

## INDUSTRIAL SCALE DEMO PLANT FOR EB PURIFICATION OF FLUE GAS (POL/8/014) F1

### CORE FINANCING

YEAR	Experts		Equipment	Fellowships		Scientific Visits		Training	Sub-contracts	Misc. Comp.	Total US \$
	m/d	US \$	US \$	m/d	US \$	m/d	US \$	US \$	US \$	US \$	
1995	4/0	45,600	360,000	-	-	2/15	31,500	-	-	-	437,100
1996	7/0	84,000	540,000	-	-	5/0	66,000	-	-	-	690,000
1997	6/0	75,600	550,000	-	-	1/15	20,700	-	-	-	646,300

### FOOTNOTE a/ FINANCING

YEAR	Experts		Equipment	Fellowships		Scientific Visits		Training	Sub-contracts	Misc. Comp.	Total US \$
	m/d	US \$	US \$	m/d	US \$	m/d	US \$	US \$	US \$	US \$	
1995	-	-	-	-	-	-	-	-	1,000,000	-	1,000,000
1996	-	-	-	-	-	-	-	-	1,600,000	-	1,600,000
1997	-	-	-	-	-	-	-	-	1,350,000	-	1,350,000
1998	-	-	-	-	-	-	-	-	1,250,000	-	1,250,000

First Year Approved: 94

Total expenditure to 30 September 1994:

\$17,091 (TACF)

**OBJECTIVES:** Construction and evaluation of an industrial scale demonstration facility for electron beam purification of flue gases at the Pomorzany Electro Power Station.

**BACKGROUND:** This project was first approved in 1994 as a Model Project. Full project implementation was not, however, possible due to unavailability of the extrabudgetary funds. The Agency organized several technical review meetings to discuss this problem. In view of the strong national commitment and the Agency's own interest, it was decided to reschedule the activities to the 1995-99 period and in case of continued shortage of extrabudgetary funds modify the project somewhat to make efficient use of Agency funds. In addition to the funds scheduled in the above table, a carry-over budget of approximately \$750,000, including \$50,000 contributed by Korea, is available. A contribution of \$300,000 from UNIDO's Japanese funds in trust is also expected to be confirmed shortly. The release of environmental pollutants such as sulphur dioxide and nitrogen oxide into the atmosphere as a result of the widespread use of fossil fuels is a matter of world-wide concern. As a result of these detrimental effects and the economic losses associated therewith, a number of countries have begun to impose limits on the release of these pollutants. The need for energy is critical in developing countries, but the available resources or economic considerations often dictate the use of poor quality fuel, and the cost of systems for extracting pollutants from exhaust gases is a major barrier. The scientific and engineering developments of the past 20 years in the field of radiation technology are such that the electron beam dry scrubbing process (EBS) has become

particularly effective in eliminating sulphur dioxide and nitrogen oxide from flue gases. In addition, pilot plant studies in Poland, Japan, Germany and the USA have established that the process can also have significant economic and technical advantages over conventional technologies. Technically the EBS process has the advantages of simultaneous removal of sulphur dioxide and nitrogen oxide, and the fact that no wastewater requiring additional treatment and disposal is produced. Also, the by-products of the process can be utilized in the manufacture of fertilizer. Recent economic studies indicate that both capital and operating costs of an electric power station equipped with EBS should be significantly less than for conventional technologies, particularly for plants of the order of 500-600 MW(e) or less. These advantages make the process of particular interest in developing countries. Based on research at the Institute of Nuclear Chemistry and Technology, Warsaw, and studies at a pilot scale facility at a district heating station, the technical infrastructure available to support the project is very strong.

**PROJECT PLAN:** During the first stage of the project the Agency will assist in the construction and evaluation of an industrial scale demonstration plant for EBS purification of flue gases at the Pomorzany Electric Power Station. The capacity of the proposed facility will be approximately 300,000 cubic metres per hour. All civil engineering of the basic work would be completed in 1996; installation of the beam apparatus and supporting systems would be accomplished in 1997. Operating tests would be initiated in 1998, and major evaluation of test data would be completed by the end of that year. During the second stage of the project, the Agency, making maximum use of Polish expertise, would support the transfer of the technology to other developing countries.

**NATIONAL COMMITMENT:** Technical infrastructure; the building for the facility and all personnel required for construction and operation; 60% of the total cost of the project, which is estimated to be \$18,860,700.

**AGENCY INPUT:** Assistance in the form of expert services, equipment and training. The remaining funding required will be sought from other major donors.

**IMPACT:** The beneficiaries will be the general public and the environment, including the surrounding forests, cultivated soil and wildlife. The Pomorzany Electric Power Station will have a modern air pollution control facility that will enable it to comply with prevailing emission control regulations. The by-products of the process will be marketed directly to farmers in the area for use as fertilizer. The technical and economic viability of the EBS technology will be demonstrated at full industrial scale, paving the way for broader application in Poland and in other countries.