PCT FOCUS: PATENTING TECHNOLOGIES FOR CLEANER AIR

The world market for electrical power is experiencing tremendous growth. In the United States alone, it is estimated that new plants will generate over 500 gigawatts of electricity per year by 2020 – more than double the output for 2001. The builders of these new plants, however – especially those that will generate electricity by natural gas or coal-fire – must address environmental concerns such as climate changes and global warming. These are real concerns that cannot be ignored; they raise questions as to how harmful gases resulting from fossil fuel combustion – gases such as sulfur dioxide (SO_2), oxides of nitrogen (NO_x), and mercury (Hg) – can be eliminated. An equally important concern for energy producers is how they can be eliminated at an affordable cost.

This article examines a success story in this area, EnviroScrub Technologies Corporation, a US company that is innovating in this field. The company's patented Pahlman Process™ scrubbing technology provides unique multiple pollutant capture capabilities in a single reaction unit. Key to EnviroScrub's success has been a global marketing program that has taken advantage of the broad international patent protection provided by the Patent Cooperation Treaty (PCT) system.

Company background and profile

EnviroScrub Technologies began operations in the air pollution control market in 2000. Its specific goal was to become a world leader in the lucrative business of removing SO_x/NO_x/Hg target pollutants from the combustion of common fuels and industrial emissions. EnviroScrub Technologies developed and patented various inventions, making remarkable progress in the development of clean-air technology. To this end, it acquired what is now referred to as the Pahlman Process™ technology at an early stage of its development. In addition to providing the best means to remove the air pollutants referred to above, which are in the flue gases of coal-fired power generation, the Pahlman Process™ technology is also highly effective at removing other dangerous gases and heavy metals from industrial emissions.

EnviroScrub Technologies is dynamic in developing, commercializing and licensing its dry Pahlman Process™ technology to power generating and industrial companies worldwide. It has entered into strategic partnerships with key companies in the energy industry such as Minnesota Power, Nooter/Eriksen and Air Cure. A significant portion of EnviroScrub Technologies' financial resources are also invested into research and development with academic research affiliates of institutions such as the University of North Dakota (recognized internationally for its expertise in advanced energy systems) and the University of Minnesota-Duluth (renowned for its applied research in minerals and other natural resources).

Area of technology covered

Pahlmanite™ sorbent is a black mineral powder developed by mining engineer John Pahlman (now deceased) and EnviroScrub Technologies' research and development team. The sorbent adsorbs all but a trace of sulfur and nitrogen oxides from combustion and industrial process gases, the toxic by-products of power plants that burn fossil fuels. Sulfur and nitrogen oxides, dubbed SO_x and NO_x respectively, are the chief ingredients in acid rain and smog. In addition, the process creates end products that can be used to make detergents, fertilizers and food preservatives.

The Pahlman Process™ technology can remove multiple pollutants by a single, dual or multi stage *dry* process, which is more efficient than any other system currently on the market. Not only does the process eliminate undesirable waste streams while producing marketable byproducts; its price tag is much lower than that of comparable technologies. EnviroScrub

Technologies reports removal of more than 99 percent of both SO_x and NO_x simultaneously and at costs that are significantly lower than the capital and operating costs of conventional technologies. The Pahlman Process™ technology is also reported to remove 97 percent of oxidized mercury and 99 percent of elemental mercury in the same process.

The EnviroScrub Technologies Mobile Unit running at the Potlatch Paper Corporation facility.

Overall patenting strategy and the use of the PCT

EnviroScrub Technologies has a coherent and active patenting strategy. It has obtained several US patents for its Pahlman Process™ pollutant removal technology and has patents pending for production and regeneration of its proprietary sorbent compounds and for water filtration applications. The Phalman Process™ has also been the subject of several PCT applications; the most recent (WO 2004/037369) was published in May.

In consolidating its intellectual property portfolio worldwide, EnviroScrub Technologies credits WIPO's PCT system with helping it secure global protection for its technology. EnviroScrub Technologies cited two features of the PCT that were of particular significance in its choice to use the system: the quality of the search and examination reports produced under the PCT and the deferral of certain national phase fees until the 30-month and 31-month deadlines. Other benefits from the use of the PCT include its simplicity and convenience by virtue of its single procedural mechanism for filing patent applications with effects in several countries. It also incorporates several fail-safe and user-friendly measures, which allow the user opportunities to correct mistakes.

EnviroScrub Technologies has entered the national phase under the PCT system in a number of countries, including through the European Patent Office and the Eurasian Patent Office. It was granted its first international patent (covering countries within the Eurasian region) in October 2003. This patent grants EnviroScrub Technologies protection in the Russian Federation, the world's fifth largest coal-consuming nation.

With patents granted and pending, EnviroScrub Technologies' global commercialization effort is under development. It has entered into licensing agreements with Nooter/Eriksen with respect to global marketing of the technology, which is expected to include developing countries, especially those that are reliant on fossil fuels. Countries such as India, ranked third in coal consumption in British Petroleum's "Statistical Review of World Energy 2001", are logical markets for the Pahlman Process™ technology. EnviroScrub Technologies plans to enter the national phase in such countries as India and Nigeria (through the African Regional Industrial Property Organization (ARIPO)) with later PCT applications.

For further information on the PCT as an aid in planning corporate patenting strategies, please visit *www.wipo.int*.

Acknowledgements

1. **Modern Power Systems** magazine – November 2002
2. **Power Engineering** magazine – May 2002
3. **Star Tribune** (Minnesota newspaper) – April 18, 2002
4. **EnviroScrub Technologies** News online: *www.enviroscrub.com*