

PANEL: "THE ROLE AND IMAGE OF THE PROFESSIONAL ECOLOGIST IN THE 70'S"

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I welcome the opportunity to join you today to discuss one of the most critical public issues of our time--the translation of ecological desires into ecological reality. The ability to enhance our environment in the face of unprecedented assaults will not only be costly but is challenging institutions, our traditional ways of doing things, and our technological ability. If we are to make the rapid and significant progress that the public is demanding, we must bridge the traditional gap between engineers and ecologists, and between conservationists and bureaucrats.

Environmental Decisions

In reacting against the seemingly endless chain of assaults on the environment, an aroused public is now supporting conservationists and others in what frequently is a completely negative attitude. We all know the demands for an end to freeways, no new bridges, no dams, no canals, and the list is almost endless. But this philosophy of reaction, which may in some cases be fully justified, leads to a general refusal to build anything. Yet in order to correct the tremendous degradation that is taking place in our waters, in order to enhance ecological values that have been completely altered from those that existed before man entered the West, it is essential that we build certain large public works including waste treatment facilities and water management structures.

The refusal to approve works that have traditionally resulted in particularly disliked urban conditions, may lead to even worse conditions. To say it another way, to stop a project or development or activity is no solution to the basic demand for that activity. If we are to protect our environment, we must face public needs and meet them in alternate ways to provide for resource protection.

Each of you knows that times have changed. Many of you abhorred the traditional engineer's approach to pollution control. Traditional pollution control agencies have developed elaborate systems to substitute for strong enforcement. Some fear that the continued association between regulator and the regulated produces a kind of unwritten understanding that the polluter will be pushed just hard enough but no harder than necessary.

In California we are changing from a system of pollution control which emphasized of individual "beneficial uses" to a system of water resource management that considers water quantity, water quality, environmental values, and economics in a single system of decision making. Ideally this would be related to land use through a formal mechanism. The public everywhere is demanding significant land use controls but in their absence looks to pollution controls as an indirect way of controlling excessive growth in areas such as the Tahoe Basin. The first major step to achieve this goal will be completed this spring when the State Board adopts some 16 basin water quality management plans. These plans will be a consolidation of water quality objectives, uses, wastewater management and reclamation systems, and desirable water practices. They will meet State and Federal requirements and will serve as the basis on which over \$1 billion of waste treatment facilities will be constructed and provide a foundation for future water rights decisions by the State Water Resources Control Board.

The Hardware vs. Software Technicians

Traditionally the hardware technicians--civil and sanitary engineers--have been in charge of our pollution control programs. Armed with traditional concepts and simplistic notions, they have set out to battle pollution with inadequate funds, inadequate technology, and

little power. The traditional image that an engineer has of himself, particularly civil engineers, is that he is a professional, who like a doctor, would determine the nature of the problem, the alternative solutions, the most desirable solution, implement that solution and perform such additional treatment as the patient may need from time to time. But even doctors don't have this omnipotence and engineers are learning that there are many things that they cannot or should not do.

Ecologists or software technicians who see man as an inseparable part of his natural environment, who believe that pollution control or environmental protection systems must be designed to achieve long-term environmental enhancement and are not ends in themselves, have been traditionally removed from many of the decisions that have been made by the hardware technicians. In their frustration and with growing support for their position, there is a tendency for them to overstate adverse effects, stop any project just for the sake of stopping it, and to pass judgment on the efficacy of various hardware systems thus falling victim to the same type of failure that faces the hardware men who actually don't know very much about what it is they are trying to protect.

Future Technology

In the field of waste treatment, we have just scratched the surface. Traditional concepts of primary treatment, secondary treatment or tertiary treatment which to the layman and even to many professional ecologists are rungs to the ladder leading to perfection, will, I predict, lose any significant meaning. It is true that in a general way, one level of treatment may be better than another. But if we are to get the most environmental protection for every dollar spent and unless we assume that the source of funding for water pollution control for instance will be infinite, we must know what we are doing every step of the way.

Unfortunately, we don't know very much particularly about sublethal effects of municipal and industrial waste discharges. We have begun to measure toxicity by TL_m tests but what percentage or factor of safety should be used, and should a total measurement of toxicity input to a water resource be the basis on which individual requirements are established? What about biostimulation? What are the limiting factors? Is it phosphorus? Nitrogen? Or something else?

Since most of California's waste is discharged to the ocean, what are the factors that an engineer should design a treatment plant for for discharge? Wouldn't a secondary treatment plant which employed chemical treatment be better than on using an activated sludge process? Shouldn't this be followed by some tertiary treatment, say, carbon filtration to get a large percent of toxicity removal? We have a desperate need for knowledge at the very time when we intend to spend a great deal more money based on traditional technology.

What about wastewater reclamation? The goal, I guess, of every environmentalist today is complete recycling. But as man uses any resource, he concentrates certain products. Those concentrated products could all theoretically be sorted out and reused. But the amount of energy that must be put into the reuse systems in terms of electrical energy, particularly fossil fuel energy, must be measured along with other environmental effects of the reclamation system. In short, reclamation is not a virtue in itself but only is virtuous if planned and carefully controlled to protect and enhance the total resource system. For instance, a wastewater reclamation project that irrigates a golf course, which drains into a channel and thence to an estuary or bay, doesn't really achieve much in the way of environmental protection. But on the other hand, a wastewater reclamation project that treats and discharges municipal wastes into an agricultural irrigation system can make beneficial use of the nutrients and conserve a water resource thus avoiding additional large investments in new water projects be they conventional or desalting.

Today's Control System

In highlighting some of the problems or historic differences of use I have hoped to set the framework on which we can improve the system. First essential thing is to develop an integrated decision-making system that assures that those who understand the environment--all of the chains and webs and systems that make up the complex natural world in which

we live--that their decisions concerning the things to protect are given fundamental weight. The second essential of a sound program is that technicians in the sanitary, civil or environmental engineering fields, develop technologies to meet these established environmental goals. As the engineer should accept the judgments of the ecologists, in the realm of the environment, the ecologist should accept the judgment of the engineer in the realm of technology. Obviously, in either of these areas, one will question the other. But somewhere the buck must stop. And we must get on with the job of protecting the environment.

In our rush and the rush of the public to pressure Congress, State legislators, in fact, the whole system to do something, we all desire to achieve our fondest ambitions in one or two years. Our total system just won't respond that fast. Its responses must, however, be geared to do the best job in the long run. For instance, the cost would be tremendous--- one way of ending pollution in San Francisco Bay is to build 70 advance waste treatment plants one for each community. Some even advocate the theory that wastewater reclamation would then be made possible in each local community. But since the water systems themselves are regional in nature and since the opportunities for wastewater reclamation, let alone potential for ocean disposal, exists only in certain very carefully selective locations, the scheme for 70 tertiary plants doesn't make much sense.

California's frequently hailed pollution control law, the Porter-Cologne Water Quality Control Act, provides a mechanism for ideal protection of the environment considering all factors including economic. But the concepts of this act run into real trouble when people demand the ultimate in protection. Because the ultimate is, by its very nature, unreasonable.

I am sure many of you are aware of the efforts of the State Water Resources Control Board to bridge the gap between engineers and biologists within the control system. Not only have we employed a number of biologists, ecologists and will be employing other specialists, but we have established a new position class entitled Environmental Specialist and have 12 authorized positions which are distributed among the regional boards and Sacramento. Thus we hope within our own organization to break down traditional barriers and provide a basis for sound control decisions.

Also, a far more close working relationship between the Fish and Game Department in California and the State and Regional Boards is being forged. Traditional frustration experienced by biologists in dealing with the control agencies is understandable and we are working to assure that our nine Regional Water Quality Control Boards are responsive to today's needs. This is not an easy task but I want to assure you that we are working on it with considerable cooperation from the Regional Boards themselves.

Ecological Perfection vs. the "Reluctant System"

In conclusion, I want to say again that if we are to do the job of protecting the natural system we must forge much better understanding between those of us who are working in the program. We must abandon no matter how great the temptation to seek the ultimate solution now and concentrate together on strong environmental protection programs in which we can invest a great deal of money and that will pay many dividends in the future. No better illustration of the problem we face exists than two points that were raised in a recent letter from an extremely knowledgeable and respected conservationist in the Bay area. At one point he took issue with the State Board's removal of the 90% BOD removal requirement from our policy which was paralleled by a requirement for five parts dissolved oxygen in the South Bay. We removed the 90% removal requirement to force the achievement of higher DO removals if that was necessary to achieve five parts. We knew, in fact, that it would be necessary and would ultimately force the removal of waste discharge from the South Bay. Yet this conservationist claimed we were weakening our policy and downgrading the waters of the South Bay by this action. In the second paragraph he attacked the concepts of obtaining greater dilution of wastes in moving discharge points by saying, "dilution is no solution to pollution." Those of you who studied the environment know that, in fact, dilution is a solution to pollution since dilution means two things: First, reducing the density of deleterious substances and hence reducing the opportunity for adverse effects on those organisms that would come into contact with these substances;

and second, the dilution normally meant removing wastes from areas of high marine life densities. Not it's true the wastes so discharged would still contain the same pounds of the deleterious substances. And, I guess, ideally we shouldn't discharge any deleterious substances into the environment at all. But that will happen in a world that is far removed from the one in which we live and I urge you to join me in abandoning this type of simplistic approach to our complex problems so that we can move ahead with practical, immediate and vastly improved environmental protection enhancement programs.

