POWER ENGINEERING AND ENVIRONMENTAL PROBLEMS IN CZECH REPUBLIC

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ABSTRACT

The thesis deals with the environmental impacts of power energy generation in Czech Republic and the possibilities of land recultivation.

1. ENVIRONMENTAL WAYS OF POWER GENERATION

The environment in Czech Republic is effected by operation of power plants and processes of heat and power co-generation. These environmental impacts can be reduced by professional management of these activities along with due conduct on our side. Our environmental friendly way of management of power and heat generation has been based upon our qualification in technology operation and personnel control capabilities and involvement. Our responsible approach to the environment is documented by the following commitments:

- Environmental protection is one of the major priorities in our power companies and has become an integral part of its governments
- Respecting the existing laws governing the environments and the peaceful use of nuclear energy and ionising radiation along with observance of the limits established by these laws and/or with respect to international obligations of the Czech Republic in environmental protection are considered our essential duty.
- Environmental protection in our country is based on prevention aimed at creation of systematic condition for safe and reliable operation.
- Our impact on the environment are monitored and evaluated. The resulting knowledge is utillized for providing information for the government authorities, regional bodies and the public.
- In the preparation of technical measures for environmental protection, the best available, economically feasible, safe and environmental friendly technologies, are preferred.
- Our approach to the environmental affairs takes in account the specific situations in which each power plant is operating and we respond to any constructive criticism and ideas presented by interested parties.

- We are aimed at improving our environmental protection mainly by means of the use of raw material, supplies and energy, control of air emissions and utilisation of the by-products, firstly the ash and gypsum in other industries.
- Treatment of Highly Polluted Waste Water

Industrial and engineering processes produce considerable quantities of waste water that is so heavily polluted that it cannot be discharged into the public sewerage system. It is impossible to develop universally applicable techniques because of the wide range of effluents involved. Each case has to be examined individually to decide whether mechanical, chemico-physical, biological, or a combination of different processes offer the most cost-effective approach. Any solution is preceded by laboratory analyses supplemented by bench-scale trials to optimize planned plant parameters. It was developed the anaerobic bioreactor for the treatment of waste water with high levels of organic pollution. Anaerobic treatment harnesses microbes to degrade dissolved organic substances into CO_2 and methane.

Rehabilitation and Environmental restoration of the landscape which was devastated by production of coal. Rehabilitating the legacy by coal production in North-Bohemia is one of the largest ecological and economic challenges. The rehabilitation is directed at reducing current environmental impacts as quickly as possible. To attain this goal, routine meaningful discussions and professional debate between proponents and licensing authorities on complicated technical issues have helped achieve optimum results. To my mind, close and constructive cooperation of all parties involved is a prerequisite for further economic development of the former coal production areas .The Czech government is funding this exceptionally large environmental project and some initial action have already been successfully completed.

Nuclear power help to solve global energy and environmental problems. Fossil fuels reserves, particularly oil, coal and gas will be finished it only a few decades. In addition, the continued burning of fossil fuels at current rates will lead to disastrous environmental repercussions. Nuclear power offers the only realistic way of achieving significant reduction in CO_2 emissions. The extraction, conversion, storage, transport and use of energy has always been associated with adverse environmental repercussions. However, due to rapid population growth, these repercussions have assumed global proportions. Energy consumption has been increasing throughout history. Invariably, two forces have spurred this development: Growing population, and improved living standards. The latter has largely been the result of the widespread introduction of machines, which however, also consume energy. At present about 60% of the total energy supplies in Czech Republic come from coal and natural gas, 30% nuclear power, 3% hydro power, 7% small power station. Fossil fuels are not only useful as energy sources, but are also important raw materials for non-energy related applications in the chemical industrie. At present there are two blocks 1000 MW nuclear power plants under construction; one power plant in operation has total generating capacity 1760 MW. With its Temelin and Dukovany which comenced commercial operation offers the highest current safety standards. These standards will be further consolidated in future nuclear power plants. On this basis it should be possible to reach a political consensus on energy that will enable

nuclear power to make an adequate contribution toward solving global energy and environmental problems.

2. ENERGY AND THE ENVIRONMENT

Large-scale generation of electricity provides us with versatile energy of the highest quality. Today, fossils fuels such as coal, oil and natural gas are the primary sources of this energy. However, using fossil energy sources has the undesirable effect of releasing emissions that burden the environment and alter the climate. As there is no foreseeable way of doing without fossil fueled power plant, we are currently doing our utmost to maximize their efficiency and minimize their pollutant emissions.

To meet the demand for energy in a responsible way we are developing and building safe nuclear power stations and investing in regenerative sources of energy such as hydroelectric, solar, and wind power. Wherever possible, the potential for saving energy must be exploited. As we are enter in the third millennium we also need to look at new ways of generating, distributing, and using energy in the future.

Energy and environmental policies have so fare occupied largely separate arenas. However, the consequences of traditional energy consumption are forcing us to give serious consideration to the energy supply sector and to make environmental protection an integral aspect of energy policy. Modern methods of supplying, converting and utilizing energy bear much of the blame for the greenhouse effect. One of our most urgent tasks therefore is to minimize the adverse consequences of energy consumption for mankind and our environment.

Global emission of carbon dioxide, methane, nitrogen oxides, carbon monoxides and volatile organic compounds from the electricity generating sector are responsible for about 50% of the greenhouse effect. Assuming that current expansion rates in global energy consumption continue, energy-induced emission will roughly double by the year 2050. To protect the Earth`s atmosphere, however, it is essential to halve these emissions by the of the next century.

Power system in the Czech Republic have important source of electricity in power plants of fossil fuels such as coal.. Its locations next to an-open coast mine facilitate fuel supply by conveyer belts and it makes this source very advantageous. But this fuel supplied from the open pit mine contains 1.7 % of sulphur, flue gas containts 9000 mg of SO_2. It was decided to build up a flue gas desulpharisation plant at this power plants.

At least since the Earth Summit in Rio de Janeiro in 1992, climate protection has been identified as one of the most pressing environmental challenges of our time. At that time, the parties to the summit adapted the Framework Convention on Climate Change, which has so far been ratified by 184 countries. In Kyoto in 1997 the parties to the convention agreed to a reduction in greenhouse gasses for industrialized countries. What are some ways for the reduction carbon dioxide? There are the degrease of energy consumption, the increase of

energy conversion efficiency, the safety nuclear energy, the new technologies of energy conversion and the renewable energy sources.

The need to continuously increase of the renewable energy utilisation is emphasied by state environmental and energy policies. State policy effort work towards renewable energy sources reaching about 6 % share on overall energy production. A state financial support system has been created to support the execution of these aims, which are primarily realised by the Czech Energy Agency and the State Environmental Fund. It exist the State programme of support of using savings, renewable and secondary energy sources.

In the long term a sustainable energy sector will have to manage without the fossil fuels. The basic components of future energy sources include all forms of solar power, tidal energy and geothermal energy. Characteristic of renewable energy sources predetermined one to be extracted in a decentralized and regional manner.

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