacture of Pure Trinitrotoluene from Crude Trinitrotoluene”
- 2) AT 69850 „Verfahren zur Herstellung von reinem Trinitrotoluol aus rohem Trinitrotoluol”
- 3) FR 475215 „Procédé pour produire du trinitrotoluol pur à l'aide de trinitrotoluol”
- 4) DE 277325 „Verfahren zur Herstellung von reinem Trinitrotoluol aus rohem Trinitrotoluol”.

In June 1918 a fire at the TNT production division caused explosion and total destruction of the installation. After the First World War and the division of Upper Silesia, Krupski Mlyn was incorporated into Germany. In the thirties, because of the sanctions imposed against Germany governing the production for the army, the plant produced only explosives for mining. In 1934 the factory launched the installation for the production of nitroglycerine and nitroglycols. This process was patented in Great Britain by Austrian Dr/ Arnold Schmid and Czechoslovakian Joseph Meissner in 1928 and was known from GB Patent 284700 „Process of and Apparatus for Nitrating Glycerine, Glycol and similar Alcohols”; as the Schmid-Meissner process.

On January 17, 1945 the Soviet Army seized the explosives factory. In March 1945 to Krupski Mlyn came from Bierun Stary eng. Stanislaw Kosciukiewicz and took over the explosives factory from the Soviet army. In 1946 he started the production of dynamite and began preparations for the manufacture of tetryl, percussion caps and nitroglycerine by continuous method. Eng. Stanislaw Kosciukiewicz served as the managing director until 1949.

After starting the production of explosives for the mining company changed its name to Wytwornia Chemiczna Nr. 3, (Chemical Factory No.3), and in 1970, to Zaklady Chemiczne „Nitron-Erg”, (Chemical Works „Nitron-Erg”) and in 1972 to Zaklady Tworzyw Sztucznych „Nitron-Erg” (Plastics Works „Nitron Erg”), starting in the sixties plastics processing

The seventies brought in further technological development of the Works. Many innovative products protected by domestic and foreign patents sprang up. Especially those protected abroad are worthy noticing.

– „Process for producing lead styphnate as a component of cap composition”, which received patent protection in Belgium, Canada, and Australia:

1) BE845713 „Styphnate de plomb, sa préparation et son utilisation”;

2) CA 1080732 „Process for Producing Lead Styphnate”;

3) AU 1718876 „Lead Styphnate Ammunition Primer”;

– „Process for the production of nitroglycerine explosives” protected by innovations in Germany, France, Sweden, India, and Great Britain:

1) DE 3026228 „Verfahren zur Herstellung von Nitroglycerin Explosivstoffen”;

2) FR 8015411 „Procédé pour produire des explosifs à la nitroglycérine”;

3) SE 401818 „Förfarande för framställning av gelatinsprängämnen”;

4) IN 152564 „An Improvement in or Relating to a Process for the Production of Cartridges from Gelatine Explosives”;

5) GB 2054551 „Nitroglycerine explosives”;

– „Nitroglycerine explosive material resistant to deflagration” protected by inventions in Germany and Czechoslovakia:

1) DE 3346011 „Schwer deflagrierender Nitroglycerin Sprengstoff”;

2) CS 244437 „Výbušnina na bázi nitroglycerinu, s malou u vznětivosti”.

The cooperation of the ZTS „Nitron-Erg”; with the Institute of Petroleum Processing began in the early nineties during a meeting of the Minister of Industry Andrzej Zawiślak with directors of chemical industry plants on restructuring and preparing a new development strategy after the implementation of the „Balcerowicz Plan”. The meeting was attended by the director of ZTS „Nitron-Erg”, Dr. Janusz Stryjewski, to whom the implementation of the production of a new product for the fuel industry was proposed.

In 1993 ZTS „Nitron-Erg” and the Institute of Petroleum Processing signed a cooperation agreement, aiming to implement on an industrial scale cetane number improver for diesel fuels, developed on a laboratory scale in the Institute. In autumn 1993 industrial tests were made on a pilot plant shared by the Institute in ZTS „Nitron-Erg”. In the following year, they applied to the State Committee for Scientific Research for funding a project of building a plant on the basis of jointly developed an invention proposal, which was registered in the Patent

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Office. Since the Committee changed the rules of co-financing of industrial plants in the scope of property rights to the erected plant for the benefit of research and development unit, the director, Dr. J. Stryjewski decided to finance the construction of the plant with the production capacity of 3000 tons/year from his own resources.

In April 1994 ZTS „Nitron-Erg” signed with the Institute of Petroleum Processing a licensing agreement to produce the cetane number improver „Nitrocet 50”. The manufactured additive received a certificate of the Institute and its samples produced on an industrial scale have been transferred to many foreign contractors representing the fuel industry and producers of additives. The first industrial batches of the additive Nitrocet 50 were bought by PKN „Orlen SA”. During the World Fuel Conference which took place in May 1998 I met Henrik Magtengaard – Sales Manager of Adibis Company. Director Magtengaard, who co-operated with the Institute since 1986, was interested in a purchase of the cetane improver implemented in Nitron SA. During the meeting it was agreed that Adibis would purchase the first pre-production batch of the cetane improver manufactured on the Institute licence. In June 1998 Adibis signed a contract with Nitron SA for the purchase of 500 tons of the cetane number improver.

The export of 500 tons of the trial batch of the Nitrocet 50 to Nyborg in Denmark, where an Adibis Company plant for production of fuel additive packages was situated, was executed at the end of 1998. The quality and price of the additive produced by Nitron SA and confirmed by Adibis Company, well known manufacturer of additives, was a substantial recommendation of Nitron SA and export passport of the Nitrocet 50 additive.

In the jubilee year of Nitroerg SA, the cetane improver Nitrocet 50 is exported to 20 different countries including: Austria, Belgium, Belarus, Bulgaria, Croatia, Czech Republic, Denmark, Holland, Lithuania, Germany, Norway, Russia, Romania, Slovakia, the United States, Hungary and Great Britain.

Implementation and development of production technology of 2-ethylhexyl nitrate would not be possible without the involvement of the engineering staff and the board of “Nitro-Erg” and Nitron SA, among them especially important engineers Marian Ambrożek, Władysław Bronowicki, Janusz Drzyzga, Korneliusz Duda, Jacek Gębski, Leszek Gierlotka, Jerzy Rachwalski,

Janusz Stryjewski, Henryk Taiber and many not mentioned employees of the “Nitroerg” Company.

On the occasion of the 140th anniversary of the glorious history of the company, I wish the board and employees of Nitroerg SA many new successes in work, further technological development of the company, thanking for the opportunity to participate in the celebrations.



The presented outline of the history of Nitroerg SA is only a fragment of a long-term history of the company, its achievements in many fields, which the author has not considered.

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