WATER PROBLEMS

by

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The productive power of industry and the variety of goods and services produced in our economy attest to the achievements of the engineering profession in America. These are achievements in which you can take justifiable pride.

The engineer has been the problem solver in industry. It has been your function to develop new methods and new processes for producing goods. It has not been your concern to think of the social consequences of some of the technologies you have devised. Today, however, the quality of our life is seriously threatened by the waste products of the same productive system that has made possible the marvels of modern civilization. We are fouling the air we breathe, the water we drink, and the land on which we live.

Today's United States population of 200 million probably will grow to 250 million by 1980, and likely will grow to 320 million or more by the year 2000. With the continuing trend of urbanization, our present 145 million urban residents probably will increase to nearly 200 million by 1980. And, unless trends are radically altered there will be perhaps as many as 270 million persons on little more than one percent of our land area only 30 years hence.

Speaking of only one of the many important facets of the future of the American society, in order to meet the energy demands of the population as projected, and to meet the requirements of an expanding technology, electric power generation, for example, must triple by 1980 and double again by the end of the century. Even if nuclear sources of power generation expand to provide half of the generating capacity, we still will have a three-fold increase in the combustion of fossil fuels.

The minerals and fossil fuels industries must expect equivalent increase in their production if they are to keep pace with our population growth in a constantly expanding technology.

The massive increases in production will require ever more stringent efforts to prevent and abate pollution of our enviornment. Even today, the minerals industry generates approximately 1.1 billion tons of solid waste annually---or some 30 pounds per person per day. Not only does this mounting pile of waste scar the landscape, but it is a major contribution to water pollution in many areas. For example, acid mine drainage from underground and surface mines as well as strip mines,

from coal mines and copper mines, pollutes some 11,000 miles of streams. We may expect the problem of preventing water pollution from the solid wastes of the mining industry to become even more aggravated in the future. For as the ingenuity of your industry is expressed in an advancing mining and minerals processing technology, we see the mining and processing of increasingly lower grade ores. Thus, the amount of waste per ton of refined ore is greater than it was in a more primitive technology. For example, in the copper industry ores averaging 15 pounds of copper per ton are frequently mined and smelted. The mining process produces 2 tons of waste per ton of ore while smelting produces about 125 tons of waste per ton of copper. Therefore, approximately 400 tons of waste material are produced per ton of copper. As I mentioned earlier, this is not merely a problem of solid waste and pollution of the landscape, but unless preventive measures are taken it also becomes a major factor in water pollution.

It is apparent therefore that modern technology increasingly has the power to disrupt and destroy the natural environment and the ecological balance on which much of life, and possible even human life, depends.

We have recently witnessed a dramatic example of this in the oil well blowout in Santa Barbara. Though that was a relatively low producing well, we will not know for some time what the effects of the oil spill have been on the local marine ecology. And one hardly dares to contemplate the effects of a major off-shore oil well blowout.

In testifying before our Senate Subcommittee on Air and Water Pollution shortly after the Santa Barbara incident, Secretary of the Interior Walter Hickel referred to a major gas well blowout that occurred on the Alaskan Continental Shelf while he was Governor of Alaska. The Secretary stated that it took 14 months to extinguish the fire, which could be seen from a distance of 150 miles. The Secretary then publicly speculated on what the results would have been, had this blowout been a major oil producing well of 10,000 or 15,000 barrels a day. As he stated before our Subcommittee, "we would have oil from the Arctic to the Antarctic." This is but one of the most dramatic of the potential dangers of our advancing technology. Perhaps of greater real danger to the quality of our environment are the less dramatic but more pervasive contributions to water pollution.

What are some of specific pollution areas in the minerals industry of which mining engineers must become more aware, and toward which we must make greater efforts at pollution prevention and control?

--copper mining and processing;

--uranium mining and mill wastes;

--phosphate extraction and the consequent danger of over-enrichment or eutrophication;

--oil field wastes from well drilling, brine disposal, and oil pipelines;

--taconite in Wisconsin and Upper Michigan;

--disposal of solid, liquid and gaseous wastes and dregging of wastes from steel mills, for instance:

--salt loads involved in mining;

--potential pollution and wastes from oil shale development.

I would particularly make reference to the problems of oil shale development, because since the gasoline shortage during the early part of World War II, I have maintained a keen interest in the development of our western oil shale lands. It is my understanding that it is not yet commercially feasible to develop these oil shale lands, but I have little doubt that at some time in the future the United States will need to turn to this as a source of energy. And the potential pollution problems of mining and processing oil shale make our present problems minute by comparison. This is an instance of where we must, in order to prevent total ruination of the environment, solve the pollution problems of oil shale mining before rather than after commercial development begins.

Let me assert certain basic principles which should guide our efforts in preventing and controlling environmental pollution. First, man is a part of nature and must learn to live in harmony with nature, with the recognition that any industrial activity to some degree despoils the natural environment and this despoilation must be minimized to the greatest degree possible; second, the Nation's water resources are a valuable national asset, subject to many uses, and that the whole Nation has a vital interest in their protection and enhancement; third, that our water resources are being degraded and that this degradation poses a threat to the well-being of the Nation and to our potential for long-term economic growth.

Acknowledgement of these principles brings us to recognition of the need for a three-pronged effort in the conservation and enhancement of the quality of our water resources.

First, reducing our water withdrawals keeps pollutants at a minimal level in our lakes and rivers. Such reduction of withdrawals applies not only to industry but to agricultural and municipal uses as well and may require reduction of the right to withdrawal in certain areas. For example, irrigation use in the southwest United States is the largest consumptive use of water in the area, and with the expanding population of that region municipal and industrial uses may in the future require higher priority than agricultural uses.

Secondly, we must maximize the use of that water which is withdrawn by developing industrial processes of more intensive use and reuse of water. The pulp and paper industry, and certain segments of

the steel industry have made dramatic strides in this respect and I would hope that the minerals and minerals processing industry would do the same.

Finally, we must reduce to an absolute minimum the discharge of contaminated effluents into our water courses, and this requires not only greatly expanded plant treatment facilities but also greater effort toward developing in-process changes which reduce pollutants.

With respect to the minerals industry, acknowledgement of these principles must specifically concentrate a greater effort on the design and construction of mining sites to prevent soil erosion, disposal of mine spoil, use of impoundments and backfill, and prevention and control of acid mine drainage through water flow by recontouring and grouting and by flooding and air sealing.

I am aware that the mining industry is engaged in research in some of these areas of activity, and that certain of the suggestions I have made are considered matters of good mining practice. However, such practice is generally on a voluntary basis and is followed with varying degrees of diligence.

The Water Quality Standards Act of 1965, which was drafted in large measure by our Senate Subcommittee on Air and Water Pollution, will make these practices more uniform. In the last two years the States have submitted to the Department of the Interior the water quality standards which were required by that Act, and the Secretary has approved most of the standards which were required by that Act, and the Secretary has approved most of the standards and the Department is now reviewing the exceptions.

In order to extend the technology of prevention of acid mine drainage, I authored an amendment to the Water Quality Act of 1968. This legislation died in the closing days of the 90th Congress, but it had been incorporated in the separate water pollution control measures passed in both the Senate and the House of Representatives. Consequently, my acid mine drainage provisions are incorporated in the pending legislation in both the Senate and the House of Representatives in the 91st Congress. These provisions would establish a demonstration program to test the technological and economic feasibility of controlling mine pollution within an entire watershed or drainage area. The program would be funded at a level of $15 million on a 75-25, Federal and State matching basis. Our Senate Subcommittee on Air and Water Pollution will meet in Executive Session this week on S. 7, the Water Quality Improvement Act of 1969, which incorporates my amendment. The Committee on Public Works of the House of Representatives has already reported similar legislation, and we anticipate House action this week. I am hopeful that the acid mine drainage demonstration program authorized by this legislation will be the basis for new advances in pollution abatement technology in the minerals industry.

There is another provision for research and development in existing

water pollution control legislation to which I would draw your attention. In the Clean Waters Restoration Act of 1966 we established a new program of contract and grant research to develop more efficient and economic techniques and technology for pollution control and prevention. This program authorizes grants to industry, totalling $20 million a year, to aid in finding new and improved ways to treat and prevent industrial wastes, with a maximum Federal share of 70 percent of project costs. I am led to believe that the applications for research grants and contracts from the mining industry have not been overwhelming in number. I urge those of you representing both private and public enterprises to give consideration to this provision of the existing statute.

We are reaching the limits---and in many areas have dangerously passed the limits of our environment to absorb and assimilate the wastes of man's activities. It is estimated that at the present rate of population and industrial growth, by 1980, the pollution load will consume, during the low-flow summer months, all of the available oxygen in all of the river systems of America. This is an appalling prospect, and the trend must be sharply reversed now if we are going to maintain an environment suitable for human life.

To do this will require a massive commitment from private and public enterprises and from government at every level. This is the challenge to each of us in this room. If we meet this challenge we will have the gratitude of our children and future generations.