

Hercules Inc.

Hercules, Inc., was a chemical and munitions manufacturing company based in Wilmington, Delaware, which was formed as the **Hercules Powder Company**. Hercules Powder Company was formed in 1882 by DuPont and Laflin & Rand Powder Company^[1] to finance construction of a dynamite plant on land adjacent to San Francisco Bay owned by DuPont subsidiary California Powder Works.^[2] ^[3] This created the company town of Hercules, California. Hercules Inc. was a manufacturer of chemicals and munitions based in Wilmington, Delaware. The company was established in 1912 by T.W. Bacchus as the Hercules Powder Company. The Hercules Powder Company was one of the companies created from the break up of the E.I. du Pont de Nemours "powder trust" in 1911 as ruled by a U.S. Supreme Court decision. In its early years as a separate company, it continued to produce explosives and dynamite." Hercules was spun off from DuPont as a result of U.S. federal government actions in the field of antitrusts. Hercules, Inc., operated under this name until 2008, when it was meged into Ashland Inc.

Hercules, Inc., was one of the major producers of smokeless powder for warfare in the United States during the 20th century. At the time of its spin-off, the DuPont Corp. retained the processes and patents for the production of "single-base" nitrocellulose gunpowders, whereas Hercules, Inc., was given the patents and processes for the production of "double-base" gunpowders that combined nitrocellulose andnitroglycerine

Hercules Incorporated



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|---------------------|---|
| Industry | Chemistry |
| Fate | Ashland Inc Successor |
| Founded | 1912 by T.W Bacchus |
| Headquarters | Hercules Plaza, Wilmington, Delaware, United States |
| Key people | Craig A. Rogerson, President and CEO Allen A. Spizzo, VP and CFO Paul C. Raymond III, VP and President, PTV John E. Panichella, VP and President, Aqualon Edward V. Carrington, VP of HR |
| Products | chemical |
| Website | http://www.ashland.com/ |

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History

Hercules Inc. was founded as a result of a DuPont Anti-trust lawsuit. The first management team revolved around President H. Dunham, T.W. Bacchus, G.G. Rheuby J.T Skelly, Norman Rood, Fred Stark, C.D. Prickett, and Gørge Markell.^[4]

Some of their products were used by the military in World War I. A school and a plant named after T. W. Bacchus in Bacchus, Utah. Hercules Powder Company ranked 65th among United States corporations in the value of World War II military production contracts.^[5]

Richard F. Heck, recipient of the 2010 Nobel Prize in Chemistry, gained experience with transition metal chemistry while working at Hercules in 1957.^[6]

By the 1960s, the community was experiencing the first signs of a suburban transition. The Hercules Powder Co., once a small dynamite manufacturing firm, had begun producing rocket motors at its Bacchus Works south of the Magna community. The growing availability of jobs was one factor encouraging subdivision development in the Magna, Kearns and ~~Est~~ Valley areas.



Display showing Hercules products in the 1950s

By the end of the 1990s, Hercules Inc., had sold off a significant number of its divisions that had not been profitable for the company. This has caused the price of shares of common stock in Hercules to rise above 70 dollars. Also, several successful cost-savings programs were implemented in addition of corporate buying its own shares. Also at that time, Hercules had a significant amount of assets available for possible purchases of other corporations. Hercules, Inc., had a Paper Technology Division (PTD) whose products were slowly becoming commodities. In order to survive, this division needed to obtain new products.

First, Hercules Inc., tried to purchase the Allied Colloids Company, but this was not successful. Next, Hercules bought the Betz-Dearborn Corporation. Betz-Dearborn produced mostly chemicals for paper processing, and the Hercules PTD produced mainly functional chemicals for paper. According to some business analysts,

Hercules Inc. paid about three times as much for Betz-Dearborn as compared with its actual value.

Soon after the purchase of Betz-Dearborn, the price per share of stock in Hercules Inc., had dropped from above \$70 to below \$10 (ten dollars). It has also been speculated that Hercules Inc., was close to going bankrupt after this failed purchase operation. Afterwards, several senior managers were forced out of the company because of this failure; however, a significant amount of former PTD's senior managers were able to keep their position within Hercules. The price of stock shares in Hercules Inc. never recovered from this debacle. Finally Hercules Inc. was sold of to the Ashland Corporation

Product lines

Commercial gunpowders

Some of the more recent gunpowders marketed to reloaders include the brand names "Bullseye", "2400", "Reloder", "Unique", and "Red Dot".^[7] These gunpowders are still being manufactured by the Alliant Powder company in Radford, Virginia.

Powders inherited from DuPont in 1912

- **EC** (Explosives Company)^[7] shotgun powder was the first smokeless powder manufactured in the United States. Production began in 1890, and was discontinued in 1931.^[8]
- **WA .30 caliber** powder was named W for United States Army Lieutenant Whistler and A for American Smokeless Powder Company factory superintendent Aspinwall. This tubular powder was used for military loading of the U.S. Army from 1894 until the military specification was changed to single-base nitrocellulose powder in 1908. Grains of 2 mm (0.08 inch) diameter were 1 mm long. Hercules continued producing the powder for other users until 1930.^[8]
- **Sharpshooter** was a flake powder introduced by Lafin & Rand in 1897 to replace black powder for loading the .45-70. Black flakes containing 15 to 18 percent nitroglycerin^[9] were approximately 2 mm in diameter. Production was discontinued after World War II.^[8]
- **Bullseye** was introduced by Lafin & Rand in 1898. Large surface area per unit weight enables rapid combustion in short-barreled handguns. Lafin & Rand began production using small, irregular particles removed by screening runs of larger grained powders. Improved manufacturing processes ~~offer~~ offered other reclamation options for reduced

quantities of rejected material. Hercules manufactured Bullseye as thin, round flakes.^[8] It is believed to be the oldest smokeless powder formulation still being manufactured in the United States.^[10] It is designed for handguns and can also be used in 12-gauge shotgun target loads.^[11]

- **Lightning** was introduced by Laflin & Rand in 1899 for lever action sporting rifles like the .30-30 Winchester and .303 Savage. Production of 2 mm diameter flakes was discontinued after World War II. Tubular Lightning # 2 was manufactured from 1903 to 1929.^[8]
- **Infalible** was a flake shotgun powder introduced by Laflin & Rand in 1900. Initial production had an orange color but graphite coating gave later production a black color. Production was discontinued after World War II.^[8]
- **Unique** is a gray flake powder introduced by Laflin & Rand in 1900.^[8] Individual flakes are approximately 1.5 mm (0.06 inch) in diameter.^[10] It is designed for shotguns and can be used in handguns.^[11]
- **Bear** was a tubular powder introduced by Laflin & Rand in 1908 for small capacity rifle cartridges like the .351 and .401 Winchester Self-Loading and the .32-20 and .25-20 Winchester. Production was discontinued after World War II.^[8]
- **Military Rifle (MR) # 19** was a tubular powder containing 20 percent nitroglycerin^[9] introduced by DuPont in 1908 and was renamed **HiVel # 1** when manufactured by Hercules. It was modified as **HiVel # 2** in 1915.^[8] Production was discontinued in 1964.^[7] A smaller grained version was produced as **HiVel # 3** from 1926 to 1941.^[8]



WWII poster from Hercules

Powders developed by Hercules Powder Company

- **Hercules # 308** was Hercules production of single-base tubular **Pyro DG** (Diphenylamine Graphited) powder for loading military .30-06 Springfield ammunition through World War I. Production began in 1915 and continued through the 1920s.^[8]
- **Hercules # 300** was a black, tubular single-base rifle powder produced from 1916 to 1932.^[8]
- **Pyro** was produced from 1922 to 1928 as lightly graphited yellow flakes for loading the .45 ACP.^[8]
- **Hercules # 2400** is a coated flake powder containing 20 percent nitroglycerin^[9] introduced in 1932.^[8] Individual dark gray flakes are approximately 1 mm (0.04 inch) in diameter and 0.3 mm thick.^[10] It is designed for small capacity center-fire rifle cartridges and can be used in magnum handgun and .410 bore shotgun loads.^[11]
- **Red Dot** is a flake powder introduced in 1932.^[8] Individual flakes are approximately 1.5 mm (0.06 inch) in diameter and some are dyed red to aid identification.^[10] It is designed for light and standard loads for 12, 16, and 20 gauge shotguns and can be used in handguns.^[11]
- **HiVel # 6** was produced from 1933 to 1941 for loading the .30-06 Springfield.^[8]
- **Herco** is a flake powder introduced in the 1930s. Individual flakes are approximately 1.5 mm (0.06 inch) in diameter.^[10] It is designed for heavy loads for 10, 12, 16, 20 and 28 gauge shotguns and can be used for heavy handgun loads.^[11]
- **Green Dot** is a flake powder introduced in 1965.^[7] Individual flakes are approximately 1.5 mm (0.06 inch) in diameter and some are dyed green to aid identification.^[10] It is designed for medium and standard loads for 12, 16, and 20 gauge shotguns and can be used in handguns.^[11]
- **Reloder 7** was the most popular of three cylindrical rifle powders introduced in 1965 to replace **HiVel # 2**. Each powder was blended from four different formulations dyed different colors. Production of the other two longer-grained powders, **Reloder 11** and **Reloder 21**, was discontinued in 1972.^[7]
- **Blue Dot** is a flake powder introduced in 1972. Individual flakes are approximately 1.5 mm (0.06 inch) in diameter and some are dyed blue to aid identification.^[10] It is designed for magnum loads for 10, 12, 16, 20 and 28 gauge shotguns and can be used for magnum handgun loads.^[11]

Solid-fuel rocket motor production

Beginning in 1959, Hercules, Inc., began to diversify into the production of large solid-fuel rocket motors, and it soon became a primary producer of these, especially for the U.S. Department of Defense U.S. Air Force, U.S. Navy, and U.S. Army - and to a lesser degree for the civilian National Aeronautics and Space Administration (NASA). In 1961, the company hired contractors C.H. Leavell & Company, Morrison-Knudsen, and Alaskan Plumbing and Heating Company to expand the existing Bacchus Works site. The

contractors added "Air Force Plant 81" adding 97 buildings, including a 97,000 square foot administration building.^[12] One of its major solid-fuel rocket products was the third-stage engine for the three -stage solid-fueled Minuteman intercontinental ballistic missile (ICBM) for the U.S. Air Force, of which 1,000 were made and deployed at Air Force Bases in several northern states during the 1960s. In addition, all of the missiles of the Minuteman I series were removed from service and replaced with the Minuteman II and Minuteman III series of more-advanced ICBMs. Hence, the Minuteman ICBM program was a huge project and a major source of revenue for Hercules, Inc.

Hercules, Inc., also produced the solid-fueled rocket motors for the two-stage Polaris missile system of intermediate-range ballistic missiles (IRBMs) for the U.S. Navy in its 41 for Freedom series of 41 George Washington class ballistic missile submarines. These nuclear submarines carried 16 Polaris missiles apiece for a grand total of 656 missiles. In addition, the Polaris series consisted of the successively-improved Polaris A-1, Polaris A-2, and Polaris A-3 missiles. The early Polaris submarines that had been armed with the Polaris A-1 were upgraded to the Polaris A-2; and then all that had been armed with the Polaris A-2 were upgraded to the Polaris A-3.

For some of the early Polaris submarines, the Polaris A-3 was the end of their upgrades, but a large number of them (about 31) were further rearmed with the more-advanced and longer-ranged two-stage Poseidon C-3 missile. Hence, the Polaris missile submarine program was also a huge project and a major source of revenue for Hercules, Inc.

During the 1960s, Hercules, Inc., also made solid-fuel rocket motors for hundreds of the U.S. Army's Honest John missile, a mobile tactical missile for carrying tactical nuclear weapons for U.S. Army divisions. The Honest John missile was mostly deployed with the U.S. Seventh Army in West Germany as part of the American commitment to NATO to defend Western Europe against aggression from the Warsaw Pact, using nuclear weapons on Eastern Europe, if necessary. None of the Honest John, Minuteman, Polaris, or Poseidon has ever been used in combat, and the threat of nuclear war has been sufficient to deter aggression and make it unnecessary to use nuclear weapons for defense.

During the 1970s and 80s, the Honest John missile was removed from deployment, scrapped, and replaced by the more-advanced Lance missile by the U.S. Army in Europe. Of all of the missiles mentioned above, only a reduced number of the Minuteman missiles remain in service at Air Force Bases in the United States, with all of the others having been removed from deployment and scrapped, along with all of the Polaris and Poseidon submarines.

For space exploration and satellite launches by the U.S. Air Force and NASA, Hercules, Inc., developed and manufactured the two large, strap-on solid-fueled booster rockets for the otherwise liquid-fueled, and huge, Titan III and Titan IV rockets. These strap-on rockets were used on the Titan IIIC, Titan IIID, and Titan IIIE rockets, and on all of the Titan IV rockets that were ever produced.

After the end of production and firing of NASA's huge Saturn IB and Saturn V rockets, the Titan IV was the largest and heaviest unmanned rocket available anywhere in the world, and especially in the Titan IV-Centaur version. The Titan IV-Centaur was used for special launches of heavy space probes into the Solar System, such as the Cassini-Huygens mission to Saturn which was launched in 1997. The Titan IV is no longer manufactured, and the last one of these was fired during a launch in October 2005.^[13] In 1995 the aerospace division of Hercules, including its solid motor line, was acquired by the American defense contractor ATK.

Business Segments

In its later years, Hercules, Inc., manufactured and marketed worldwide specialist chemicals that were used in a wide variety of industrial, home, and office markets, and it had over 4,500 employees. Hercules was composed of two major divisions: the Paper Technologies and Ventures (PTV) division and the Aqualon division. In 2005, the former accounted for 49% of its sales and 35% of its operating profits, with the latter producing 37% and 68% respectively^[14]

Aqualon Group

Aqualon produces products for physical property modification of aqueous systems which are sold into a wide variety of industries including personal care, food additives, and construction.

Paper Technologies and Ventures Group

Paper Technologies

Paper Technologies produces specialty chemicals to the pulp and paper industry. These products include functional, process, and water treatment chemicals for a wide variety of pulp and paper applications.

Functional chemicals can be divided in three main groups. Wet strength resins, Rosin sizes and AKD -sizes. Significant persons developing functional chemicals in Hercules could be mentioned: Dr. Keim on his efforts developing PAE wet strength resin, Mr Kai Kiviö on his efforts on developing cationic rosin size. Basis of AKD -technology Hercules acquired more or less voluntary from German BASF after the Second World War.

Ventures

Ventures produces specialty chemicals for a variety of markets, including adhesives and sealants, paints, inks, coatings, lubricants, rubber, plastics, and building and construction.

Hercules Incorporated, in collaboration with Professor Kaichang Li of Oregon State University and Columbia Forest Products, received a 2007 Presidential Green Chemistry Challenge Award for the Greener Synthetic Pathways category in developing and commercializing a formaldehyde-free adhesive made from soy flour and Hercules' unique polymer chemistries.

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External links

- [Hercules Incorporated website](#)

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