

By

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Chairman Farnes, members of the 1973 Western Snow Conference, Ladies and Gentlemen: For the past few years, I have been Chief Administrator or Manager of the Denver Water Department, while prior to that, I was with the Bureau of Reclamation in a variety of water resource development positions. As a result, I have had an opportunity of working with my fellow panelists for a great many years. And I wish to commend the Technical Program Committee for bringing these gentlemen together. I'm sure you'll find them most knowledgeable in all areas of water -- including that condition of water government officials find themselves in quite often these days -- HOT.

My fellow panelists have become aware, I'm sure, as I have, of the valuable service provided by the Soil Conservation Service and other associated public and private agencies. Your contributions to advanced technology, and cooperation are invaluable assets for planning, constructing, operating and managing a water utility such as Denver's.

As Manager of the Denver Water Department, I find the topic "Water Resource Technology and Supply" particularly intriguing. It lends itself to a discussion of population projections, growth vs. no growth philosophy, increasing water use per capita, and to an examination of water as our most vital, renewable natural resource. It also poses such questions as: will the expanding economic activity strain municipal and industrial water supply systems in the years to come? Will metropolitan needs cause irreparable damage to our agricultural base? Can water be used to stop growth? Should water in metro areas be recycled and reused regardless of cost? How do you go about giving the public you serve an opportunity to participate in the decision making process? And what happens to the environment when you develop a water supply? As a panelist, I can raise these questions collectively at such conferences as this but in our daily work, we must come up with answers.

Let's start off this morning by putting water into a proper perspective. We tend to lose sight of the tremendous water supply available on earth, a supply estimated at 326 million cubic miles or put another way, 40 million Glen Canyon Reservoirs, sufficient water to provide 400,000 acre-feet for every person living today in the entire world. In Denver, we use about 225,000 acre-feet annually to supply the total needs of 800,000 customers plus industrial and manufacturing uses.

But fresh water actually available to us in lakes and rivers and easily accessible ground water is quite another matter. It amounts to only about one-third of one percent of the total. Perhaps more effort and research should be concentrated on finding ways to utilize the tremendous water reserves that exist but, up until now, remain unusable. For Example, the amount of water in our atmosphere is over ten times as large as the water in all the rivers taken together. And how about ocean and sea water, glaciers and icebergs and supplies deep in the earth?

While great strides are being made in the development of the earth's easily accessible water sources and the management of our present day supply, we cannot afford to relax. The future offers even greater challenges. The real problem of today is twofold: managing water sources from which we currently draw our supply and developing that untouched source which contains 99.5% of the earth's total supply.

The need for better management tools in connection with our present water supply has become of paramount importance over the past few years. Continued emphasis must be given to the reduction of evaporation, artificial recharge, and waste water reclamation and reuse. Evaporation must be controlled and new techniques must be developed beyond the current state of the art which seems to be limited to the application of monomolecular films

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on the surface of the water, the elimination of marine growth in shallow areas, roofs, and floating covers. Artificial recharge must be expanded upon by arranging the location of withdrawal wells and points of return so as to increase the rate of natural recharge. Waste water reclamation and reuse is, of course, one of the major management challenges. Some of the developed processes in this field are foaming techniques for removal of detergents, absorption techniques for removal of toxic organic substances and odors, electro dialysis, chlorination and distillation. At the present time, the reuse of water appears to be one of the most promising ways of making supplies last longer. The Denver Water Department presently is researching the treatment problems associated with reusing water once used through its system. Our program is directed toward providing additional waters necessary for the future of the Denver metropolitan area.

But while this is a popular program and well received by environmentalists, we must always keep in mind the basic fact that it takes water to make water. We view this research project as a necessary component of our overall program to provide an adequate water supply essential to the metropolitan area. The basic problem is one of economizing -- not technology. We are confident we can demonstrate that reuse water can be made safe for human consumption. But with the present technology, treatment of sewage effluent water will probably cost three to four times that presently required to treat natural stream flow and the construction of the recycling plant itself may run as high as ten times that of a conventional treatment facility.

Our time schedule calls for a ten million gallon per day reuse plant to be on line by 1977 to supply industrial grade water and by the mid-1980's a hundred million gallon per day treatment plant to supply water for all purposes.

The current programs for reclamation of salt water are extremely encouraging. Desalinization or demineralization processes must be advanced if we are to take advantage of the practically inexhaustible supplies of the oceans and large brackish water supplies of the inland areas. We must be able to obtain fresh water from these saline sources at costs low enough for widespread use. While such research might seem to have little interest to a land-locked state like Colorado, I'm sure Felix Sparks would like to see California reclaim Pacific Ocean water rather than continually reach for more Colorado River water.

Benefits of such research can be far reaching. Scientists tell us that it may be possible to fuse the heavy hydrogen elements of sea water to produce a new power source. If this technique is developed, one gallon of sea water could provide as much power as 300 gallons of gasoline. The development of such a technique would have a tremendous impact on our power dependent, but energy shy civilization.

One of the technical sessions Wednesday is devoted to another important process in the procurement of additional water -- cloud seeding. The water supply contained within the earth's atmosphere should be considered as a new source. Increasing attention must be given to solving the legal problems associated with tapping this potential supply as well as refining techniques of artificially inducing precipitation. Glaciers are another natural resource which must be considered as a possible new water source. About three-quarters of all the fresh water in the world is stored in the form of glacier ice. Transportation and distribution of this supply makes trans-mountain and trans-basin diversions seem simple by contrast -- even when we talk of taking Columbia River water to Los Angeles or Canadian water to the Great Plains areas.

We must support research in desalting, weather modification, and other means of increasing water availability. Simultaneously, those of us in the water utility business, must demonstrate a willingness to adopt new management techniques to assure the public we serve that the present day supply is being fully utilized.

While we in the water utility business are doing an excellent job in developing, treating and transporting water, I feel that we have not changed rapidly enough to meet the challenge of the 70's. I'm afraid we've become reactors instead of leaders in two vital areas -- protecting the environment and community participation. In our present society, it is not enough to inform the public of the facts as we know and understand them. The public must be given the opportunity of participating in the decision making process, even though this may be a painful learning process for many of us.

It is also clear that the traditional public hearing at which an accomplished fact is explained is not public involvement. The public has given us an ultimatum to include them in the planning processes or run the risk of having beautifully engineered projects blocked through vociferous and effective public opposition. We at the Denver Water Department learned this the hard way in our bond election last July. Now we are embarked on a program of taking our problems to the public, outlining alternatives faced by customers and asking them for their suggestions and comments before finalizing a capital improvement program.

We must also become knowledgeable in the environmental field. We are seeing increased criticism of our water works. We are being labeled "ecological degraders". Rather than merely react to these charges and label them false, we must devote as much time, energy, initiative and money to environmental impact studies as we do the engineering feasibility. These studies must identify, analyze and evaluate in detail the ecological impact at specific project sites and project the environmental effects -- both good and bad -- on areas far removed from the sites.

It is our obligation to provide the best water service possible in the most efficient manner. This means not only keeping abreast of improvements that can be incorporated into our water systems and their operations, but also of exercising a position of leadership, of taking the public fully into our confidence and of giving the public all the facts, the truth about water needs and our plans to fulfill these needs. We have to meet the challenge inherent in preserving the delicate balance between the needs of our people and the natural resources of our land.

Gentlemen, thank you for your kind attention, and I would like to wish you a pleasant stay in the State of Colorado and a most successful conference.