Remarks of Gilbert C. Stamm, Assistant Commissioner, Bureau of Reclamation, Department of the Interior, at a meeting of the National Federation of Federal Employees, Sacramento, California, October 9, 1969

BROADENED HORIZONS OF WATER RESOURCE DEVELOPMENT

You are all familiar with the story of the politician who, seeking support of a constituent for a coming election, recalled a whole series of actions he had fostered through the years for the advantage of this particular voter and his relatives. "Yeah," said the voter, "but what have you done for me lately?"

Today the Bureau of Reclamation and other Federal water resource development agencies find themselves in much the same situation as the politician, although the question might be rephrased to "What else have you done for me lately?" The significant benefits their programs have provided through the years have played, and continue to play, a leading role in the outstanding economic progress of America. But today this is not enough; in 1969 we cannot confine ourselves to helping people grow more and better food, to generating hydroelectricity to turn the wheels of our industries, to supplying clean, fresh water for domestic and industrial uses.

Today it's a whole new ballgame. Our present-day national goals include providing not only food and shelter and economic security, but attractive, healthful, and socially inspirational environment, as well as opportunities for cultural and pleasurable experiences. This is an exciting challenge which we in the water resource development business welcome. It means we must gear our operations to realize these expanded
goals. And I feel confident we can do it.

In my own agency, we have been broadening the scope of our goals ever since Theodore Roosevelt signed the Reclamation Act of 1902 for the express purpose of irrigating the dry lands of the West to make them capable of settlement. Today's wide expanse of productive irrigated farmland throughout the West and the thriving cities that have grown up there testify to the success of that primary objective. But irrigation was only the beginning.

As the water needs of the Nation escalated and changed in nature, the program of the Bureau evolved and expanded to meet them. Its functions multiplied to include hydroelectric generation, flood control, municipal and industrial water supply, recreation, fish and wildlife enhancement, and water quality improvement. In its infancy Reclamation was concerned only with water that flowed in streams and rivers; now it is concerned with all sources of water—that in our natural waterways, ground water, moisture carried in the atmosphere, and even the brine of the sea. At first involved in development of a single-purpose project at one site, the Bureau soon increased its operations to include development of the entire length of the stream, then of the whole river basins, and now it is engaged in inter-basin development.

In a recent message to Congress, President Nixon pointed out that by the year 2000 it is estimated there will be 300 million Americans living in this country—three times the number in 1917, and nearly 100 million more than today's population.

The great majority of the next hundred million Americans will be
BORN TO FAMILIES WHICH LOOK FORWARD TO THEIR BIRTH AND ARE PREPARED TO
LOVE THEM AND CARE FOR THEM AS THEY GROW UP," MR. NIXON SAID. "THE
CRITICAL ISSUE IS WHETHER SOCIAL INSTITUTIONS WILL ALSO PLAN FOR THEIR
ARRIVAL AND BE ABLE TO ACCOMMODATE THEM IN A HUMANE AND INTELLIGENT WAY.
WE CAN BE SURE THAT SOCIETY WILL NOT BE READY FOR THIS GROWTH UNLESS IT
BEGINS PLANNING IMMEDIATELY. AND ADEQUATE PLANNING, IN TURN, REQUIRES
THAT WE ASK OURSELVES A NUMBER OF IMPORTANT QUESTIONS."

AMONG THE QUESTIONSPOSED BY THE PRESIDENT WAS, "WHAT OF OUR NATURAL
RESOURCES AND THE QUALITY OF OUR ENVIRONMENT?"

WE WHO WORK IN WATER RESOURCE DEVELOPMENT THEN MUST ASK OURSELVES
FURTHER QUESTIONS, INCLUDING: WILL OUR FOOD PRODUCTION BE ADEQUATE?
WILL THESE FUTURE GENERATIONS HAVE AMPLE OPPORTUNITY FOR OUTDOOR RECREATION?
WILL OUR CITIES AND COMMUNITIES HAVE THE WATER AND POWER SUPPLIES TO MEET
THEIR NEEDS? AND WILL THE AMERICANS OF 2000 HAVE ACCESS TO THE BEAUTIES
AND WONDERS OF NATURE WHICH HAVE ALWAYS BEEN THE HERITAGE OF OUR PEOPLE?
IT IS TO MEET THESE NEEDS AND DESIRES THAT WE MUST FASHION OUR PROGRAMS.
DR. JACK CARLSON, ASSISTANT DIRECTOR OF THE BUREAU OF THE BUDGET, IN A
RECENT SPEECH, DECLARED, "MAKING WATER RESOURCE DEVELOPMENT FULLY RESPONSIVE
TO THE ECONOMIC, SOCIAL, AND POLITICAL CONDITIONS OF THE FUTURE IS A
CHALLENGE WE ALL FACE." I SEE IT AS CLEARLY OUR CHALLENGE.

IT IS NOT ONLY THE GOALS OF WATER RESOURCE DEVELOPMENT PROGRAMS THAT
ARE CHANGING AND PROLIFERATING; OUR METHODS ARE ALSO BURGEONING AS A
RESULT OF OUR IMPROVING TECHNOLOGIES AND SKILLS. WE ARE REACHING INTO
AREAS UNEXPLORED UNTIL RECENT YEARS. IN ADDITION TO UTILIZING SPACE-AGE
TECHNOLOGIES TO DEVELOP OUR SURFACE AND GROUND WATER, WE ARE NOW SEEKING
TO WRING ADDITIONAL FRESH WATER FROM THE CLOUDS AND THE SEA.

"Project Skywater," the atmospheric water resource program being conducted by the Bureau of Reclamation, is one of our most exciting operations. It is aimed at augmenting snow and rainfall in chronically water-short areas by cloud seeding. After several years of intense research, carried on chiefly through contracts with universities and colleges, this program has now advanced into pilot projects, which will test different systems of extracting moisture from the clouds. At the end of a 4- or 5-year period, each will have demonstrated the efficiency of one particular technology in providing additional, useful water.

Successful pilot projects will provide bases for decision-making and may lead to actual operational programs.

One pilot project which will be of especial interest to this audience is that which involves the seeding of winter storms in the upper Colorado River drainage to increase the runoff and the consequent storage in reservoirs. It is conceivable that as much as 1.5 million acre-feet of water a year can be added to the Colorado River supply. I don't need to tell you what that would mean to the thirsty Southwest, including Southern California.

Project Skywater is not limited to the West, as are most Reclamation programs. It is being applied nationwide, with the purpose of increasing the water supply for the entire country. Research has already led to an estimate that within a few years 475 million acre-feet of water could be developed annually at a cost of $1 to $4 per acre-foot. A technological break-through of such magnitude would go far toward assuring the United
States sufficient water to help attain the economic, cultural, and social conditions we envision for the country by the turn of this century.

Another promising project to develop additional water supply for our growing society involves desalting. Scientists have long known how to produce fresh water from salt or brackish water. The problem here has been how to perfect a method that would make desalting of vast quantities of water economically feasible.

Studies of future water requirements in 18 regions of the United States are underway or planned under the aegis of the National Water Resources Council. Where appropriate, these studies will include consideration of the possibility of desalting sea water to meet critical future water needs. They will identify water and related land resource needs and capabilities in the 1980-2000 and 2020 time periods. In cooperation with Mexico and the International Atomic Energy Agency, the United States participated in studies for a joint venture to build a dual-purpose generating and desalting plant which envisions use of the water and power output in both the United States and our neighboring country to the south. Discussions are presently underway on possible implementation of the resulting recommendations.

Also a preliminary Bureau of Reclamation investigation has examined the potential for a desalting plant here in California to supply water for the Santa Barbara County coastal area. Congress has not yet authorized a feasibility study for this proposed project, but it may be in our future. All three of these studies are dealing with known
TECHNOLOGIES AND SOUND PROJECTIONS OF NEAR-TERM FUTURE TECHNOLOGIES AND ARE EXPLORING WAYS TO EXPAND THEM TO MEET PRESENT-DAY CONDITIONS AND NEEDS.

At Oak Ridge Laboratory in Tennessee, the Atomic Energy Commission is studying new concepts of an Agro-Industrial complex, based on the development of water, power, agriculture, and industry as a unit for regional economic development. Nuclear power would be used to desalt the water and at the same time produce electricity. A decade ago President Eisenhower suggested such a concept for the Middle East as a force for peace in that troubled area. His was a vision which still might materialize. There is a bill before Congress at this time proposing that the United States join Israel in building such a dual-purpose plant in that country.

Weather modification and desalting are just two examples of the new, creative approach to water supply problems. Advanced technologies are also being used in conventional water resource development and in water salvage operations, which include improved water management techniques from the drainage divide down to the mouth of the river and out into the fields, waste water renovation, phreatophyte control, ground water recovery, and evaporation reduction.

Science and research into the natural environment have made giant strides in the past decade, and the prospect for greater future accomplishment is bright. Two aspects of this progress are methods of weather forecasting and the use of satellites for information gathering. Prime progress in water conservation could be made if we were able to predict
weather patterns, even three months in advance. We are getting closer to this goal. Weather satellites and instrumentation at remote locations are telling us more all the time about our weather. Someday man may be able to forecast what next summer's precipitation and temperature will be so that our water storage can be precisely regulated for maximum use.

The Bureau of Reclamation is participating in the Department of the Interior's program for orbiting EROS, the Earth Resources Observation Satellite, which is being designed for the sole purpose of obtaining earth-oriented resource data.

Thus our space programs are being put to practical use. We do not yet know the limits for the EROS program, but hopes are high. If we can achieve a significant gain in our understanding of the interplay of the atmosphere and the earth, we may truly be able to derive a high degree of expertise in our management of the Nation's soils and waters.

Those 300 million Americans of the year 2000 will be the heirs not only to what we hope will be an adequate and quality water supply resulting from the new technologies. Furthermore, if we take full advantage of new technologies, they should also live in an environment less blighted by many of today's pollutants, eyesores, and irritants.

I'd like to mention here that I do not think water resource development in the West is quite the culprit in depleting the environment that some critics are contending. It's becoming fashionable in some quarters to blame it for all of the woes of the world that can't be ascribed to either the war in Vietnam or Communist plots.

Engineers have been accused of polluting our streams and lakes and oceans of tampering with the balance of nature and even of destroying certain species.
Today's pollution problems, only recently recognized by most Americans, have caused many people to become what Glen Seaborg, chairman of the Atomic Energy Commission, terms "environmentally uptight."

They feel that if somehow we could "turn off" our modern technology we would solve all of our environmental problems—if we could stop building dams, stop taking water out of the Delta, just take our hands off the environment, then we could return to the simpler, unpolluted, natural days of yesteryear. As with most "good old days," they were not quite so idyllic as they appear in retrospect. Mother Nature herself has over the years altered the environment so much that many species which once dominated the earth have vanished. They disappeared not because they tampered with their environment but because they were incapable of doing so.

The answer to our environmental problems lies in further developing our technical abilities, gaining greater knowledge and understanding of the effects of man's activities on our environment, and in putting this knowledge and ability to work for us in our future planning and construction.

An example of such accomplishment relates to so-called "thermal pollution," which is the raising of the water temperature of rivers, lakes, or bays by the coolant water circulated through powerplants, or by other activities of man.

Increases in temperatures can affect aquatic life, but the effect, depending upon many variable conditions, can be either good or bad. If present in excess, they can destroy certain fish; but if understood and properly regulated, they can improve the health and growth of others. It is up to the engineers and scientists to put this raising of water
TEMPERATURE TO BENEFICIAL, RATHER THAN DETRIMENTAL, USE.

THE POSSIBILITY OF USING THIS WARM WATER FOR AGRICULTURE ALSO IS BEING INVESTIGATED—FOR IRRIGATION AND CONTROLLED FOG SPRAYING THAT MIGHT PREVENT FROST DAMAGE, EXTEND THE GROWING SEASON IN SOME AREAS, ALLOW TIME FOR RIPENING, AND CONTROL SOIL TEMPERATURES.

RIGHT HERE IN CALIFORNIA WE HAVE BEEN ABLE TO MAKE THE DIFFERENCE IN TEMPERATURE OF IMPOUNDED WATER WORK TO OUR ADVANTAGE. WE KNOW THAT THE WATER AT THE HIGHER LEVELS IS WARMER THAN THAT BELOW. FOR YEARS NOW WE HAVE BEEN RELEASING WATER FROM THE HIGHER LEVELS AT FOLSOM DAM DURING THE IRRIGATION SEASON AND FROM THE LOWER LEVELS TO SUPPORT THE FISH HATCHERY IN THE RIVER.

OUR EXPERIENCE WITH FISH RELEASES ILLUSTRATES HOW THE BUREAU OF RECLAMATION HAS BEEN MOVING INTO THE ENVIRONMENTAL ENGINEERING FIELD, AT FIRST SLOWLY AND EVEN ACCIDENTALLY, BUT OF LATE MUCH MORE RAPIDLY AND DELIBERATELY.

WE DISCOVERED AFTER THE COMPLETION OF SHASTA DAM THAT THE COLD-WATER RELEASES WHICH IT MADE POSSIBLE GREATLY BENEFITTED THE SPAWNING OF FISH IN THE RIVER. BUT IT WAS ONLY BY ACCIDENT THAT THE WATER WE RELEASED JUST HAPPENED TO BE IN THE MOST BENEFICIAL TEMPERATURE RANGE FOR FISH. WHEN FOLSOM WAS BUILT, WE THOUGHT ALL WE'D HAVE TO DO WAS TO RELEASE THE WATER AND THE FISH WOULD THRIVE. BUT THEY DIDN'T. WE FOUND THAT ALL OF THE COLD WATER FROM FOLSOM WAS BEING RELEASED DURING THE SUMMER AND WHEN THE FISH RUN STARTED IN THE FALL THE WATER LEFT WAS TOO WARM. SO WE DESIGNED SHUTTERS THAT ALLOW US TO RELEASE WARM WATER IN THE SUMMER AND SAVE THE COLDER WATER FOR THE FISH RUN.

SINCE THEN WE HAVE BEEN PLANNING HOT AND COLD WATER RELEASE FACILITIES.
INTO OUR DAMS—AND WILL CONTINUE TO FOLLOW THIS PRACTICE IN THE FUTURE.

THE ESTHETICS OF OUR INSTALLATIONS IS NOW A CONSIDERATION IN THE PLANNING OF ALL OF OUR FACILITIES.

WE HAVE APPOINTED AN ENVIRONMENTAL ADVISORY BOARD COMPOSED OF MEN WHO ARE EXPERTS IN THE FINE ARTS, ARCHITECTURE, AND LANDSCAPING. AFTER STUDYING VARIOUS OF OUR PROJECTS, THEY HAVE SUBMITTED RECOMMENDATIONS REGARDING ENVIRONMENTAL PLANNING AT THESE AREAS. SOME OF YOU MAY BE AWARE THAT THE WORLD RENOWNED ARCHITECT, MARCEL BREUER, WAS RETAINED TO DESIGN THE THIRD POWERPLANT AT GRAND COULEE, AND THE FIRM OF KENNETH BROOKS AND ASSOCIATES WAS ENGAGED TO DEVELOP AN ENVIRONMENTAL MASTER PLAN THAT WOULD EMPHASIZE "THE GRAND SCALE OF GRAND COULEE FACILITIES." THIS PLAN COORDINATED THE THINKING OF NEIGHBORING COMMUNITIES WITH A LONG-RANGE CONCEPT OF HOW THE COMPLETED PROJECT COULD EFFECTIVELY SERVE PEOPLE, AS WELL AS PROVIDE POWER.

Closer to you here tonight, we have developed an environmental master plan covering construction at Auburn Dam and its immediate vicinity. We have also developed a model that will serve to illustrate to all project personnel the effect of their construction activities on the environment. Also, we are considering establishment of an engineering museum that would give the public an insight into the engineering requirements of such a project.

Our decision to build a concrete arch dam at Auburn was based primarily on its effects on the environment. We had originally considered an earthfill dam, but when we found that we would have had to strip many square miles of land in the vicinity of Auburn in order to obtain the earthfill materials.
NEEDED, WE DECIDED ON THE CONCRETE ARCH DESIGN.

IN THE FUTURE, I PREDICT THAT WE WILL BE CONSULTING WITH MORE AND MORE PEOPLE OF MANY DIFFERENT DISCIPLINES BOTH WITHIN AND WITHOUT THE BUREAU AND THE FEDERAL GOVERNMENT. WE WILL BE USING THE TEAM APPROACH TO ENVIRONMENTAL ENGINEERING THAT HAS WORKED SO WELL IN SPACE EXPLORATION. A SYSTEMS APPROACH WILL BE WORKED OUT WHEREBY A TEAM OF ENGINEERS, ECLOGISTS, ECONOMISTS, ARCHITECTS, GEOLOGISTS, ANTHROPOLOGISTS, DEMOGRAPHERS—AND POSSIBLY, MISS SINGER—ATTORNEYS WILL DEFINE THE PROBLEMS, SUGGEST ALTERNATE SOLUTIONS, AND EVALUATE THOSE SOLUTIONS. AFTER THE DECISION IS MADE AS TO WHAT SOLUTION SHOULD BE APPLIED, THE TEAM WOULD EVALUATE THE COMPLETED PROJECT FOR FURTHER INFORMATION WHICH COULD BE APPLIED TO FUTURE PROBLEMS.

DURING THIS EVALUATION PERIOD, WE WILL CONSIDER MANY DIFFERENT ASPECTS—SOCIAL AS WELL AS ECONOMIC: THE WELFARE OF THE INDIVIDUAL WHO MIGHT BE DISLOCATED BY OUR PROJECTS; THE BROAD SOCIAL AND ECONOMIC BENEFITS THAT CAN BE ACHIEVED; THE LOCAL BENEFITS OF RECREATION; THE LOSS OF A FAVORITE FISHING HOLE OR A SPECIES OF FLOWERS; IN SHORT, ALL THE EFFECTS OF OUR PROPOSED CONSTRUCTION ON MAN, ANIMAL, AND NATURE.

IN MOST CASES WE WILL PROBABLY DISCOVER METHODS WHICH WILL ALLOW US TO SERVE MANKIND WITHOUT HARMFUL SIDE EFFECTS. Thus we will be able to have our cake and eat it too.

THE PROBLEM OF COST LOOMS LARGE IN CONSIDERATION OF ANY ASPECT OF WATER RESOURCE DEVELOPMENT. TODAY THE BUREAU OF RECLAMATION HAS THE BIGGEST BACKLOG OF AUTHORIZED PROJECTS IN ITS HISTORY. THE TOTAL PRICE-TAG IS $5 BILLION. CONSTRUCTION HAS BEEN INITIATED ON SOME, BUT MOST ARE
Awaiting funding. If construction appropriations should continue at the level of $200 million a year, it would take 25 years to eliminate this backlog.

The fiscal year 1969 appropriation for Reclamation construction was $196 million--$46 million less than 1968, and $93 million less than in 1964.

In constant 1958 dollars, the 1969 appropriation was $156 million, the lowest appropriation for construction since 1958. Based on constant dollars, the average construction appropriation during World War II was only 20 percent less than the 1969 appropriation and the average appropriation during the Korean War was 73 percent greater. Since 1965 when troop commanders were first authorized to order United States troops into combat in the Vietnam conflict, the average construction appropriation has been 32 percent greater than it was for the fiscal year 1969.

As a percentage of total Federal budget outlay, Reclamation construction appropriations have never been a significant item. The 1969 appropriation was 1/10 of 1 percent of the total Federal budget outlay.

Compared to 1969, Reclamation construction appropriations as a percentage of total Federal budget outlay averaged 10 percent greater in World War II, 270 percent greater during the Korean War, and 60 percent greater during the past 5 years of the Vietnam conflict.

Compared to the Gross National Product in 1969, the Reclamation construction appropriations will be about 2/100 of 1 percent of the total Gross National Product (.0002). The fraction of Gross National Product represented by these appropriations averaged 80 percent greater during World War II, 230 percent greater during the Korean War, and 40 percent...
greater than the average of the past 5 years of the Vietnam conflict.

Here are some other good insights into our present situation. An article in the Wall Street Journal of September 5 concerning President Nixon's announcement of a 75 percent reduction in Federal construction contracts said that: "Savings of up to $300 million will be sought partly in such 'pork barrel' areas as Army Corps of Engineers and Reclamation projects." The Chairman of the Senate Subcommittee on Public Works complained that "In spite of the fact that next to the air we breathe, water is our most precious resource, it seems the Bureau of the Budget first looks to the water resources program for a disproportionate share of any contemplated cuts whenever there is a need to reduce Federal expenditures."

There are two points I wish to leave with you from this review of our current funding situation. First of all, it is no surprise to this group that our present program, measured by any of the criteria I have just discussed, is at the lowest level it has been the past three decades. Secondly, we have been kidding ourselves if we blame the paucity of our current appropriations entirely on the Vietnam conflict.

You are well aware that the prospective 1970 budget is not likely to be a significant improvement over 1969's. There is a ray of hope in the fact that the 1970 Public Works Appropriations bill reported to the House by its Appropriations Committee just last week added nearly $16.5 million to the $245.9 million Reclamation budget sent to the Congress by the administration. Of course, the bill has a long road to travel through the legislative mills before final enactment.
We must recognize the forces that prevail at this time. Cowboy and miner—always needs and desires of the people will prevail.
Why is there such a great contradiction between apparent future need for water resources investment and current appropriations for Reclamation construction? First of all, Reclamation is not a popular program. To the general public we have been labeled with the stigma of "pork barrel"; and as a "Western only" program; we are accused of adding to "crop surpluses" when billions have been spent to support farm prices and retire cropland; and the public sees an apparent "subsidy" involved in pricing irrigation water at less than allocated costs.

We are well aware of the criticisms directed at our program and have made honest attempts to provide objective factual answers. The record reveals forcefully, however, that we have failed to stem the tide of adverse philosophy. In such circumstances we don't give up, rather we regroup, develop a new tack, and try again.

It is an indisputable fact that the Reclamation program is for the benefit of people. Probably no other program in Government is so completely people-oriented and people benefiting economically, socially, and culturally. However, the Bureau must generate a team effort to work out and carry out the specifics of newly oriented programs.

As I have pointed out, benefits to people must not be limited to basic physical and economic needs. Our future efforts must encompass human desires as well as human needs, and must recognize, evaluate, and consciously include on a full partnership basis under the multiple-purpose concept, the opportunities for social and cultural benefits that presently occupy such a large place in our national objectives and programs.

I am confident we can do it. In fact I believe that water and land development programs look good from any angle.

It looks good from back here, too.

Possibly being prejudiced, having been in the water and land development field for 30 years, I believe that development of this nation's only renewable, wealth-creating resources is basic to this nation's
Pressed for time—

Search—or rather than find—
My old roost in that context.

Don't fly off the pump handle when you fire.

I pound.

Old methods must give way for new.

Horse blew first—

Communication failed.

Need more food.

To fly a kite.

Chug to the ruin. We must the forces that—

Six shooters—bang bang.

Click click a?

Shotgun—shh.

But the always waste to.