

including export, will bring the total bituminous coal production this year to about 534 million tons. This coal production, in addition to providing an important contribution to our industrial progress, also provides employment for more than 128,000 men and contributes \$2.5 billion to the national economy.

When this bituminous coal is utilized for the generation of heat energy, whether for conversion to electricity or for direct use in industrial processing, a number of byproducts considered pollutants are produced. These include smoke, which is unburned carbon; ash, which is the noncombustible portion of the coal; and gaseous oxides of certain foreign elements in the coal, notably sulfur. The coal producers, in cooperation with those who use coal, have a long record of accomplishment in the development of means for controlling these pollutants.

The emission of smoke from a coal-burning plant is, and should continue to be, a thing of the past. Through intensive research, carried out almost 20 years ago, the technology for coal combustion without smoke pollution was developed and the modern, coal-burning plant of today emits practically no unburned carbon.

A similar situation exists with regard to the uncombustible ash of coal. The development of mechanical and electrostatic collectors has progressed to where the stack emission of "fly ash" in modern plants can be reduced to less than 0.5 percent of the original ash in the coal. Because the development of this ash control equipment is more recent than that of smoke control, not all coal-burning plants are so equipped. But as old plants are phased out of use through obsolescence, and new plants are constructed to replace them, this high-efficiency ash-collection equipment is being installed. The electric utility industry, in particular, should be commended for their efforts in the development of such equipment and the investment of non-profit-making capital to the extent of millions of dollars per plant to enable this achievement in dust control. And the ultimate in the control of dust has not yet been achieved. Research still continues and the more recent development of bag filters, which remove almost 100 percent of the dust from the gas stream, are currently being tested by a number of large utility companies.

The third byproduct which I mentioned earlier, namely, the oxides of sulfur, are the cause of the most concern at the present time. The technology for controlling this so-called pollutant is by no means as advanced as that for control of smoke and fly ash. This is perhaps understandable because it has been apparent for many years that unburned carbon in the form of soot, and unburned other constituents of coal in the form of fly ash, were true pollutants. One could see them, feel them, and readily assess the damage being done. No such means for assessment of the damage of sulfur oxides has been possible. One cannot see them or feel them, and the only way one is aware of their existence is in extreme cases wherein the concentration rises to the point where one can smell them. But this is a rare instance, and the concentrations of sulfur oxides in the air are for the most part so low that we are not aware they exist. Whether their existence is detrimental to health is a matter which has not been resolved. As was pointed out in the report of the Environmental Pollution Panel of the President's Science and Advisory Committee, "Restoring the Quality of Our Environment":