GROUNDWATER QUALITY PROTECTION POLICIES FOR THE ROCKY MOUNTAIN REGION AND THE NATION

Transcript of Conference Cosponsored by

Environmental and Energy Study Institute
Colorado Water Resources Research Institute
Keystone Institute
Colorado Department of Health

April 1986

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The Colorado Department of Health

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Colorado Water Resources Research Institute
Colorado State University
Fort Collins, Colorado 80523
Norman A. Evans, Director

FOREWORD

This is a transcript of the **Conference on Groundwater Quality Protection Policies for the Rocky Mountain Region and the Nation** held in Denver Colorado on January 18, 1986. The conference, and five others like it in other regions of the country, were held to provide input for a groundwater protection agenda for the U.S. Congress as it begins debate on new groundwater quality protection initiatives.

The conference featured roundtable discussions among officials from the sponsoring organizations, local and state officials, environmentalists, corporate representatives, farm groups and others on groundwater protection needs and current programs in the region. Also considered were federal policy options, legislation and mechanisms to implement groundwater policies through what are necessarily local and individual decisions.

The conference covered a variety of groundwater contamination issues, but it specifically highlighted the implications of agricultural and mining activities on groundwater quality.

The conference drew approximately 150 participants from the Rocky Mountain region. Cosponsors of the conference were the Environmental and Energy Study Institute (Washington, D.C.), the Colorado Water Resources Research Institute, the Keystone Institute and the Colorado Department of Health.

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Saturday, January 18, 1986
9:00 A.M. to 3:30 P.M.
Paladium Room
Regency Hotel
3900 Elati Street
Denver, Colorado

APPEARANCES:

KEN MURPHY, Environmental and Energy Study Institute

CONGRESS WOMAN PAT SCHROEDER

JOHN EHRMANN

JUDY CAMPBELL BIRD

DR. NORM EVANS

DR. HENRY CAULFIELD

GARY BROETZMAN

TAD FOSTER

CHRIS SHUEY

APPEARANCES continued:

WILLIAM RALEY

DON GOOLSBY

RICK AUSTERMANN

MAX DOTSON

CRAIG BELL

GERALD DAHL

PAUL FROHARDT

RAY CHRISTIANSON

DAN LUECKE

P R O C E E D I N G S

MR. KEN MURPHY: Good Morning. My name is Ken Murphy and I am the Executive Director of the Environmental and Energy Study Institute, one of the sponsoring organizations today, and I have the pleasure this morning of introducing Congresswoman Pat Schroeder to give the opening remarks.

We appreciate you taking your time on a Saturday to to come and we hope to listen and learn and hope to bring the benefit of your ideas and advice and experience back to Washington, D. C, and in the hopes of informing the ground water debate.

One of our other hosts who had planned to be here, Congressman Mike Strang, unfortunately could not at the last minute, and he sent a letter for me to read, and it reads:

"Dear Conference: I am truly sorry I am not going to be able to join you today, but I had a death in the family and I am attending the funeral out of state. I particularly regret not being present today, because the subject matter, from 1964 to 1971, I was on the Colorado Commission on Ground Water and in 1970, served as the Commission Chairman. I am very familiar then with the area and the issue and look forward to hearing yourfindings. With

the fine set of hosts and co-sponsors with you as participants, I know you will have an excellent meeting. With best wishes, Mike Strang, Congressman.

Congresswoman Schroeder represents the First Congressional District of the State of Colorado. She is the dean of the Colorado delegation and senior woman member of Congress, and doesn't have much gray hair yet.

She serves on the Judicial committee and the Armed Services Committee, and is on the Post Office and Civil Service Committees, and Chairs its Civil Service Subcommittee, and also is on the Select committee on Children and Family and Youth. She is also a member in good standing of the forerunner of the Environmental and Energy Institute.

Without further ado, Congresswoman Schroeder.

CONGRESSWOMAN PAT SCHROEDER: Thank you all very very much. I come here to bring greetings from the many members of Congress that are backing these bills.

As you know, this is the sixth in a series. My understanding is, it is the last, and you will then start trying to compile the data and the things that you learn from this. I think this is a very very important process. We all know that we have learned an awful lot about ground water.

In the Fifties in the Denver region, we had some farmers who lived north of Denver, who started to notice

strange things happening to their crops and animals and to their own health. They begin to suspect something had happened to the ground water, and then they began to suspect that something had come from the Rocky Mountain Arsenal, where they were making nerve gas. Well, at that time, there was a different kind of relationship. The Army said absolutely not, we wouldn't do anything like that, and spent their time stonewalling and trying to prove, of course, they didn't do any such things.

After very very aggressive proof had been brought forth by different state health agencies, we learned indeed that it had happened, that the groundwater had been contaminated by some of the actions of the Arsenal and by the pesticide plant nearby.

So, consequently, as we learned more and more about aquifers, about all the different things that happened, we have seen that the ground water quality issue has gotten bigger and bigger.

We in the Rocky Mountain area obviously have a lot of things that are peculiar to our area. The different kinds of aquifers, the present mining tailings that are around in different areas. The agricultural pesticide problem, wetland preservation and what is going on there, and, of course, just recently in Denver, we have had the problem of finding industrial pollution very close to Denver's own

water table and water supply, and that obviously made us all terribly nervous.

As you know, in Congress the congressional agenda has not been moving very fast in this area. There has been a lot of concern, but we have not been able to move into really doing anything. There are some amendments in the new Safe Drinking Water Act and Clean Water Act extensions that would affect a little bit of ground water, but those are all languishing in a Congressional conference committee and we don't know if they will ever see the light of day, and basically, there has not been a lot of new ground broken in this area.

It is going to be difficult to do much of anything at the federal level in the next few years because of the Gramm Rudman debate, and the fact that the last thing we need are probably new problems. Everybody is trying to figure out which program we already have that should be thrown out or pared down or what our new priorities should be, so anything that we look at, they are looking more and more at how you find a new mechanism for raising the money to achieve it.

I think everybody understands something will have to be done about ground water quality and then the question is going to be how are we going to pay for it, because dipping into general revenues isn't going to work anymore. There are

no general revenues left to dip into, as we know--there is only general debt to dip into.

So the whole new debate has been the polluter pays, and nobody is quite sure how the Congress is going to go, but you being here and you having input is very very helpful to us, because it is at a time when people are not set in cement, when there still is all sorts of openness to a lot of different suggestions, and you can help craft the way it goes. These kinds of conferences are so terribly important, because you can go two ways with these things. You can either have local experts in government and local people in business getting together and agreeing on what might work, or if you don't have that happen, which is what you are trying to do today, if you don't have that happen, then you end up seeing what we have seen happen before we in Washington decide what will work and come back and tell you what it is and what you will do and you are now forced to do this, and very often we don't know what will work and we make mistakes and so forth and so on.

So this is terribly critical, because you are coming out at this time, and it is critical problem to the future, and obviously has always been a problem for the west where water is so very precious. We can't lose any of it.

So how do we address this problem so that we get progress on it rather than just spin our wheels, and have

people really delaying and stalling and spending all our energy in the wrong way. We want to direct the energy to dealing with ground water quality and not all the other things.

So thank you for coming and thank you for being here to brain storm. I won't be able to spend the whole day, because there are a thousand things going on in the city today, but I have people here from my office taking notes, and we will be constantly in touch to find out what comes out of this meeting and the six others or five others so that we will know. Obviously in the next couple of years, Congress will be trying to put together some comprehensive legislation in this area, and it is very important that we all stay in touch. So thank you very much for doing this and I want to thank all of you for being here.

MR. MURPHY: I wanted to say a couple of other things about the sponsors of this conference. It is being co-sponsored by our Institute, the Colorado Water Resources Research Institute, the Keystone Center and the Colorado Department of Health.

The Environmental and Energy Study Institute is a non-partisan public policy organization based in Washington, D. C. It was joined a year ago by a number of members of Congress. The Institute's goals are to meet

critical needs for better informed, thoughtful debate for renewed bipartisan concensus on these issues, and innovative solutions. The Colorado Resources Research Institute is Colorado's designated management center for all all types of water research; their activities are directed towards solving and mitigating urgent and critical water related problems in Colorado.

The Keystone Center is an independent, non-profit organization, whose goals are to facilitate and formulate national policy and decisions in environmental and national resources issues through negotiations and to expand the understanding of environment and our natural resources through education.

The Department of Health of Colorado is the state agency with chief responsibility for ground water protection as well as other environmental health issues. As Congresswoman Schroeder noted, this is the last of a series of six regional ground water conferences. Others have been held in Ohio, Florida, Kansas City last week, Tennessee and California. These conferences are designed to get input from people in the real world out here, and your advice as experts in development of national recommendations for action.

The conference is generating important innovative projection of ideas and increasing public awareness.

Following these conferences we are going to have a policy development workshop in Washington, where we are going to try to glean the best of what we learned from these six conferences, to test out promising ideas and come up with our best judgment about what we can do with this important resource.

We are here today to discuss current activities to prevent ground water contamination in the Rocky Mountain West, particularly focusing on agriculture and mining problems as well as discuss the goals and strategies.

The panelists we have here today are very distinguished. We will give short five minute presentations on their perspective, and then have informal round table discussions with representatives from the sponsoring organizations and the panel, and finally, we are going to open it up to questions from you people.

I would like to introduce the representatives of the sponsoring organizations. I will start with Dr. Norman Evans, who is Director of the Colorado Research Institute. Sitting to his left is Judy Campbell Bird, who is the Ground Water Program Director at the Environmental and Energy Study Institute, and sitting to her left is John Ehrmann, who is the Director of Science and Public Policy at Keystone Center. John will be the moderator of this morning's session.

MR. JOHN EHRMANN: We would like to get started with the morning session and we are very pleased as our opening speaker for this session to have Alexandra Smith, who is deputy Administrator to this region of EPA, Region VIII. I have had the please of working with Alexandra on a couple of Keystone efforts. She always brings good spirit right to the process as well as good ideas. Alexandra has a undergraduate degree in government and MBA from Washington University and previously was director of Air and Waste Division of Region 10 out to the northwest of us here.

MS. ALEXANDRA SMITH: Good morning. I thought from all the cars going up the hill as I drove down from Evergreen this morning everyone was meeting in Keystone this morning, John, but I am glad to see so many people are here.

With growing public concern on what is going on in ground water and drinking water, it is very timely topic. I wasn't completely aware this was the end of a series of six sessions, and I would have been interested in reviewing some of the previous comments, but I am sure this region has a great deal of expertise and opinion input and concern as well from what is going on.

My perceptions this morning-- I am not a hydrologist and I don't have elaborate expertise in ground water, but

I thought it might be useful if I gave you some sort of history on what I have perceived over the past 10 or 11 years that I have worked for the EPA, some thoughts on what is involved with hazardous waste and Super Fund programs, and a similarity that you find in what we have discovered in agricultural contamination and also mining waste.

A little bit on the degree of public concern that I have seen generated and we continue to assess what the problems are and the risks, and how this awareness has driven EPA programs on this.

There are a number of EPA staff here as well this morning, and you come from various, either academic, industry or local state agencies with expertise, but I just thought it might be useful if I gave you as part of the overview what I see happening within EPA.

As part of this, I wanted to remind you a little bit of what EPA does. When I started out with EPA, it was primarily a water quality agency, and also an air quality and water quality agency. We were concentrating on a lot of water quality permits, NPDES permits, construction grant programs, and I had no idea that the main mission at that time was pouring concrete and building sewage treatment plants. Somehow, I thought it was more blue sky and green trees, but soon learned that our main appropriation was in construction grant programs.

Another element that we learned a great deal about from our scientists was on monitoring stream segments, how were we doing on cleaning up different parts of the country, how was the Willamette River, and what was going on in Niagara Falls. I am sure many of you followed that as well.

We also though more of the risk associated with these in terms of fishable and swimmable, and EPA has gradually evolved from that, having a philosophy oriented towards more of a public health concern as well, and I think the public now has developed expectations of the Agency in all the EPA areas of moving from the fishable and swimmable kind of philosophy into more of the public health concern. I have learned a lot more personally about what goes into ground water and pay attention to what Jefferson County Health Department people tell me that nitrite levels are, and so I think that we are all having an increasing concern there.

An important element of what is happening with EPA has been the advent of hazardous waste programs. They help us address the problems, given the different regulatory authority, and help us bring to the fore front a host of risk evaluations, which is becoming very important in this area, and also have provided the need and direction for

retaining a lot of our people in hydrology and just a common thing, it is administrating the agency that we did have a lot of engineers and lot of chemcial engineers and biologists and whatever, but we just over the past years have not had a lot of regions, a lot of hydrology expertise, and this has really delayed us, and we now have the ability to reshape our staff in that area.

But with the hazardous waste program it brought a lot more public attention, as you are aware of, a lot of emotional response often generated by the general lack of understanding of what the risks are and how can we protect our resources, and how can we turn our resources to a useable resource. Because of the hazardous waste program we have begun to discover what the ground water concerns are as well.

Now, many of you have been working on ground water for a number of years, but it has been my perception, and based on with the air and hazardous materials Director in REgion 10 for about five years, so as the program emerged, and as we began to discover more of the problems associated with what we are seeing in ground water, I am going to define a couple of things as I talk.

We discovered a lot of industrial chemicals and commercial products which you have read a great deal about in the press, and these are the products that are

either disposed of or become problems through the manufacturing process. By pesticides in agricultural chemicals, I mean those that were really applied legally and with good intentions by agricultural communities, and this included pesticides and fertilizers. By mining waste water, part of the topic this morning, I mean the waste from mining smelters and oil shale production. And once again I just wanted to state these are my personal perceptions, and some of the things that have been going on at the agency as being a branch chief in the water division earlier in my career.

One thing this region does is that we are the leading region nationally for the office of pesticide and toxic substances, so my role has been a great deal of time with the Assistant Adminstrator to toxic and pesticides talking about what the problems are across the country. When we start addressing comtamination concerns, I want to give you a few examples of what we found in agricultural chemicals.

Many of you have suspected there was contamination at various facilities, and I think there was an awareness that somehow putting all those chemicals on the ground are going to show up somewhere, but we didn't know a lot about it, but we started finding through the hazardous waste program traditional things that had gone on at the facility.

Then other things begin to crop up. It was my experience with commercial land disposal facilities, and the ranchers in the surrounding areas were getting increasingly concerned because they were afraid that chemicals from land disposal sites were migrating off the site and affecting their ground water, and when we looked at where they were concerned there had been some pesticides that also were in the surface water and through the water and migrated over to their area. So I had our staff go out and monitor wells in the surrounding areas. We really wanted to make sure that we did not think that there was migration off that site, but wanted to make sure that was true, and unfortunately, we found good news and bad news. The good news was, that it hadn't migrated off those sites, and they were at low levels, and we were concerned, but nevertheless they were there.

So this growing awareness and then through the cancellation process, I am sure you knew was always a topic of hot concern, when the pesticide use on grains and fruits was going through a reregistration and cancellation process, and what happened was, with that action, some of the people in this one area realized that, gee, before they bought a hole, they had their wells tested for EDB. This also brought attention, and we designed a survey to try to locate what was going on there.

It was through the various direct programs that we were looking at, and from the ground water concerns it just kept popping up in a number of areas, and we discovered these similar tests. Everyone began to be aware there were truly problems with the ground water contamination, even in places like Hawaii, as you are probably aware, that even paradise was threatened, and they decided to monitor, after California did some monitoring, and decided that DBC, PNB, and they also found EDP and DCPB and the State of Hawaii had to do a lot in the area of ground water protection. Pesticides have been found in ground water in at least 23 states; contamination by 16 different pesticides can be attributed to normal agricultural practices, and 50 differ pesticides have been found in ground water from all sources.

Another thing that the Agency is working on that many of you are aware of is nitrates. The health risks are associated with blue babies, and agricultural activities are the greatest source of elevated nitrate concentrations.

In the South Dakota aquifer study, it showed 30 percent of the domestic wells samples exceeded drinking water standards.

Well, the problems with agricultural practices, I hope, are going to be discussed later today.

I have been encouragedthe past year that the Office of Pesticidesand toxic Substances is concerned with the

leachers, and these chemicals have been looked at in a bigger effort in trying to identify the pesticides which are likely to leach and move through the soil quick and don't biodegrade quickly enough, and hopefully putting additional controls on those which are found to be presenting a significant risk as well as relooking at some of them through this process.

In late '84 OPTS also issued an order requiring manufacturers to provide information on whether their products were leachers on an accelerated basis in order to have a completed data base. They started new ground water teams in the Office of Pesticides and Toxic Substances to evaluate impacts of these products, and they are looking at reregistration of a number of chemicals and asking for that data. They are starting a national pesticide ground water survey, and I believe North Dakota has already done their survey. I am not sure of their results, but I know the states are getting underway in this area. The ground water survey for pesticides in the ground water program is designing and exploring surveys to provide a national picture of the extent of the pesticide probelm. We still aren't sure to what extent and what areas this is really concentrated in.

Once we find out regions are worried what is happening, that we found various pesticides in aquifers and ground

water, what do you tell people. So we are looking at what is there and have been assigned work to develop better prevention techniques as well along with this, the public water supply program, drinking water program at the national level has been brought along.

As you all remember they monitored fecal coliform, turbidity,and now with the hazardous waste program and the pesticide program we are working on intermediate efforts. In pesticides alone they are going to accelerate the program. We found it --What does it mean-- How much can we tolerate-- and they are doing these RMCLs -- Such things as chlordane, DCP, REDB, 24D and a lot of contaminants--- 11 of us that have been active in the pesticide area, and many of the proposals are to have zero or no levels. It will be interesting to see what comes from the comment period on those things.

Part of this overview is to include mining waste as well, and mining waste in this region has been a source of great attention at the regional level and they are working with headquarters as well.

Mining wastes and ground water, from our people in the office in speaking with them, they also evolve like pesticides with us gaining greater knowledge through it. We have been dealing with surveys on water and air in mining problem areas.

Actually with Super Fund we have been able to look at more of the concerns, and generally the Agency concerns have been with older operations in the mining areas. New operations can often be designed and operated to preclude the suspected and known problems in the older or abandoned facilities that we find.

Now, mining waste problems with ground water contamination depend on a few things, the type of mining wastes, the hydrological setting, the management of the waste, and the waters associated with the mining that may or may not contribute to a known or potential ground water problem. Each mining site has a specific set of conditions that require independent evaluation to qualify and to quantify the ground water contamination potential. Our knowledge base is rapidly expanding in this area through what goes on in Super Fund. Currently, there are 39 mining sites across the country related -- that are related to mining waste facilities, that are listed or proposed under Super Fund-- the National priorities list, and 18 of those facilities are in Region 8. Now, they don't all correspond to ground water contamination, but that part of the scoring that goes on with the model that is used to rank a site on the national priority list, ground water is a primary part of that component. And because of the contamination of the local water supplies that are sometimes hydrologically

connected to some of these sites.Super Fund has paid for temporary replacement of drinking water for citizens where there has been a situation like up in Milton in Montana, where that happened, and once again, I want to tell you not all mining sites ground water aspects too. The kind of pollutants we are seeing from mining there are cyanide contamination, leaching arsenic, copper, lead, mercury, cadmium and acid drainage problems, and interestingly enough, total dissolved solids make some drinking water unuseable because it didn't look good or taste good. So that is also a problem.

The contamination at mining sites is just a real general overview, and I am sure some of you are truly expert in this area of release of heavy metals into the hydrological lense and hence to the ground water. Sometimes just surface water seepage goes immediately from the tailings or processing ponds, run off from the sites or direct discharge of acid mine drainage to the surface or subsurface waters. In most cases, these metals have been shown to be acutely toxic to live organisms. Sometimes we don't see them at high doses, but because mining wastes are associated with enormous amounts of wastes, so it may be you have to have a higher concentration. The information on long term chronic toxicity is currently limited. In some cases like arsenic, they may contribute to cancer in humans.

Another complication is understanding the implications ofmining wastes from ground water to underground, the unique geochemistry of a particular waste, what is called metals mobilization potential or long term potential. Our mining experts tell me we sometimes aren't aware what the problem will be for almost a hundred years, because it changes as it moves through the geochemistry.

Another unique aspect of mining waste which is another problem is, that as we all know, the water in the mines is pumped out and when the mines were abandoned, the water goes back in again, and often times the ground water regime reestablishes itself; that is contaminated ground water as well. So what are we doing as a result of this mining. We are continuing to look at the regulatory aspects of CERCLA or Super Fund. We are looking at regulating mining wastes. There has been a recent report to Congress that is available through our regional office, if you haven't seen that. It is a continuing evaluation of the problems and monitoring; and another thing we are veryhopeful about is recently, just in the past month, between the Region 8 and Headquarters in Washington, D. C. we have established a national mine waste task force that will be hoping to promote an understanding in both dialogue on the issues and problems and getting our facts together, not only hopefully with states and local agencies, but also with mining

companies themselves.

In conclusion, what are the implications of pesticides and mine waste problems. First of all, I think it really has been encouraging to me over the years to see the difference in how many aspects are different, how EPA looks at things. Those of you, and maybe some of you worked for the Agency before in the past, it has been my observation that many things have been very immediate; specifically the water people only talked to the water people, and the air people only talked to the air people, and the pesticide people only talked to the pesticide people. Really in ground water and through some of the things we have been finding, they have developed an intermediate approach. The hazardous waste people now talk to the toxic people and use their expertise, and the water people program and drinking water people are setting standards so they can help the hazardous waste people in the ground water situation.

The Office of Research and Development has done a great deal on risk assessment recently, and are teaching all across the Agency how do you do risk assessments. If you do risk assessments, how then do you manage your decision in the risk area. We have been doing a much better job at identifying data gaps, describing the problems, getting monitoring surveys up and running. Just a tremendous amount of effort has come through. There has been a great deal of

work done on how do you define, how do you explain to the public what the risks are? What concerns do you have? What does that .02 mean? And so the Agency has really come a long way in that area specifically, not that we don't have a ways to go, but over the past years it really has been encouraging.

We are doing a much better job in health advisory and the establishment of a ground water office in April of 1984. They put together this protection of ground water strategies in August that year, and it has put us in a lot better shape to address the problems and hopefully solve some of them. The states are getting involved with us, and they have been involved for a long time, but it is a much more coordinated effort. There has been some funding available for the states. They are participating in the surveys that we are doing in the ground water and agricultural chemicals area. We are just building a better dialogue. Companies are doing a lot better job of addressing the problem and looking at the ground water problems themselves and putting money into surveys to see what is going on in there. Just even accelerating drinking water programs and getting those maximum contaminant level numbers out, so we can tell people and explain to them and define what the problems are. This is a real indication of what has been going on in ground water. The changes in regulations,

the pesticide regulations, looking for leachers, and having that as a factor in our regulatory area has been an important factor that not only do we learn to clean it up, but how do you prevent things from happening in the future. Ground water development under RCRA has been a big help.

I think this overview will give you a little bit of the information, a little bit of the history of the Agency and how we have been evolving with several programs and the programs are getting a lot more together. The pesticide and mining wastes are an important component of that, along with industrial chemicals. Interest is very high and you can tell that by the size of this audience. So I hope this leads into what the panels are going to tell you more about specifically today on more ideas for controls and what our current processes are going to be. If we can answer any questions, or some of the other EPA people that are here, I would be delighted to do so.

MR. EHRMANN: Thanks, Alexandra. I think that was an excellent overview and thanks to Congresswoman Schroeder. Max Dotson will be on the panel this afternoon, so if you have specific questions of Alexandra's comments, or anything she has said wrong, you can get Max in trouble.

I want to say a few words about the panel and the way we organized the session as a whole. Even though the ground water quality issue is a broad one, we have arranged

the panels today to focus particularly on the agricultural and mining issues related to ground water quality. That doesn't mean we aren't or won't have some discussion on other sub-topics under the ground water quality rubric, but we have got panelists up here who are particularly skilled and knowledgeable in the area of agriculture and mining activities as it relates to ground water quality. Other regional workshops have focused on other aspects of the problem. We have asked each panelist to keep their remarks to no more than five or ten minutes. I am going to be fairly strict about that because we want to make sure that the folks on this side of the room have a chance to ask some qualifying questions and clarifying questions,and I do want to provide ample opportunity for the audience, those of you in the audience to ask questions and make comments. We want this to be as much of an interchange and discussion format as possible. So we will try, and we want our panelists to impart a lot of information, but I want them to do it as quickly as possible.

After we have the panel this morning and round table discussion we will break for lunch, and then the afternoon panel will commence at 11:45. In the spirit of keeping things brief, I am going to make short introductory remarks for each of the panelists. The first panelist is Gary Broetzman who is Director of the Water Quality Control

Division of the Colorado Department of Health.

MR. GARY BROETZMAN: Thank you. We are pleased to be a part of these sessions this morning. Today, I will be talking from my role as Director of the Water Quality Control Division. We have responsibility both for water pollution and safe drinking water and also as Chairman of the Water Quality Committee of the Western States Water Council. It is an organization made of water interests in the 14 western states of the country. I will be talking in general about the processes under way in the western states for dealing with ground water and problems in general.

Groundwater is the large unseen water reserve in many areas of the Rocky Mountain region and the West. It is especially important to this arid region of the country because of the physcial and economical limits to the availability of surface waters. Although considerable groundwater has already been withdrawn, great volumes still remain in generally good quality.

Today, groundwater meets the needs of 50% to 80% of the public water supplies within the western states. Municipalities rely upon groundwater not only because of its relatively dependable availability, but also because of the lower cost of development and treatment. Most groundwater can be made suitable for safe use with only

disinfection.

Beyond its importance for municiapl purposes, irrigated agriculture uses large volumes of groundwater in the West. An obvious example of this is the High Plains overlying the Ogallala aquifer extending from Nebraska and eastern Colorado to Texas. Groundwater is also very important for industrial purposes. For example, groundwater has supported much of the economic development of southern Arizona and the energy rich areas of Colorado, Utah, and Wyoming.

From a state management perspective, the western states have recognized the need for managing and regulating groundwater use for many years. Historically, groundwater management has bene directed primarily at controlling depletions.

All western states use some type of permit system to regulate depletion of groundwater. These permit systems vary from state to state and depend upon the regulatory approach deemed most appropriate to that state. Characteristically, the approach being used in each state takes into account the nature and seriousness of the problem, the established legal doctrines for that state, and the state capabilities and resources that have been and can be dedicated to groundwater management. Colorado initiated its state management sy stem in 1957 under the State Engineer's office. Other states also started at about that time.

Programs in New Mexico and Utah originated even earlier with the New Mexico program dating back to 1927.

Over the past approximately 15 years or so, contamination of groundwater has become an increasingly serious problem in a number of the Western States. This is especially the case where high demands exerted on the resource have preceded adequate regulatory controls to identify and prevent water quality problems from occuring. But a number of states have taken early action. For example, Arizona and New Mexico developed regulatory measures to control groundwater quality in advance of pending serious problems. In most other states, Colorado and Utah among them, groundwater control programs are in their infancy.

As with state programs for the control of groundwater depletion, proposals of control programs for groundwater quality have led to a variety of approaches and methods across the western states. Some of the states use a broad classification of aquifers; others use a more site specific approach of protecting uses of groundwater in the vicinity of sources of pollution. Some rely on control regulations for establishing limits by general rule; others have a permitting process that allows for more site specific requirements. The differences in approach aside, the programs of these states generally have a common theme; that is, protection of the uses of the resource with particular emphasis on drinking

water and related public health.

In developing their groundwater quality control programs, the Western States have had to cope with two major problems; program fragmentation and quality/quantity interrelationships. Fragmentation of program activities has occurred in a number of the states because of state efforts to control a variety of independent activities that have evolved over a number of years. Some of these activities relate to seveal fragmented federal programs such as control of mine reclamation, uranium and other radiological mining and milling, and oil and gas development. Still others were initiated to address state and local needs, such as septic tank controls and the management of solid waste disposal sites. Some states have resolved this fragmentation problem with formal or informal interagency working arrangements aimed at achieving common program goals and emphasis. Colorado is one of those in that we have 14 different agencies with groundwater responsibilities involving 18 different laws. Others, such as Arizona, have these various functions incorporated into only a few agencies, thereby avoiding some of the coordinating challenges.

The quality/quantity relationship in the context of overall groundwater management is becoming increasingly important as we experience quality degradation due to increasing depletions of the groundwater. We recognize that as groundwater volumes are reduced, the remaining supplies

tend to become more concentrated with natural and man-made chemicals and contaminates. We are also seeing increased attention being given to the prospect of injections of treated wastewater not only for disposal purposes, but also for replenishing the aquifers. It is becoming apparent that if we hope to preserve and protect groundwater quality for the long term and over broad geographic areas, close working relations between the states' water resources and water quality agencies are essential.

Over the past three years, the State of Colorado through my agency the Water Quality Control Division, and our regulatory Commission, the Water Quality Control Commission, has been developing a comprehensive approach for groundwater quality protection statewide. This effort was initiated by a series of public meetings across the state in which the public showed much interest and concern over the protection of groundwater for drinking water purposes, and the fragmentation of on going programs and approaches at the local, state, and federal levels that protect groundwater quality to varying degrees, and the number of activities and facilities that are not being regulated adequately.

Some of the more significant problems identified are, industrial wastewater facilities that are exempt from RCRA requirements, such as lagoons that store industrial process waters, septic sy stems that are inadequately designed or

operated, and several large facilities along the front range, many of which are under Federal control, and agricultural chemigation practices associated with center pivot irrigation rigs whereby fertilizers and pesticides or herbicides attachments to these rigs have the potential to convey these chemicals directly to the groundwater.

WE are addressing these and other concerns through a coordinated groundwater and quality program based on the following three components.

1. An overall management goal, what are we trying to accomplish.

2. A basic overall framework for defining the quality of groundwater that must be protected consistent with the goal and the methodology for defining specific performance requirements of pollution sources such that the groundwater quality is protected. We call this the basic regulations similar to the basic regulations that we have in place for classifying and setting standards for surface water streams.

3. Setting minimum design standards for regulating a given category of activities or facilities currently unregulated. These are control regulations and are comparable to the technology-based requirements set for categories of dischargers to surface waters.

The Water Quality Control Commission adopted the overall program goal in 1984. That goal is to protect uses of

groundwater and the public health associated with those uses The Commission is expected to adopt the basic regulations this spring following completion of a public hearing on them in March. Once that regulation is in place, we anticipate that it will be used by all on going programs that affect the protection of groundwater to bring about the consistency needed in those programs. Further, over the next year we expect to direct our attention towards the promulgation of control regulations directed at currently unregulated activities. Industrial ponds not covered under RCRA and chemigation are leading candidates.

Over the past few years we have seen the growing emergence of federal interest and responsibilities in groundwater. This occured first in the Safe Drinking Water Act in 1974 with special consideration given to sole source aquifers and a control program for underground injection control. The EPA groundwater protection strategy developed over the past two years further heightened the federal presence. Ultimately, the RCRA amendments last fall added a number of groundwater quality control requirements related to treatment, storage, disposal, and neutralization of toxic and hazardous wastes.

State water managers are watching with interest this growing federal involvement in groundwater management and quality control. We generally see the need for a national

framework of groundwater quality control. We welcome the technical support and funding assistance. But, we are apprehensive over whether Congress and EPA have an understanding of, and an appreciation for, the unique set of problems that confront the Western States. We are concerned over whether the federal mandates, if they are imposed, will have the institutional, legal, and regulatory flexibility to be compatible with the overall existing state groundwater management efforts.

Beyond that broader issue, we in Colorado have two specific groundwater concerns involving the Federal government. One involves the re-authorization of the CERCLA Bill. We and other states have strongly urged Congress to eliminate a proposed provision which would exempt Superfund projects from state requirements for protecting groundwater quality. So far, Congress has not seemed to recognize this need, thus, Superfund projects could well be implemented such that they would undercut state groundwater quality management efforts. The other concern pertains to the need for federal facilities to protect groundwater. In Colorado, perhaps our most serious contamination of groundwater is caused by the Rocky Mountain Arsenal and Rocky Flats. Military bases are also likely problem areas, as are large federal contractors such as Martin Marietta, just outside Denver. Thus, we believe that Congress and federal agencies need an increased

commitment to correct those problems under their direct control.

In summary, the western states have had a long history of groundwater management. Those efforts vary significantly from state to state, depending on a number of factors. State efforts have been expanded in recent years to regulate groundwater pollution. More recently, federal program requirements have emerged in controlling groundwater quality. Those federal efforts need to recognize the state role in water management, the state regulatory groundwater efforts already in place, and the need to build upon and improve the effectiveness of those state programs. Further, an increased federal effort is needed to correct groundwater quality problems associated with federal facilities or under direct federal control.

Thank you very much.

MR. EHRMANN: Thank you, Gary. As I said earlier,we will hold questions until the panel has completed all of their comments. I should repeat that what we are trying to focus on this morning as Gary did very well, what are some of the key issues and concerns related to groundwater as it relates to agricultural and mining activities. This afternoon's panel will focus on initiatives to deal with those issues, so as you formulate your questions, that would be important to bear in mind in terms of the

split in topical focus for the two sessions.

Our next speaker is Tad Foster, who is Assistant City Attorney with the City of Colorado Springs.

MR. TAD FOSTER: John, thanks for the opportunity to share with you and others perspectives as a city employ ee of a major municipality in the State of Colorado.

I had originally anticipated about 15 minutes in which to express my ideas; now that I am trying to curtail them into five minutes, they may be somewhat disjunctive.

As an employee of a major municipality, it is always difficult to represent any municipality in terms of either its use of ground water or its impact on ground water. It is particularly difficult because perspectives vary with the size of your city, geographical location or historical experience. It is also difficult for me since, as a member of the Water Quality Control Commission of the State of Colorado, we are presently in a hearing on groundwater regulations, and it is necessary for me to avoid the appearance that I have already made up my mind, so please excuse my biases if they come through too clearly.

In this presentation, I want to hit basically three points: the municipal viewpoint on relative importance of groundwater, at least in the State of Colorado as a supplier of drinking water; the plethora of present regulations

which protect groundwater, as seen from a regulated entity viewpoint; and perhaps some refinement that can be made to existing regulations. First, how important are ground water supplies for municipalities. In the case of Colorado Springs, groundwater accounts for only two percent of our total water supply system. Groundwater has never been found to be a reliable source of water for our municipality Our experience is that areas on the eastern edge of Colorado Springs have frequently annexed, because they have determined that their groundwater supply is becoming increasingly unreliable. When wells sand in, they look to surface water supply sources.

We have observed that municipalities downstream from Colorado Springs who are dependent upon groundwater supplies are searching out surface water supplies in order to expand.

I have observed the area north of Colorado Springs in the Black Forest and Monument areas using central systems as well as individual wells for ground water supplies despite the fact of grave concerns that the groundwater supply is being mined more quickly than it is being replenished.

I have observed areas east of Colorado Springs, and in areas that we never thought were going to be developed people are now looking at the groundwater supply as a means for beginning a population and a tax base, so they can

develop the financing mechanism to purchase surface water elsewhere.

If I were to generalize about urban use of ground water, it is that major municipalities have not relied upon ground water for drinking water supplies, that developing areas use groundwater as a way of starting an urbanized area and developing a tax base so they can finance more expensive surface water supply systems.

What does this mean for protecting groundwater? It does mean that it must be protected for at least drinking water use purposes wherever it is either presently being used, or is likely or could be used for drinking water supply purposes. It must be protected for not only the short term which, thinking in terms of water supply for municipality short term, may mean 40 or 50 years. It certainly should be protected for the long term, which probably means in excess of a hundred years.

What is the quality of the drinking water -- the ground water in our particular portion of the state? I can't tell you very well, because we don't have much in the way of data. If there is anyone major failing when you start looking at groundwater quality, there is very little data as compared to immense amounts of data that has been collected by the U.S.G.S. on surface water streams. We do know in Colo rado Springs area we are still suffering the

impact of a mine tailings pile that was developed in the late 1800s during the Cripple Creek gold rush period. I cannot say whether that tailing pile is impacting the downstream groundwater users along Fountain Creek. Much of the communities of Security, Fountain and Widefield all withdraw from Fountain Creek, but we have very little groundwater data on the quality of this water, and the impacts of any tailings piles several miles upstream. We have very little data on the agricultural impacts on wells in the surrounding area around Colorado Springs.

The U.S.G.S. is doing a special study now on ground water quality downstream of Colorado Springs, and we are beginning to find significant pieces of information, but it is going to take more time to determine its real true significance. I think we can accept the fact that ground water for an urbanizing area should not become polluted, but the question is whether there is a need for federal legislation, state legislation or simply county or local legislation.

At this time, I would conclude that there is no need for sweeping federal or state legislation. How do I reach this conclusion? I do not look at the problems we have had so much in the past, as I look at how the regulations and the legislation that we presently have are presently being implemented. Looking at it from a regulated industry

viewpoint, as the operator of a wastewater treatment plant, as the operator of a power plant, as the operator of a solid waste landfill, as the operator of a variety of activities within any municipality, we find outselves burdened and responsive to a plethora of regulations which all protect not only the surface water quality, but indirectly ground water quality.

Let me give you an example. Our wastewater treatment discharges to Fountain Creek. Our NPDES permit as issued by the State of Colorado directly protects the ground water quality of the alluvium underneath and beside Fountain Creek. That is because Fountain Creek was classified as a drinking water source in 1981, which the Water Quality Control Commission did, because it was found in the course of a hearing by testimony presented by Colorado Springs that Fountain Creek recharges the Widefield aquifer. The Widefield aquifer is a source of supply for Fountain, Security and Widefield, as well as a source of water for the City of Colorado Springs.

We also have a permit. Let me skip over a few things to try to catch up on time.

Turning to solid waste. We have the designation for a solid waste landfill for the disposal of our sewage sludge as well as fly ash from our power plants. That certificate of designation was received after expensive testing and

engineering. No groundwater was located beneath the site. Dams were constructed upstream and downstream of the valley within which the landfill was located. The regulation providing for certificates of designation, specifically required examination of groundwater and the protection of aquifers that are nearby and protection of domestic wells that are nearby.

Looking at some of the other regulations that are being applied to a municipality, snow can no longer be dumped into creeks or along the banks of creeks. Willows and Cottonwoods adjacent to any creek, whether it is flowing or intermittent, can no longer be removed for the purposes of installing flood control structures. Storm drainage must now be permitted to protect against flood events having adverse impacts upon downstream water quality. Of course, everybody now has oil spill control plans, which apply to transformers, oil tanks, fuel tanks. Containment barriers are now around every electrical transformer, hospital, airports, public works department, parks department; all now have procedures for proper disposal of the used chemicals, pesticides, oil and solvents; even the fire department hazardous response teams now contain spills sop up equipment, and never flush them away.

It is clear there is a high degree of regulatory control already existing, which is to protect groundwater

quality.

I sense that what we now need are refinements in our regulations and legislation, not new legislation.

The Colorado Water Quality Control Act applies not only to surface, but also subsurface water. The Colorado Water Control Commission is considering a regulation which would allow for the classification of aquifers according to their use. I sense there is no need to specifically classify the alluvium and aquifers which are adjacent to our streams, because they have already been classified by the nature of the classification of the stream. Other aquifers may need to be defined, if we can do so, and identified as to their uses.

Perhaps the most expedient way to identify the use of any aquifer is if there are presently ground water wells permitted by the state engineer's office, which permitting defines the use as whether it is industrial or domestic or agricultural use. Perhaps it is appropriate to develop a rebuttable presumption that all subsurface water is drinking water as a starting point, and then allow those who have other uses to come in and show their other uses.

The problem is regulatory overkill to the extent we may be imposing restrictive effluent limitations upon anyone who is to discharge to an aquifer or above an aquifer. Are we going to cause those who would otherwise discharge to

go to an evaporative system rather than discharge from wastewater ? Do we want to encourage evaporative systems in a water short state? Should we have flexibility in our regulatory process that allows a wastewater system, whether it be industrial or domestic, to clean up their water to a certain level that may not necessarily be drinking water quality levels before it recharges the aquifer from which it has been withdrawn, realizing that it may have to pay the price of cleaning up the water for other users within the aquifer? Should we have the flexibility of saying it may be a less expensive thing to clean the water up at the source where it is used, than it is to clean it up at its point of discharge?

Do we need to be more aggressive in determining sole source aquifers within the State of Colorado and then adopting through the Water Quality Control Commission control regulations that address specific pollution problems within a particular sole source aquifer?

I have one area of concern where there may be an opportunity for federal regulation. As we look in Colorado Springs at the organics such as benzene, toluene and other organics that may be discharged into our wastewater plant, we ask ourselves, will the existing pre-treatment ordinance, which is relatively restrictive and stringent, be sufficient for removing those solvents that are being

discharged from our wastewater plant? We are fearful if a more restrictive pre-treatment ordinance, which is imposed upon industrial dischargers discharging to our system, will not be sufficient, because so many of these solvents, these organics solvents are already in household cleaning detergents. Is it appropriate for the federal government to have a labeling requirement on any container, whether it be used for industrial or commercial or residential purposes, to have a labeling requirement prohibiting the discharge of any of the residue or the contents of the solvent? Perhaps what we should be recognizing is control of the solvents is not at the point of the wastewater discharge or the wastewater treatment plant, but is at the point of use.

In conclusion, in an era of scarce tax dollars where the federal government is now imposing more and more costs on the municipalities while refusing to restrain the requirements that are used, continues to impose upon the municipalities that burden, is it more important that we spend our dollars not on drafting more regulations, but spend those dollars in enforcing existing regulations and improving the existing regulations through enforcement and data collection and not concrete in the ground. Thank you.

MR. EHRMANN: Our next speaker is Chris Shuey. Chris is the Coordinator of the Ground Water Project for the Southwest Research and Information Center, New Mexico.

MR. CHRIS SHUEY: Thank you.

Southwest Research and Information Center is a non-profit education scientific environmental group from Albuquerque, New Mexico. We have been involved in various concerns about water quality and specifically groundwater for many years, since dating back from the mid-Seventies. We are not scientists in the sense that we have PhDs in hydrology, but we have had a considerable amount of study and personal involvement in site specific ground water contamination cases.

I wanted to briefly give an overview of how we look at groundwater in New Mexico from the standpoint of the citizens or persons who work on these things, as from an environmental standpoint.

I think the relationships in New Mexico in terms of groundwater quality are not that much different from many aras of the arid west. I want to review some of the major sources of pollutants that we have, and talk about some trends and some policy implications that we have become familiar with over the last several years.

In New Mexico, it is arid. Because of that, we have very little surface flow. The surface flows we have are primarily agricultural or irrigation uses. Some 95% of the drinking water in New Mexico comes from the ground. It is very different from what Mr. Foster just described. One

of the very important things to remember about rural areas in the West with the inadequate surface flows is that people, especially folks of middle to lower incomes cannot afford to develop deep underground aquifers. The water will be used wherever it is. If it is an arroyo or an intermittent stream, it is going to be used for livestock. If it is in the alluvium, it is going to be used by people for drinking water supplies. Often we find the quality of water, either for one reason or another, natural causes or industrial, municipal causes, is slightly polluted, but people still will use it and I think that is probably a situation that is very well known in many rural areas of the west.

In New Mexico, I want to talk about three of the major categories, inasmuch as we are talking about mining wastes here and some agricutural wastes. Mining wastes from the standpoint of polluting large areas of underground water supplies is by far one of our biggest problems. We have five uranium mill tailing piles with 85 million tons total. We have a huge square mile copper tailing pile, other hardrock facilities and mine wastes that dot the state from one corner to the next.

These facilities in terms of the uranium wastes have contributed radioactive materials from the uranium decay chain, heavy metals and some process chemicals

to the ground water. We are beginning to see a trend in some of the copper processing facilities in which leaching facilities are coming into being the state of the art and using large amounts of very toxic heavy metals and process fluids, and groundwater is slowly being affected beyond what it was many years ago. Unfortunately, these large volumes of waste are difficult to clean up; they are not necessarily amenable to recycling and recovery, which is talked about quite frequently of the classifical hazardous chemical wastes. I have had a chance to work on oil fields production wastes. This is from the front end of the oil and gas production network, unrefined problems. We have more than 20,000 unlined, so called produced water disposal pits which are in alluvium areas, where depths to groundwater can be 10 feet or even less. We find that those wastes are characterized like the classic hydrocarbons, the very toxic benzenes for which we have human carcinogenic data. We have had incidents of municipal water well supplies being polluted from leaking diesel fuel facilities from crude oil pipeline breaks. We have also had an increase in leaking underground storage tanks, especially for gas lines.

Again, a problem not only characterized throughout the west, but throughout the country.

The third category is what we call nitrogenous wastes,

which we have been talking a little bit from animal feed lots and dairies, municipal sewage facilities and backyard septic tanks. Unfortunately we found, especially in one of the areas of Albuquerque, that there are many shallow alluvium water supply wells and next door to septic tanks. The data is not quite about whether or not the degree of nitrate contamination is directly related to those kinds of wastes, but it is a cause of concern.

In terms of the mining wastes, that is very important concept to remember and it was mentioned earlier this morning, either though we are talking about in some cases radioactive materials, heavy metals which in high concentrations can be toxic, certainly over long periods of time, constant exposure produces health effects for people who are exposed, but when you have high concentrations of total disposed solids, either on the acid side of the scale, or the alkaline size of the scale, sulfates, chlorides these so called aesthetics contaminant make ground water and water just as unuseable as if it had been polluted by the TCEs and the EDPs and EDBs. It tastes bad. It is just not useable.

In terms of, and I want to say something real quickly about how we do things in New Mexico in terms of protecting groundwater, and there are other people here in the audience who are by far more knowledgeable about these

things than I am. It was stated that New Mexico's groundwater protection system has a long history, and in fact, we have a water quality act that goes back to 1967. Our regulations for protecting water quality and regulating and permitting discharges to the ground began in 1977. The basic standard of the statute is what we call reasonable degradation. There is a certain amount of pollution that we will tolerate if it means an economic advantage to the dischargers. I won't enter into an editorial comment about that, you can ask me later. I will say a couple of things. One is that since 1977 the state has been able to generally have a good handle on what we call new dischargers. The dischargers are from industrial facilities and municipal facilities that have come along and been constructed since the effective date of the regulation. Even though we had this concept of reasonable degradation I think in all respects the state has tried to adopt this view that prevention is very important. It is an economic issue. When groundwaters are contaminated, it is too expensive to clean up. We have very large sites of contamination in the state dating back many years in which the pollution may never be cleaned up, because it is too expensive.

This is a point that I may disagree with Mr. Foster on. Putting it on the user of the water is an onerous

concept. The problem with the regulations in the state though are in terms of these large facilities that were in operation at the time the regulations came into effect. We have had a slow progress of bringing them under compliance. But in many cases, we have had to put up with a certain amount of pollution that existed at the time that the facilities came under permit. That water will, therefore, never be cleaned up to its natural condition.

We have heard some talk about the EPA groundwater strategy. New Mexico has not necessarily a classification system, but we do protect all waters of 10,000 parts per million TDS or less. In that respect, it gives us a wide latitude for protecting what we call waters of current or reasonable foreseeable future use.

One of the other difficulties I have with our regulation is in the area of the idea that if you own a piece of property, and you have property boundaries, you can put the pollutant into the ground and into the groundwater as long as they don't reach the property boundary. Well, as we all know, groundwater in the right direction doesn't observe property lines or political boundaries. I am told by the state that we are now getting close to having a compromise between no degradation and some degradation, and that is to give the state and the state agencies clear latitude and authority to stop or threaten actions that may pollute the

groundwater; we may go to a system of zones of temporary degradation, in which the facility would be allowed to put a little bit of pollutant into the ground water, but in no circumstances would those be allowed to go beyond a property boundary.

We are also, I am told, developing additions to our regulations that would allow the state to enter into a remedial action, negotiate an action with facilities that have caused groundwater to be contaminated as opposed to taking large expensive legal enforcement action.

On the federal level in terms of how we are looking at it in New Mexico, I have a couple of real quick points. We need relief from the Superfund petroleum exclusion, and I have been told by staff members of Congress that if we in the national governors association continue to push that, we will lose Superfund. Well, we have a couple of refineries, one abandoned and several others, that have polluted groundwater. One in particular, an abandoned refinery has hazardous ranking, higher than any of our other four Superfund sites in New Mexico, but we can't get on the Superfund list. But the threat of Superfund has caused the former operator to come in and propose new remedial schemes.

I have been involved on the state level in hearings to adopt regulations to protect shallow ground water in

alluvial areas from these unlined produced disposal pits. We didn't get everything we wanted. We are going to go back and do some additional study. I think that is probably a problem in other oil and gas producing states in the west. We haven't heard much about it. I tend to think there is a lot of data nationally and locally on groundwater resources itself, on pollution especially in areas where ground water is used, but in the area of oil and gas wastes we have very little information.

I have seen Governor Babbit of Arizona suggest that if the states do not have groundwater protection programs and do not adopt such programs, we have to have some penalty involved, such as withholding Superfund monies. I think we need to reassess that.

We have a number of sites that are affecting or have the potential to affect people's health through their wells. Simply penalizing the victims of the pollution by withholding monies, because a state has failed to act, I think is not a wise approach.

I tend to agree with the idea that the west as an arid climate has a net evaporation climate, and little bit different from the parts of the east. People in the east have to be cognizant of the variability of the ground water resources here, of how they are used, and I used to think that well, maybe there was a national approach to this

problem. I am not quite convinced that there is now. I don't know. I am willing to continue to talk about it, but on a site specific basis when we go out and look at ground water contamination problems, we have to know the characteristic of the site. It is hard for me to understand how a national program could recognize all the variables from one end of the continent to the other. Certainly, there is a need for some national policy.

I think, if I have to repeat myself, the thing that needs attention is prevention. It is just too damned expensive to clean up messes once they are made.

I would conclude by saying that one of the things we desperately need are the agencies that are responsible for protecting water quality to begin to develop a constituency, a public constituency of people that can lobby and support programs and strong programs for preventing water pollution, surface water pollution and groundwater pollution. Our agencies tend to operate without understanding there is a public out there. They are very concerned about the reaction of a budget type legislature. It is a problem, but until the agencies begin to get out the information about the extent of the hazard they will not be able to elicit the support of the people who are affected by these pollutants.

Southwest Research has developed a lot of information

on various aspects of the problem. We will be happy to share those bits and pieces of information on a whole range of things that I have been talking about and many others if anybody wants them; please give me your name and I will send you some stuff. Thank you.

MR. EHRMANN: Our next speaker is William Raley, who is from the Colorado Water Resources Research Institute.

MR. WILLIAM RALEY: I think I will start out by asking how many farmers are in this group? We got any farmers here? Good. I am glad to see that, because I think at least you can help me. I am going to try to address some of the agricultural aspects of groundwater contamination on groundwater pollution.

I think it was noted earlier by Alexandra that 22 states had shown up with pesticides in the groundwater. I am not familiar with her particular statistic, but I think that it is possibly a potential problem in agriculture.

I think one of the problems in the past is that I think groundwater is a neglected resource, in that it wasn't there, we couldn't see it easily, we didn't know what was happening many times when we applied fertilizer or pesticides and I think it is something that I will pick up on a little bit.

I will say right off to begin with, I don't think we need any new programs as far as agriculture is concerned for groundwater protection. I think we have a lot of programs that we can fine tune and put into place a little better, that are already on the books and we are already doing some of this. We just need to fine tune them and direct them to groundwater protection.

A case in point, I think that most land grant universities in the whole nation, especially in the west, since we are talking about this region, have soil testing laboratories, to where farmers take soil tests and send in their tests and they are sent back out with recommendations for fertilizers. I think that is a good place.

Now, we have talked about it for years and a lot of farmers have used this service, and, of course, there are some private soil testing labs also. It has been mainly used for addressing economics of applying fertilizers and getting the most yield. I think all we need to do is take that program and address it to groundwater protection also. I think that could be done fairly easy. It might take some effort from our geologists to tell us what the aquifers are underneath our farms and how we could contaminate them by this, and I was very interested in what Alexandra said about the leachers and the pesticides. I think there is a simple program right there available to us, that we could

utilize in passing information on to the farmers to help them prevent leaching into the aquifers. It might take sometime, and it will take some more information.

Also, I think most land grant universities have an irrigation water management program of some kind. I know we do at CSU. One of the courses, the newest I guess, is not real new, but irrigation scheduling. It is one program that is catching on, I think, especially on the high plains with the center pivot program, and, of course, we are not the only agency doing this. I think we are cooperating with the Soil Conservation Service, especially in the Colorado high plains in developing irrigation scheduling programs.

Now, this program was initially started out to help the farmer economically, and, of course, as you all know, we can't save some of those farmers. Some of them are already gone down the drain, but when it comes to ground water pollution, I think that we can incorporate, you know, that program, and in helping farmers apply the appropriate amount of water to raise the desired crop yield without contaminating the groundwater. I think it is a whole new era. It helps the farmers economically and he doesn't have to pump the maximum amount of water necessary to get the maximum yield or the optimum yield that he wants. I think the irrigation scheduling program has a very real

potential for that.

In Colorado and in some of the neighboring states here, I have been involved in the chemigation education program. Gary Broetzman mentioned this. This is a real concern. As I said, I don't believe most farmers, and there has been no conspiracy to go out and contaminate the ground water. I think there are a few out there, as some of us all know, that have dealt with farmers, they are no different than any other person or population, there are a few that are negligent. They will do anything to try to get away with anything they can, but by and large, farmers are very conscious of the natural resources around them, probably more so than a lot of them that don't deal in the natural resources area.

So, I believe that if they are given the tools, the information needed, and they understand the situation, that by and large, they will try to prevent contaminating our environment and especially the ground water.

Recently, in the last two years, the chemigation and those of you that do not know or understand what that term means, farmers can apply pesticides and even fertilizers through their center pivot systems. Of course, it lends itself to some real problems if it is not done properly, and, of course, we being a member of the extension service staff, we are very conscious of the

the need to provide the educational materials and information to farmers to help them cope with this problem and we, through the help of the Environmental Protection Agency, gave us a little grant, we developed a slide show and a bunch of information sheets that we give to the farmers the information as to how to prevent chemigation contamination. Of course, the primary point is the possibility of flowing chemicals back down into the well. Of course, we have delved into and instructed the engineering department on campus at CSU to help us develop some. We are in the process of helping develop standards for back flow devices that might prevent that. This program is in place and it is using these slide shows and h ave been using them all winter, not only in Colorado, but they have been dispersed to most of the neighboring states that share the Ogallala aquifer. I think there again, the idea that if we educate farmers, I think they will do a much better job if they understand what the needs are.

By nature farmers are suspicious of regulators and I think Gary Broetzman is already aware of that. I think in Colorado we have tried to support this by not supporting the suspicion, but helping out in educating the farmers the best we can to prevent contamination that might occur in the meantime. Notwithstanding that, I think there probably needs to be some regulation. I think everybody agrees with

that, even some farmers. I think it just needs to be flexible enough where it doesn't threaten a resource with some nitpicking regulations that cuts a farmer out of the possibility of using the tools to grow a good crop.

I think another program that is already in place, and that is our experimental station, and our USDA research program. I think there again, historically, we have been involved in helping farmers produce more. In fact, we have helped them produce themselves out of business, some of them, but we can, I think from now on, we are going to have to fine tune some of our research programs and also look at how, especially in our irrigation and crop research, and that is, how to prevent ground water leaching chemicals and fertilizers, pesticides, whatever, into the aquifers.

I think the whole area of the pesticides is some thing that really struck me very clearly this morning when Alexandra mentioned the word leachers. For years, and I have worked with farmers most of my working life, we were very conscious at least as an extension agency, I was very conscious of what the label said, how to apply and how much to apply. Of course, I think this is one area that all of us were ignorant on. Let's face it. We did not understand how pesticide was leached into the groundwater. Now, maybe we are beginning to realize that there is a possibility.

I believe in all honesty that most of the people,

including the industry people representing the chemical people, do a very conscientious job in working with farmers in helping them to determine the proper chemical to use and at the proper rate according to the label. But all of a sudden, we are realizing maybe that our labels on our chemicals really don't cover the leachers, so to speak, as she said, and how they are carried, you know, and what the potential for ground water contamination is. There is a whole other area as far as pesticides is concerned. You can't blame it all on the the farmers in the use of pesticides. I don't have the exact statistics, but the urban people use a great deal of pesticides on their yards and on their gardens. I am especially aware of that, because I supervise the extension agent in the metro area here. Our horticultural agent has developed educational programs with the urban people, the home owners, in helping them understand just like we do with farmers in how to properly apply pesticides. Up to now we have been limited, because those labels don't alway s carry a guidance as to how they might affect the groundwater, so I think that is a -- I would pass the buck back to EPA and the industry people who are developing those chemicals, that they be more conscious first of all of the ground potential for ground water contamination, and then tell us on that label so that we can help people understanding and that the individuals that

buy those pesticides can understand how much to apply and how to apply it and how it might affect our groundwater.

So I think with that, I have tried to give you what is being done in Colorado. I think there are some things being done that we can do better. We have got programs in place that all we need to do is tie them more closely to groundwater. I think the key issue in Colorado is, do we have a policy. I guess you hear people from other states saying the same thing. Do we have a groundwater protection policy? Are going to enforce that? Of course, what can we do through education to support the prevention of ground water contamination. I think the question is, how effective the current programs are. I don't know how effective they are. I think by and large, the farmers basically are doing a pretty good job, not because we have educated them so well but because of economics, if nothing else.

A farmer cannot afford to over apply fertilizers or pesticides. The general trend is to apply just the least you can possibly get by with and get the job done. Now, of course, that is not the historical perspective, because years ago I can remember when farmers thought a little was good,a lot wasbetter. I think that has changed. I think the economics has changed. I think by and large though we can do a lot through education.

I think the extension service and the experiment

station and the USDA and, of course, the Soil Conservation people that are working with farmers are in place, and we got the programs there, all we need to do is fine tune them and associate them with agriculture.

I guess when we get to the questions, what more is needed, you know, picking up on what Congresswoman Schroeder said, in this day of cut back in funding, you know, it would be awful easy to say up here, especially as a public servant, I said,all I need is more funds, but I think I would say in all honesty what we need to do is use more effectively what we have. Everybody in this day and age is going to have to do more with less, and that includes our research people. I think they will have to do more with less. We will have to zero in on these particular problems, and if ground water is a high enough priority, ground water protection, which I believe it is, then I think we can whip the problem, and we probably can't do it over night, because I think it will take time, but I think we are headed in the right direction. Thank you.

MR. EHRMANN: Our next speaker is Don Goolsby, who is Water Quality Specialist with the U. S. Geological Survey central region. Don has got a few slides he is going to show.

MR. DON GOOLSBY: I would like to make a few brief comments from the perspective of an agency who has a

scientific fact finding mission, but no regulatory mission. We are not a regulatory agency. The Geological Survey, as you know, has been involved in groundwater resources for many decades. Many of these studies have included studies of groundwater quality and at least sometimes we are doing quite a bit with regards to groundwater contamination.

In my brief remarks here I would like to try to address two of the questions this panel was asked to address, that is, what are the major sources of the groundwater quality degradation and what more is needed. I am trying to condense my remarks here so my presentation doesn't come across a little disjointed.

I would like to start by showing and discussing a few slides, which will help illustrate some of the non-point sources of water quality problems in the region. The information and data that were used to prepare these slides have been obtained largely through cooperative programs, cooperative efforts that we have had with state and local and federal agencies.

I would like to restate a statement made by the gentleman from Colorado Springs regarding the lack of data on ground water quality. I think with regard to such things as salinity, dissolved solids, we have a fairly large handle on groundwater quality, but with regard to the things we are really concerned about today, toxic substances

organic chemicals, pesticides, trace metals, this type of thing, there is not a lot of information. That information is very scarce except in a few areas.

Through some of the work done in areas where we do have a fair amount of information on the groundwater quality is the State of Nebraska. The slide that is shown up here highlights some of the past, present and potential ground water problem areas in Nebraska. I am not going to dwell on the slide, but the brown areas highlighted are nitrate, nitrogen concentrations greater than 10 milligrams per liter, which is the drinking water standard. The red areas highlight areas where there are potential problems. There are elevated nitrate levels and evidence of pesticides in groundwater, but as of yet, we don't have data to indicate that the nitrate concentrations are exceeding the drinking water standards.

In this next slide which focuses on probably the most impacted area in Nebraska, Buffalo and Hall Counties, you can see in the center part of this area some of the nitrate and nitrogen cocentrations are greater than 20 milligrams per liter. This is an area that is extensively irrigated along the Platte river.

The next slide you will see a couple of areas where we did some ground water quality reconnaissance in 1984 and 1985. The colored boxes are counties where this reconnaissance

focused on.

In the next slide you can see the nitrogen fertilizers and pesticides used in Nebraska. As you will note, the nitrate and nitrogen fertilizer amoutns used were great, in the amount of 100,000 tons of nitrogen. This was up in the early 1980s, and appears to have declined since then. This may be the result of change in agricultural practices or the resulting change in the economy. I am not real sure. Also, you will see the pesticide uses for two years, 1978, 1982, the total pounds of pesticides used in those areas was between 25 and 30 million pounds. This was active pesticide ingredients.

The next slide just simply gives a few of the pesticides compounds that are used. These are herbicides and pesticides. I am not going to dwell on the slide. It shows the numbers as well as types of compounds. The major pesticide used in Nebraska and throughout much of the west is herbicide.

As on some of the work we did in 1984 and 1985 studies the next study shows the result of some of our pesticde analysis. Out of about 57 samples -- ground water samples, that were collected in those areas, 19 of them contained detectable concentrations of pesticides and 18 samples contained the pesticide atrasine. These are low concentrations, low levels. There are not criteria for these

pesticides, and I think it is still reason for concern; what we don't know is what the impact of these low levels area. We have done some similar work in Nebraska in 1985, and in about 57 samples collected, 29 contained detectable concentrations of pesticides.

Moving on to another type of agricultural problem in this next slide, it illustrates that is probably salinity. The salinity problem is caused by several factors, including evaporative concentrations of water that is applied to the soil.

Water may be used several or many times in an area, percolating down through the groundwater table and is pumped back to the surface where it can undergo further evaporative concentrations. An example that I would like to point to is some work that we did on the Arkansas River between Pueblo and the Colorado/Kansas state line. This slide just shows the increase in irrigated acreage as you go down that reach of the river for about 160 miles, and the depletion of groundwater. The average flow of the water, you can see how water is diverted to agricultural uses.

The next slide shows the impact on both the surface water and the groundwater. You can see the increase and concentration of the unit measured here is specifically an inductance, but it can relate that to dissolved solids in this reach. The dissolved solids in groundwater increases

to 1,200 per liter to greater than 2,000 milligrams per liter in the lower reach. I am certain similar problems like this exist throughout the area. I am going to skip the next slide, but go on to the one after that, which highlights another problem that has been touched on a little bit, but hasn't been much said about it.

The red in this slide in Montana shows areas of oil and gas production. In parts of Montana and also in parts of Kansas, and I am sure other areas throughout this area, the groundwater is being impacted by brines, oil field brines resulting from leaking mud pits and improperly constructed injection wells. In Kansas, for instance, there were more than 16,000 injection wells. There is a large area of Kansas that has been impacted and large parts of Montana have been impacted by brine contamination. Much of the current regulations is aimed at cleaning up present contamination and protecting against future contamination.

I think one of the big questions this panel was asked to address is how effective are current measures to protect groundwater. As has been said by the gentleman on my right here, we really don't know how effective some of these things are, and I don't think some of the current programs are really providing for this. I don't think there are ways to judge how effective the groundwater injection programs are. Further, I don't believe there are programs

currently in existence that determine how extensive and how widespread groundwater contamination is or to quantify the severity of the problem. In my opinion, some type of program or some orientation of programs that are in the agencies currently is needed to be implemented to try to address these things; that is, if we want to determine the ground water protection strategies that are being implemented are really working.

I would like to end my remarks by briefly mentioning two of the programs that the Geological Survey has. The first one is the federal/state cooperative program. This is a program by which the Geological Survey conducts water resource studies and maybe studies of groundwater contamination. We provide 50% of the funding for these studies and 50% of the funding is provided by the state or lcoal agencies who are cooperating with us. Over the years, we have done a lot of work through this program in groundwater resources but these studies have included some things on groundwater quality. But the program has been primarily an agency focus, whose responsibility deals with groundwater management and groundwater quantity, and most of these agencies have no groundwater quality responsibility. consequently a lot of the work we have done through this program has not focused on the ground water contamination, especially with regard to toxic substances that we are

talking about here today. Groundwater protection, I would like to emphasize, is a high priority issue with the Geological Survey, and the Department of Interior. We are interested and willing to cooperate with other agencies within the extent of our resources and manpower.

One last program I would just briefly mention is a new program that we started this year. Believe it or not, we started a new program this year, even with the budget reductions; this program is known as National Water Quality Assessment Program. We have received a small amount of funding to do some planning for this program and to start a couple of pilot studies. It will address water and surface water with regards to groundwater. The program will be a national perrenial program of data acquisition, interpretation and assessment of the groundwater. The emphasis will be on trace contaminations, the chemistry of groundwater and the relation to the system hydraulics and land use. We plan to make every effort through this program to work to seek active participation and involvement of all state and local agencies that have groundwater responsibility. The program is being closely coordinated with EPA's ground protection program. I think I will end that with my comments. Thank you.

MR. EHRMANN: Our next speaker is Rick Austermann.

MR. RICK AUSTERMANN: I would like to begin with a disclaimer. I am listed on the agenda as a representative of the energy industry. I do work for an industry, not necessarily the energy industry, but I don't purport in my comments today to reflect the views of any particular industry group or any particular company. I think in one respect industry is a lot like the Democratic Party, that it exists more in an abstract concept than as a real organized industry.

I would suppose, as the industry representative on this panel, and I suppose I will try to fill that role to the best of my ability.

To begin with, I think everyone or almost everyone can agree to a few things about groundwater. I think one of these is that the groundwater resources of the nation and in particular, the Rocky Mountain Region, are important and valuable resources-- that these resources do need to be protected from the degradation so they do remain available for use in the future.

I think most of the people would also agree that this goal is not being met in all instances. I am sure we are all aware of the examples of the unacceptable level of the groundwater contamination that has occurred. However, as soon as we move beyond some of these general statements, agreement becomes ever more difficult. In large part, this

is because different interest groups have different perceptions of the problem that is being addressed and what it is that society should be defining as its goals. As with most problems of this sort, I think this disagreement accurately reflects some of the complexities of the real world. In my opinion, I think this is supported by much of what you heard today. Really, it is not anyone single groundwater pollution problem. I doubt if there is any one single solution that would be appropriate for the resolution of these various problems. The precise nature of any ground water problem, or indeed the question of whether there is a problem at all, inevitably varies from time to time and place to place, depending upon a number of different number of different variables, some of which, you have heard about already today, and a few of which I will address later on.

Now, by making this somewhat gloomy introduction I don't mean to imply that the problems associated with groundwater contamination are necessarily unique, nor do I mean to imply that they are incapable of the solution. I think our political and governmental bodies somewhat surprising are somewhat quite good at solving complex problems like this. What I am saying is, that the policy makers need to keep some of these variables in mind, so that whatever solutions they do come up with fits the problem.

One of the things that has distressed me most about the

groundwater debate, and I have been involved with it for quite sometime, is I keep seeing 1980 solutions still being proposed for what I perceive as 1980 problems. It is a little bit of beating the dead horse. It seems to me a lot of the proposals I have seen for dealing with the proposed problems really address problems that either are already under control, or for which a regulatory context already exists. The problem being enforcement or money. It seems to me that a lot of the proposals ignore the real problems that we face today and in fact, would not deal very well with the types of problems that we see cropping up every day in the newspapers.

Now, since the focus today is on agricultural and mining problems, I will try to commit what I say to problems unique to those industries. I do think it is appropriate that the two industries are grouped together, because I think in at least one very fundamental way they differ from a lot of the other potential pollution causing activities. If you go back to the 1960s and 1970s when a lot of our fundamental environmental statutes were first adopted, the overriding idea was that pollution causing activities are something that are distinct and apart from the natural environment. They are something that is imposed on top of the environment that ultimately are subject to complete utilization either through containment

of the pollution source or in the absence of an ability to contain it, elimination of the pollution source. I think this is expressed very clearly in the Clean Water Act, which has as its goal the elimination of the discharge of pollutants. I think as a practical matter you see many embodied in the hazardous waste program under RICA, in which the preferred control technology is total containment where you totally isolate the pollution source from the environment.

What is different from farming and agriculture and mining is that the activities themselves represent an intentional disruption and interference with the natural environment. You go out and plant your crops. You dig the soil up, so that things will grow in it, and you add fertilizers and you add pesticides to intentionally alter the natural environment.

When you mine, you go in and you dig holes in the ground to remove minerals and you crush that rock for the purpose of extracting it. This intentional act is interference with the natural environment, and the only way to avoid that interference in a pure sense is to prohibit the activities, which I suppose some people have proposed in the long run.

The reason I think this distinction was important bears very heavily on the type of practical control

techniques, and the types of regulatory strategies that the agencies should be adopting. I think one of the issues that we have been asked to address is, what is being done and what progress is being made in the agricultural and mining fields to control pollution. I personally feel that in the past 20 or 30 years great steps have been made to control pollution. In the area of agriculture, we just heard testimony as to how people are more sensitive about the application of pesticides,fertilizers.

In the areas of mining, a lot more thought is being given to the design of the facilities, such as tailing ponds that everyone loves to talk about are no longer just leachers of dirt. They are engineered structures, which are very carefully designed. The significant point here is that the control techniques that are being developed for both mining and agriculture are management techniques. They are not designed to isolate the activities from the environment and there is always going to be a certain interaction between existing and closed activities of this sort. No matter how carefully you control the application of irrigation water or the application of pesticides or fertilizers, some of it is going to get into the groundwater no matter how carefully you design a tailing impoundment, and I include here something with a double liner and a leachate collection system interceptor well

and everything else, some things are going to get into the environment. That is the approach that has been taken by the industry and I think that needs to be recognized by the regulators.

If I got a couple of minutes left, I would also like to address two issues which I think are particularly of importance to us in the context of these industries. First of all, everybody talks about ground water protection, and this still seems to be a great deal of confusion about what the ultimate goals of a ground water protection program should be. Some people characterize it as a program to protect resources. Other people characterize it as a program to protect drinking water. Other people characterize it as a program to promote more general environmental protection. I would submit to you, that each of those three goals has very different consequences once you get into details of a regulatory program, and people need to do a better job of defining what it is they want to accomplish.

I think one very good example of some of the problems that arise, that one good example is the current hearings that are going on in Colorado to adopt ground water classifications and standards. One of the very basic issues that has come up is what exactly is it that you are trying to classify, and what is it you are trying to adopt standards for. Is it everything that is under the ground.

Is it any water that happens to be in a saturated zone. Is it water in a saturated zone plus economically available for recovery. Until you know these things, you really don't know what it is that you are trying to protect.

Another problem that the agency is learning to deal with is the nature of the regulated community in this type of program is substantially different from the regulated community of 10 or 20 years ago. Back in the early '70's there was a very clear them vs. us type of mentality; get the polluters and protect the rest of the inhabitants from the planet. I think once we review the nature of the ground water problems we are facing today, the distinction between water users and water polluters begins to vanish. The ground water protection programs are going to affect a lot of the very small water users, who are also the water polluters. I think the type of extensive permitting programs that have become popular in the past may not be appropriate for this type of problem and may well collapse under their own weight.

Because of some of these problems, I would close by saying that I tend to agree with the panelists who have recommended that sweeping federal initiatives not be taken at the present time. I am not sure that they would do much good. They may in fact do more harm than they do good, and certainly cost a lot of money. I think there are a lot

of programs in place that are designed to protect ground water and they may not be working properly, but that doesn't call for adoption of sweeping new programs. I think there are also programs or problems that aren't being addressed by a system program, but I question whether they would be addressed by sweeping new initiatives. Thank you.

MR. EHRMANN: Thank you, Rick.

I first want to give some of the folks to my right, Norman, Judy to ask any questions they have of our panelist and then we will open it up for general questions and comments. When we get to that point, we have a microphone over here on my left and we will be able to move this mike off the podium. The reason for the mikes is so everyone else and the reporter can get everybody's comments. Also, please identify yourself when you go about asking your questions, and also identify the person up here you would like to respond to your question if you have one particular individual in mind. I will start off and give Judy Bird the first opportunity.

MS. JUDY BIRD: First of all, to Mr. Raley, I just want you to know that your comments are very similar to the ones we heard last Saturday in Kansas City for the entire session. I have a couple of questions. Specifically, you were talking about the irrigation scheduling programs and the chemigation education programs. Are those programs

that you all do with the U.S. Extension Service, or are those ones the institute has taken on its own?

MR. RALEY: Those programs are primarily conducted with the cooperation of several agencies, namely, the Extension Service and soil Conservation Service in the field, and, of course, backed up by research from the experimental station and ARS on the campus.

MS. BIRD: Do you think that the land grant universities you mentioned are receptive to changing the way that they have directed their soil testing programs?

MR.RALEY: I don't know. I really haven't explored that very much in detail, but I would say that if there is a technical way of doing it, that they would be receptive. I really do.

MS. BIRD: Thank you.

MR. EHRMANN: Do you have any questions?

DR. EVANS: Several of the speakers have talked about data and I wanted to raise a question among them, not to anyone in particular, but the need for a data base is clearenough and the apparent shortage of data is clear enough. There is some conflict, I would say, in effect of water quality regulations versus water rights. I am wondering how you feel about how the data base ought to be put together, whether it ought to be done at the state level or at the federal level as Don Goolsby talked about,

as an example of the Geological Survey data base development.

MR. EHRMANN: Somebody want to take a whack as that?

MR. RALEY: Let an attorney do it.

MR. FOSTER: Having had the pleasure of working with the U.S.G.S. data insofar as surface streams and water quality classifications,writing permits for waste permits, like any data collected from ground water wells by the U.S.G.S. it is generally recognized and generally accepted in any kind of dispute. One way that we probably could encourage additional data collection in my mind is, that while we now require permits or some sort of permit for those who have septic tanks and while the state engineer will provide a form of an approval for domestic wells, we have no permitting process or requirement for data collection after the wells are installed and after the septic tanks are installed. That is kind of a state law change that we could implement that would develop a data base such that a home owner on a drinking water well with the septic tank would be paying a fee, which would help support our impoverished county health departments to collect that kind of data, so that over time we would be getting a data base for regional areas where people are dependent upon ground water for drinking water purposes.

We know we have got a problem in data collection. It

is a matter of one developing financing so we can collect the data.

MR. EHRMANN: Any other panel member wish to add to that?

MR.RALEY: I would like to resond. I think Tad there is a requirement on Senate Bill 213 for requiring the amount of water pumped, but I don't think it has ever been enforced.

MR. FOSTER: Well, our total orientation is towards the quantity and not towards the quality, and again, we can create laws that we don't have the financing vehicle for enforcement. There is no reason for creating the law.

MR. SHUEY: I think the Office of Technology Assessments in October of 1984 looked into the national ground water concerns and had a couple of conclusions, and one was there is a lot of data out there about ground water and ground water quality, but it hasn't been brought together in a large cohesive fashion. My experience has been there is a lot of data in state agency files and local agency files. We need to get the best minds together to pull that together, but there is a class of data that is lacking and I don't know whether it happens in other states, but we don't have any way in New Mexico of collecting data on private water wells. Maybe Mr. Foster's idea of charging

fees for the local health agency to collect water samples from private wells, maybe that is a way to do it.

MR. GOOLSBY: I would like to make one brief comment. The Geological Survey, as some people alluded to, does have a national water quality storage base. EPA has a data base, which is known as STORET. I think in our data base we would want to restrict that to data pertaining to the resource itself and probably exclude our regulatory data and won't include that in our data base.

MR. BROETZMAN: I would just like to reiterate, I think there is a lot of data on ground water. I don't believe it is anywhere near extensive as surface water. I think the fragmentation is a problem in Colorado. I believe there is data in many different state agencies. We haven't done a good job, in my opinion, of pulling that together and making the best of it.

DR. EVANS: I would like to add a note to that. Beginning in 1978, we had a task force created by the Water Quality Control Division here in Colorado which I chaired to start developing a strategy, and one of the things we quickly saw was the fragmentation of data, just as has been pointed out.

One of the suggestions we made, and I will pass it along, was that we have an interagency task force formed of the several state agencies who do collect data, the Geological

Survey, the Water Conservation Board and the State Engineer and the State Health Department and others, and I think even the Mined Land Reclamation Board and so on, that we do an interagency task force and assign them the job of collecting the data and going further into the job of classifying ground water bodies, and that looked like an approach to that problem.

MS. BIRD: I am eager to hear what happened. I am waiting.

DR. EVANS: What happened is it is still happening; in the development of the strategy Gary has referred to they are coming down to the wire now and in hearings on a proposed strategy and standard.

MS. BIRD: I have a couple more questions. First of all, Mr. Goolsby, you have some pretty good information on Nebraska it looks like, and I wonder how do you think that information, if you are to assist them in Nebraska in making decisions about pesticides and fertilizer uses?

MR. GOOLSBY: The information that we have collected in Nebraska, the reason we do have such good information, is the result of another federal program that we had under way that I didn't talk about, a program concerning ground water contamination. About two years ago, through this program, we selected a few states to go into

and try to pull together all the existing information that was available from state agencies, wherever the information was available, and try to synthesize that and put together a picture just to see what we could do with the existing water quality information on a ground water amount. The information I was showing here from Nebraska came from a published report that came out of that study. This has been very closely coordinated with state agencies in Nebraska and the information there is available to them, and in fact, they contributed much of the information that was used in that study.

MS. BIRD: You don't actually go the next step and offer any advice to them in making a decision based on all of this information?

MR. GOOLSBY: We have an office in Nebraska, of course, and the personnel in our office are our own various task forces and coordinating committees with other officials in Nebraska. Through those committees advice, information, suggestions and so forth are given at the request of those other agencies. That is the mode in which we generally operate.

MS. BIRD: Chris, you mentioned you felt that there are problems in the west that are significantly different from the problems in the east, and therefore, a national program is perhaps not appropriate. Do you mean

by that that you feel that the resources in the west would be more protective of the resources in the west or less protective or different? Could you just elaborate on that?

MR. SHUEY: I think one problem is the political problem. As much as I would like to think we could have a national concensus on how to protect ground water, I have a feeling that is going to be pretty difficult. My experience, and what I was trying to say, my experience in talking with people from the east is, that they aren't necessarily sensitive to what goes on in an arid climate out here in the west. I am not suggesting that there should be uneven levels of protection between the east and the west, because, wherever groundwater may be, either in South Carolina or in New Mexico, it has similar characteristics. I was just trying to get across the point that the physical and geographical conditions and characteristics are different to the extent that a national technical way of protecting ground water may not apply at all sites. We have come to learn that ground water protection is rather site specific. What I was trying to get across, there may be a need for a national goal or national standard by which everyone could abide and I tried to define that as some way of preventing pollution or taking action to prevent pollution, recognizing variability and limitations of doing so.

MR. EHRMANN: I would now like to open it up for

questions or comments from those of you out there. As I said, there is a mike over here and we have an assistant that is going to help get you a mike on this side. Again, if you have a question, please identify yourself before you ask the question and then direct it to the appropriate person up front here. Does anyone have any questions or comments on anything you have heard this morning? If not, I will let the panelists whack away at each other for a few minutes, but I would hope some one out there may have a query or follow up comment or complaint or something of that nature.

MR. DON BEAKEY: I am Don Beakey, City of Burlington in eastern rural Colorado.

I would like to direct a question to Gary. Our question is what would the Department of Health recommend in monitoring in rural domestic water wells, and could the department handle a sampling process that they do for rural Colorado cities?

MR. BROETZMAN: Are you referring to monitoring of the drinking water systems for a rural community?

MR. BEAKEY: Well, the rural domestic wells themselves. We send samples to you every week.

MR.BROETZMAN: You are talking about private wells?

MR. BEAKEY: Yes.

MR. BROETZMAN: We have no jursidiction from a

regulatory perspective of a private well, as you know. We do provide advice and try to explain the limits in public water systems, which has the same applicability in private wells as well. We do offer a charged sampling support. It is that advice that we can provide and our general advice is to try to stay within the limits established by the federal government.

Nitrates are a problem in many of those areas out there. We know that, and to the extent that nitrates are preventitive, action can be taken. There are alternatives that you can look for, other sources, but generally we try to advise them to stay within the limits as defined in our regulations for public water systems.

MR. BEAKEY: In other words, our rural folks have a question; should they wait until it tastes bad before they have it checked?

MR. BROETZMAN: If I had a private water well, I would try to check it periodically. I would want to know what I am drinking, and certainly, we advise along those lines. Sometimes when you wait for odors, you do have more problems than you really want.

MR. BEAKEY: Then your department could handle that on an individual sample test?

MR. BROETZMAN: I believe we do sampling at cost in our laboratory, yes.

MR. RALEY: I might add to that; CSU does test water at our soils laboratory, for individuals, and we get thousands of them every year, and they test for just about everything you would want to test for in the soils lab at a very minimal charge. It is about $12 a sample; something like that.

MR. EHRMANN: Any other questions from the audience or comments?

MR. GREG LYONS: I am Greg Lyons, State Senator from Arizona. Let me share with you briefly my perspective, so that the questions might be put in more appropriate context. I represent a district in Tucson, Arizona. Tucson is a city that is one-hundred percent dependent upon ground water for drinking water. There are no surface water supplies that are economically accessible. Additionally, Tucson has a Superfund site located in the southern part of the city consisting primarily of TCE contamination by the Hughes Aircraft Company, the Department of Defense, and other industries of a similar nature located within the area. Consequently, there is strong concern in my city as there is throughout the state about the problem. We do have, as a couple of gentlemen mentioned, a ground water protection program, not for quantity only, but also for quality. It is currently in dispute and under court challenge, and there is a

citizens initiative being circulated, that if successful in gaining the number of appropriate signatures, and no one really doubts that it won't be successful, will appear on the fall ballot in November and represents an extraordinary stringent approach to the problem, but one in the absence of the legislature acting will come to pass. I have a million questions, but I will just ask one and save the rest for more informative discussion. This is a question that I would like some perspective on, maybe starting with Mr. Foster as a member of the Colorado Water Quality Control Commission. One of the debates we get in Arizona is who is it that does the regulating. I think that is probably an important consideration in terms of apprehension about a future federal role, and that is that the role of the industry, the regulated industry in particular, states it would be less if it was at the federal level than it is at the state level. A number of states in the west, and I think it is the rule rather than the exception, have some kind of commission approach to it, and representatives of industry are on it in many cases. Indeed the State of arizona is dominated, and I guess I would be interested in any one's perspective, starting with Mr. Fosters and on that kind of approach,the politics of it, and the substance of it,a nd whether that is something that ought to be perpetuated or decreased as times goes on?

MR. FOSTER: Let me restate the question in a very simple form. Do I have a conflict of interest? I think I might say, yes, I do. Colorado's Water Quality Control Commission consists of nine members. The members are appointed by the Governor with the approval of the state senate, so it is really in the hands of the governor and the senate and various lobbyists and organizations. It is going to be a mixture of that kind of organization. In our case, I think many of us feel there is a good mixture of municipal perspective, industrial perspective, environmental perspective and public citizen type of perspective. We have had times where there are those who believe the Commission was dominated by environmental perspective and I suspect there may be those that believe we may be dominated by municipal perspectives. What is interesting is that a municipal perspective is one of both the user and the regulator; one who has an interest in clean water as well as an interest in maintaining the cost at a level that the taxpayer and the rate payers feels acceptable.

I think Rick Austermann's concept of a blending between the polluter and the user is true. All of us are in this bag together. We are all trying to figure out what is reasonable. Probably the institutional question that is becoming more and more important is, it was easy to go that first 80% of clean up cost, or even 90% of clean up cost.

Now, we are at the last 10% and it is going to cost us more for that last 10% of clean up cost than it did for the first part. And now the question is, it is all nice to be in favor of clean water and pristine water, but if we don't receive any tangible benefit from that huge additional cost, what is our position? Those of us who wear an institutional hat on behalf of municipalities may be more recalcitrant than those who have a position on simply taking an environmental perspective of saying pristine water is great. On the other hand, even the environmental community recognizes that if we go so far as costs so much we are going to get a back lash at a political level, that is going to be worse, so where is the compromise. I would suggest thatso far as the institutional framework, a Commission, I think, works well. The question is, who is on the Commission, and you really have to participate at the political level in getting the right kind of individuals on that Commission. Probably what is most important is the quality of the individuals that will be able to devote the time to it. It is a hell of a time consumer, and will he be able to listen to the facts presented with an objective mind. Are they going to be willing to participate in making decisions that have to be made where there is not sufficient information. We cannot study an issue to death. The people aren't there who can afford to

do the studies that are often necessary to the kind of decisions to be made in a very technical area. That does have political overtones. I would suggest that most of the time from the Water Quality Control Commission perspective the decisions we make are not political, but technical, but they are developing more and more of a question of how far do we go with the imposition of cost on the discharger, and are we seeing any benefit from that.

In the case of the Clean Water Act, the interpretation that we are getting from EPA, the purpose of the Clean Water Act is to restore the streams and we are now past the point where the cost is free of any relevant -- it will be restored regardless of cost. That is the kind of story we are getting in Colorado. I think we need to be looking at that question in terms of ground water; do we want to put a limit on. Where does cost come in the framework of the discussion.

MR.SHUEY: We also have a Water Quality Control Commission. It is made up of eight representatives of different state agencies that have some concern about water quality and one member of the public at large appointed by the governor.

Now, under the state statute in addition to being able to adopt the regulations and prevent and abate water pollution the Commission must, in adopting regulations,

consider six statutory factors, almost all of which have to deal with the economic impact of the regulated community of the regulation. From the standpoint of my bias, there was a time I think when those of us who were in the environmental movement perceived the water Quality Control commission on the side of the discharger. I got to believe that has changed.

There was an attempt in the last legislature, however, to adopt a bill that would amend the water quality act to appoint by statute on the water quality control commission a representative from agricuture, industry, the state extractive industry and the state's manufacturing industry, and to exempt them from the conflict of interest requirements, which says that you can't make half of your livelihood from the enterprise regulated by the Commission. We effectively defeated that. I don't have as many complaints about the operation of it now as I think some of us did at one time.

MR. EHRMANN: Any other comments on the panel?

MR. JIM WARNER: I am Jim Warner with Colorado State University.

I am in the Department of Civil Engineering and Ground Water there. I have a question for Gary Broetzman on the panel. My first question has to do with the

State of Colorado. The State Engineer's office has primary responsibility for quantity of flow or quantity of water, and the Health Department has to do with the quality of water. Historically in the State of Colorado, most of the concern has been with quantity, so it seems as if the state engineer's office has had the concentration of engineers and hydrologists and stuff, who are more expertise in ground water. Do you see a problem with the Division as it is set up? The Colorado Water Quality area is in one agency and the quantity in another agency. That is my first question.

I have a second question,and it is directed to Gary and the industry representative, and that is, it has been my observation that when the permit application, when the ground water contamination comes up in Colorado, that your agency may be dependent abit on data provided by the industry that is doing the pollution or the consultant hired by them,-which seems to be somewhat of a conflict of interest. Do you see a problem there?

MR. BROETZMAN: Let me deal with the last one first. There is no question that a lot of the data that we use for decision making is developed by the permittee or the applicant. We also develop some data on our own. We have a limited budget certainly to do stream monitoring, both in terms of hot spots where there are decisions to

defining ambient data.

We try to review the quality of the data as best we can. We rely on the professionals who are developing the data, and assess that in relation to standard approaches for data acquisition. We generally don't find a great deal of problem with the data. We find more of a problem in the interpretation of the data and I think that is where a lot of the disagreements and honest professional disagreements take place. We have encouraged the permittees to do more stream monitoring. We try to work with them so that we are watching the process unfold rather than wait until the end of the monitoring or study process. We feel that more data certainly helps for making better decisions. I might point out the whole system of water quality control, drinking water control in this country and at the state level is based on the data being generated primarily by the regulated entities, and with us overseeing that, and relying considerably on that data for decision making.

So to change that would be a very difficult process and a very costly process. So those are my comments on that last question.

With respect to the first question of fragmentation. I pointed out in my statement that is a problem with most states across the country and in the west. I think it would be very difficult institutionally to change that. There are

some advantages and some disadvantages in being separate. There are some advantages of maintaining some independence in being separated. We are in the process of developing capabilities in engineering, geologic and hydrologic with respect to ground water. We do have quite a bit of engineering support within my division with respect to stream standard and stream data. As to whether we are placed at a disadvantage, I don't think we are necessarily placed at a disadvantage. We have, I might add, a good working relationship with the water people in the state engineer's office. It has been a very helpful cooperative effort. I don't see us competing over turf as it is. We are just developing that capability on my own staff and we are doing that so we can communicate effectively with the other agencies.

MR. DAN LUECKE: My name is Dan Luecke with the Environmental Defense Fund. I have a question for Mr. Broetzman and also for Mr. Shuey and Mr. Austermann. Before I ask the question I would like to state what I have suspected is obvious, and that is, when we are talking about ground water protection from contamination, it is something different from surface water and air pollution. In fact, I would say that anything that has to do with pollution of the land is in a different category. If we take Mr. Goolsby's data on Nebraska, for example, those areas we see contamination,

I would submit if all sources of that contamination seek to discharge immediately, resident times and half lives of those materials, those contaminants in the ground water would leave it there for a very very long period. We don't clean up the ground water the same way we clean up the surface water, or contamination of the air by cutting off the source of the contaminant.

Given that is the case, do those to whom I asked the question believe that the potential polluters of the ground water ought to be held to a different standard of proof, if you will, than any of those who are potential polluters of surface waters or of the air?

MR. BROETZMAN: Let me say that I believe that one can develop a very strong case for a more preventitive program for ground water quality management than perhaps forsurface water, because it takes geologic time to correct a problem that occurs. I think one can also build a case that one should error on the side of it being overly protective of ground water. That is a tough one in dealing with the regulated community. Wisconsin, I believe, has a program where they use a more stringent set of criteria for protecting ground water for public health than they would a surface water, because if they make mistakes or make the wrong assumptions in setting wrong standards and finding out with time, then it is very difficult to correct that

problem. That has been going on prior to the time that a change needs to be made. I think as a philosophical approach, yes, one should try to be a little bit more careful of ground water contamination than the surface, and whether that will evolve in our program we will have to see, but I tend to agree with that philosophically.

MR. SHUEY: Well, I would agree philosophically too Dan. As you know, there are a couple of differences between surface and ground water. One is that surface water has a dilution system, and we have had the concept of everytime that dilution is not the solution to pollution, and that is how we clean out surface water. Ground water, as you know, is not amenable to that. It takes a long time after the pollution stops to clean up the system, if it is ever cleaned up, and that may take hundreds of years. At least looking at our standard, we already have a more stringent requirement for ground water protection than surface water protection, but what we lack is remedial action, and we lack that because everybody sits around scratching their heads to what extent do you clean up a polluted system. Do you clean it up to background or existing concentrations that were in the aquifer at the start of the operation, or that were contributed by the operation before it came into regulation, or do you allow a certain amount of residual pollution to exist forever.

My view is that you do everything possible to clean it up and I think that is an additional burden on the discharger. In our state we have been trying to forgive some of the initial pollutants, but now that it is well know that we want to try to prevent pollution wherever we can, I think that in itself is a different standard, a more stringent standard. I am always looking for suggestions on how to deal with remedial problems, because they are very big problems.

MR. AUSTERMANN: I think the air, surface water and ground water programs are designed to be, and should be designed to do different things, so to dance around your question, I think the standards of dischargers to ground water are properly different from those that apply to air and surface water emitters. I think whether those are more or less stringent would depend upon a lot of site specific circumstances. The air program is primarily designed to protect ambient air quality standards, which are designed to protect public health. I think the operative assumption in the air program is that plumes of polluntant disperse very quickly, which doesn't mean they go away, but any pollutant emitted into the atmosphere very quickly affects all of the air around the polluting source. If you look at surface water programs, at least as it operates here in Colorado, it has been more restrictive standards and

designed to protect not people, but aquatic life. I think the application that occurs after pollutant is discharged to surface waters is some what less complete and somewhat less quick than it is into the air, and that is certainly less to ground water. Once you talk about a discharge to ground water, one of the problems you have to address, and I think I raised what is it you are intending to do, are you protecting all sole source aquifers for drinking water or are you trying to protect downgrading of diversions in irrigation or what? Are you talking about a single water source, where possible, you can identify a discrete plume that will result, or are you looking at a lot of diffusion smaller sources, which may be contaminating a larger portion of the aquifer more quickly. To answer your question, I think you ought to take a more detailed look at the next use between dischargers and the user and the potential users than you do the surface water and the air.

MR.LUECKE: May I be allowed a follow up question and a point of clarification on my question?

MR. EHRMANN: Sure.

MR. LUECKE: I think there are two issues here. One is to standard. In other words, concentrations that might be allowed in ground water or in a surface water system or air. The other is the understanding of the mechanisms by which the source is polluted and then the

movement of material through the medium, whether it is the air, ground or surface waters. My question was directed more at that second concept than the first. It is not a question of standards, but a question of our understanding of the physical system. For those of us that have had the misfortune to be in Denver earlier in the week when we had a couple of earlier rather unpleasant days with the meteorology, what it was and the conditions they were, we had very very polluted air. I would sumbit that if the resident time of that air quality were measured in years or decades rather than in days, that the department of health and the community at large would be very concerned about our understanding of the mechanism of the sources, the dispersion and so on, and would be doing more about the problem. We, as a community, would demand to know more about the problem than it is doing.

With ground water we do have those long resident times. Once we have made a mistake, once we realize we didn't understand the mechanisms, once we realize that we didn't appreciate the hydraulic connection between various aquifers or ground water systems or whatever the state calls them, there is not much we can do about it. When it is the air we can hope for a strong wind and we know we will get it, but with respect to the ground water that is not the case, so the question was directed at our understanding

of the mechanism and there the burden of proof, if you will, on the user.

MR.EHRMANN: I am going to just let that stand where it is. Dan will be on the panel this afternoon, but I got three people or four that want to ask questions, and we are running short on time.

MR.DICK RUSSELL: I am Dick Russell, environmental writer, and my family has a farm in Kansas, and I think my question would be directed to Chris. Before I ask it, let me say I wasn't here for much of this morning's discussion. I got here a little bit late, so you may have covered this. If so, you can make your answer brief. I also want to state I am the publisher of the new National Magazine called You and I, which I would like to show people, whoever is interested at the break. Most of this issue is about rural life and what is happening to the rural environment. I have written an article and another article, what is happening to the Ogallala Aquifer, and is focused on western Kansas and southwestern Kansas, and in the Garden City area, both in the magazine and my question, of course, the depletion of the aquifer is really bad. It is down 40% in many places in what it was 20 years ago, and is a very serious problem that has come about mainly because of center pivot irrigation and creation of an artificial corn belt there. My question is, what is the status, and I know

that Kansas has been suing Colorado under the Arkansas River compact, because they say in Kansas that Colorado is holding up too much water from the dam here and I wonder what the status of that lawsuit is and also briefly if you haven't covered it, whether Colorado is facing similar problems with the Ogalalla?

MR. SHUEY: Well, I have to decline, because I am not -- my work has been really in quality aspects of ground water and I only know peripherally about the Ogallala Aquifer from what I read in the newspapers. In the eastern plains of New Mexico, I think the general attitude, most especially in the agricultural community, there is not a great concern about the quantity problem as the folks in Colorado have expressed. I'd really rather let them address that point.

MR. EHRMANN: I think since our focus is quality, if the answer is, I want to answer your question, but I don't want to take too much time. If someone on the panel could answer that.

MR. BROETZMAN: It is my understanding that both issues were raised in the Arkansas and Ogallala, and are more of a quantity than they are a quality problem.

MRS. HESTER McNULTY: I am Hester McNulty and I am Water Chairman of the League of Women Voters. I have a comment and then a question. The comment is in

response to the question previously asked about the separation of water quality and water quantity, and I would like to point out that the Water Conservation Board addresses quantity only. We had a hearing yesterday on where should the state go forward with some sort of water planning in a background paper, and they said it has been the duty of the state to protect water rights from water quality and water quality legislation. So they didn't even consider the Water Quality Commission part of the state. In our testimony we pointed out that in fact the Water Quality Control Commission part of it was part of the state, so my question Mr.Foster: my oganization, the League of Women Voters, has been following ground water for a period of years and it has been a priority with our organization all over the state. We have found that if you can't beat a party to the hearing because of the Colorado legislation that lets organizations that can hire lawyers and come in with reams of paper, you don't have as much say. I would like his response. I don't feel very defeated after the ground water quality hearings that the lawyers were going to win the day, and the citizens groups like ours that have worked their heads off on ground water quality didn't count for much, and I would like his response?

MR. FOSTER: Hester is definitely a well known face in front of the Commission, and is always an effective

participant despite our demeaning attitude at this point. I think it is a question to what extent can the public effectively be a participant in what are basically very technical type hearings, without assistance of either lawyers or expert witnesses. I would also suggest that if we look to Trout Unlimited as an example, public participation can be effective in a technical type proceeding. Trout Unlimited has been effective in finding attorneys in town who are willing to do a pro bona basis. They have been able to find within their own membership the kind of expertise on aquatic life issues that have been able to participate in the hearings. Trout Unlimited picks their battles very well, and they usually are successful in their presentation.

Perhaps what we are seeing now is the role of citizen participation in what basically are technical decisions -- to move more and more toward utilizing technical expertise if they can find it on a pro bona basis.

Now, I think it is fair to say that other state agencies such as the Division of Wildlife, such as our own staff, the Water Quality Control Division often take a position that is very similar to the League of Women Voters and other public interest type organizations. So they often have significant amounts of clout because of the other state agencies that are taking similar positions. There is no way

to make a simple solution. I think we have to realize it takes time and effort and money to make these kinds of decisions come to fruition.

MR. SHUEY: If I may add, Tess, as you know it has always been a concern of ours, and I think we tried to address it in terms of not only educating ourselves, but not being a fraid to address the technical issues; not that we are expecting to or can do ground water modeling or very detailed hydrologic studies-- you know, transmissivity, permeability and all that kind of stuff--but you largely find that average citizens who are well owners and who use the ground water have very important pieces of information to add to those kinds of regulatory situations. Don't discount their involvement or the role that they can play in these large technical decisions. We tried to bring to them citizens who have experiences that all the hydrologists and the lawyers in the world don't have.

MRS. McNULTY: I did organize the health department to show up for those sort of comments, but because the state health department around the state, but then it was more a bunch of lawyers, and it was technical. I was on the committee and kept up with all the advisory committees with the technical things. I am not complaining about technology. I am complaining about the lawyers.

MS. MARLEN FISH: I am Marlen Fish and I live

in Lakewood and I am going to be introducing a bill next week on establishing anoffice of geographic information in the Department of Local Affairs. I think several of you have already heard about that. I am not sure I want to bring that subject up today, but I think there are a lot of you interested in what this might mean, and you might want to talk with me about it at lunch. I have heard a lot about information stashed away in agencies, and the idea of this particular piece of legislation is to try to establish some guidelines to make the data base so that we do have a plan down the road that fits together, especially for the counties, but also for the state and also the geological information. So we are still drafting and there is time for input and I think perhaps it is better to talk about some of those things before the bill gets on the table, so that is why I am letting you know that I am doing this and I basically came to listen and to learn. Thank you.

MR.EHRMANN: Thank you for the comment.

MR. LYONS: Mr. Foster says that he favors a rebuttable presumption of a drinking water quality standard across the board. I am just interested in knowing if there is anyone on the panel who would take issue with that?

MR. SHUEY: Why don't we have Mr. Foster define what he meant by rebuttable presumption?

MR. FOSTER: The concept behind rebuttable

presumption in essence, we would deem all ground water in the state, all ground water within the state as suitable for drinking water purposes, and if anybody wanted to use or discharge water to ground water at quality less than ground water quality or drinking water quality, they would have to establish to the commission why they should be able to do so. In other words, let's establish a floor of drinking water quality which is to be protected and maintained. Now, you asked will anybody take issue. I will take issue with it. Going back to Dan Luecke's earlier comment, realizing that once ground water is fouled it is fouled for decades and longer, do we want to even foul it to the slightest degree? If we have ground water that is better than drinking water quality, do we want to even let it deteriorate and degrade down to drinking water quality. Certainly you can make a lot of good argument there should be no degradation at all because of the difficulty of clean up. I would suggest that even though the State of Colorado has not really developed a policy along that line, when you look at the regulations that are already in place, for the establishment of solid waste sites, for beneficial use of sewage sludge, in essence, we have adopted a non-degradation provision, but then the question becomes, is that really beneficial? What is the cost trade off? Is it really realistic? Can you line the bottom of a sewer lagoon so that it is absolutely

impermeable, or should you expect there is going to be some permeability over the life of that facility that is going to impact the ground water, and is antidegradation really an achievable goal? These are the kinds of issues that we are frankly struggling with before the Commission.

Going back to the question of drinking water quality, does anybody really know what drinking water quality is. We have got a whole set of primary treatment drinking water standards that have come out of the EPA, and yet Congress is looking through the Safe Drinking Water Act of imposing a whole new set of additional parameters. That must have limitations imposed on it so if we were to simply protect an aquifer to the existing set of parameters, contaminants, then a whole new set of contaminants came out that we had not earlier protected, how are we protecting them. One of the problems we are trying to figure out is the level of protection we are seeking to achieve when we really don't know what is coming in front of us, that is far down the line.

MR. SHUEY: In New Mexico, we already have. We protect ground water that is 10,000 parts per million TDS or less. And if the TDS is 200 parts per million, and you got a waste disposal that causes the contamination to rise to 199, the standard is 1,000, that is limited degradation. You know, you can ask me what I think about that as a policy

matter. The thing that we try to avoid though is this concept of significant risk in which you somehow, especially for the synthetics and organics and the real toxic materials, that you have to somehow establish this is the effect before you take action, and I kind of hear that as an undertone not only here but in many of the things that I have participated in, where we have to go out and have to show there is some polluted ground water or a statistically significant number of dead bodies before we can take action to prevent pollution. I think that is standing on its head the concept of the ample margin of safety that was in the Clean Air Act and the kinds of requirements that are built into RCRA to keep those things out of the ground water system. It is a rough policy decision to make. That requires a lot of people getting together and doing a lot of discussion.

MR. EHRMANN: I would like to thank the panel for their participation as well as those of you in the audience who queried them. It was a session that set the stage well for our discussion this afternoon on policy options.

We will be in recess for the noon hour.

(Noon recess taken.)

AFTERNOON SESSION

DR. NORMAN EVANS: Ladies and gentlemen, let's come to order if you please.

We have the panel in place and just ready to go.

I am just here to introduce the afternoon participants. I do want to say a couple of things first before we go further. These proceedings will be printed from this transcript and it will be available and a notice mailed to you when it is ready, and it won't be too long, so you will get a notice in the mail.

I am going to close a gap that may or may not exist, but we talked a good deal about data information, about facts, and one of the things we all feel sensitive toward considering the subject at hand is that the lack of solid scientific facts in a lot of the cases that we're dealing with. As for example, how does the critical concentration of particular elements itself affect biota of certain kinds. I did want to point out then that research is an element in this big picture that we ought not to lose sight of. I just call that to your attention so it doesn't fall through the cracks in any consideration of long range plans.

I wanted to point out in our program in Colorado and

Water Research Institute, for example, we are doing work for the water quality control interest. Just a couple of examples I wanted to mention.

Chemigation was talked about, and we have worked on evaluating the contamination in an aquifer for a slug of chemicals that might back flush back down into the well, and where does it go and what happens when the pump starts up again, does it all come right back out, or how does it diffuse in the aquifer, and trying to look into that slug of chemicals that might go back down the well.

The second one is geochemical injection of the deep aquifers in the Denver Basin, which locally is a very important source of water supply in the metro area just coming into its own more or less. The question of injection of recharge is a real one facing water managers, and the chemical interaction and geochemistry in the aquifer is under question and study.

A step in the direction of eventual recharge and monitoring strategies for ground water quality management is another research project and subject that we have actively going on relevant to the questions we are talking about today Also incentives for improving irrigation efficiencies is another subject very closely related because of chemicals, fertilizers, pesticides and so on, and some of which are leachers that have been talked

about, and it is related to the management of irrigation water, so those are some of the things I just wanted to bring into focus very quickly. Now, the moderator for the afternoon will be Professor Henry Caulfield. He is Professor of Political Science at CSU. He has a long career and is very closely oriented to the subject of the meeting; a long career with the Department of Interior, and he retired and joined the University Academic Community probably about 15 years ago. It is my pleasure now to introduce Professor Caulfield.

PROFESSOR CAULFIELD: Thank you very much, Mr. Chairman.

This afternoon we need to get on as we are starting a bit late. Ms. Bird is going to participate again as a questioner from the Staff that is sponsoring this conference.

This afternoon, the topic is National Ground Water Protection Policy Alternatives. So we are getting in to the idea of policy and into the question of alternatives, and I'd like to highlight a couple of things from this morning that are going to come up again this afternoon. One is the organizational diversity that is involved at the state level and also the national level to some extent in handling this problem. We also have brought as was brought out this morning many policies at the federal government as

represented by different laws, and that impinge on this question, but no one law which focuses on this question. As I understand the national level EPA considered the question whether there should be a ground water law or not, and to some degree they decided there shouldn't be a separate new statute on this question, but instead, they should have a ground water strategy as a regulatory matter, and that is where they are today.

The question though makes relevant this session on a national ground water protection policy to separate states as exemplied in S 1836 introduced by several Senators and including a friend of mine, senator Gary Hart of this state. And so it becomes a question, and probably will come up this afternoon,as to whether a bill like S 1836 is relevant to our times or is way past the time when we need this or maybe it is not good enough, We are talking about national policy, but this is the situation from the facts brought out this morning and it is relevant obviously for any of us that were here this morning to question what we need in the way of additional national policy with respect to this particular problem, which is addressed in terms, or implied in many laws that are already on the books.

With those few remarks, I will just proceed now with our speakers. I am not going to introduce them anymore

than they were this morning because we want to get on to the substance of the program, so our first speaker is Max Dotson, the Water Management Division of EPA, Region VIII.

MR. MAX DOTSON: First of all, let me thank the sponsors of the meeting today for the opportunity to speak to such an auspicious crowd. I am particularly thankful for being put on the agenda.

I am reminded of the bumper sticker I saw the other day that said, "Fight Crime. Shoot First." And so maybe we can change that away and fight pollution, talk first.

Another reason I always like to be put first on the agenda has to do with an experience I had this last fall at a meeting at Thornton, which puts on every year a clean water week. I was second on the agenda, and Congressman Brown was first, and as usual he did a good job and answered a lot of questions. Prior to the meeting I had probably an over consumption of coffee and beverage, and had to take care of a personal matter. I left the podium and went down to the men's room. They summarily introduced Margaret Carpenter while I was in the bathroom and that was somewhat embarassing as she was introduced as me as I was walking up the aisle, so fortunately, I am able to sit here today, having taken care of my important body functions.

Let me lay out a little theme here in terms of my remarks having to do with the fact that I very commonly like

to play the devils advocate in many instances, and I like to work people in the audience, not the panel up here, to work the people into an anti-EPA frenzy, and I think that might be very important today after having a very good lunch, that we need to get on with it. So I will play the devils advocate. One thing I want to make perfectly clear; as I present EPA's policy option, I will tell you that I don't make the cars, I just try to sell them. So keep in mind, the decision has been made that is our policy and we can discuss it in that manner.

First of all, let me say that the strategy which is essentially the policy right now that EPA is dealing with particularly with the states is long in coming, and I think from an attempt to go all the way back to '78 by the Agency to try to put together something called ground water protection strategy. It was finally signed and put in place in August of '84, so the point to be made here, as you sit here and talk about different policy options, just a ground water strategy took six years to put into place. So it gives you an idea of perhaps the difficulty of putting legislation or putting some things in place that go significantly beyond what we presently have in the ground water strategy.

The basic approach that EPA has laid out in its ground water protection strategy is fairly simple.

Now, with regard to EPA, it is built on a strong tradition in terms of allowing the states to take the lead. As you know, most of our environmental programs have been delegated to the state and the states are essentially the agent for that particular piece of national legislation. It has served us well. I think there has been remarkable progress, particularly in the areas of responsibility, and there has been remarkable progress by the state in doing the right job as specified by the federal criteria.

So that is the basic theme; the ground water protection strategy essentially relies upon the traditional approach.

Another idea inherent in the strategy is to do a better job of using our many statutes. As you know, it is quite an alphabetical soup out there,CERCLA, RCRA, and I can go on and on. Kind of reminds me of Congresswoman Schroeder's comments this morning, she was referring to it as the safe drinking water act. I know for a fact -- Gary Broetzman, are you here, this is kind of a long tradition -- that I always have to take a cheap shot at Gary. The reason I do that is because I like him so much. Gary is an example. He heads up the water quality program of the State of Colorado, and he has a hard time differentiating between the safe drinking water and the safe water drinking act, and everytime he gets too much

vermouth in his martini, he gives a call to Rick Carr his drinking water chief and starts to complain, but anyway, as you can tell, even the acronyms get meshed together, and that is probably symptomatic of a bigger problem; if you think it is hard just stating what the acts are, it is even more difficult trying to coordinate them.

Again, inherent from EPA's groundwater protection strategy is needed to coordinate those programs and a mighty difficult task.

Another aspect of the ground water protection strategy is to enhance state programs that are presently in place. This is through technical assistance and so forth. We currently have seven million dollars in supplemental appropriations to give to the states to develop a ground water strategy of their own.

I would say the response by the states has been remarkable. I think we have very good work plans that the states have been working on and implementing, all of our states in our region, and this is a situation that may exist nationwide. I don't have a real good handle on it, but keep in mind that the six states in Region VIII have basic statutes that do not exclude ground water. They all include ground water, which is in contrast to the federal clean water act. So in terms of us relying on state

programs we're blessed with the fact they do have fairly broad authorities. That is not to say there is not some gap in their authorities, but anyway, I think a lot of our states have taken advantage of this funding mechanism and the technical assistance, and are really up front. Some states, as a matter of fact, were out front before the ground water protection strategy was put in place. As an example, Wyoming has a fairly sophisticated program, including classifications and regulations. Montana started issuing permits for discharges to ground water three y ears ago. Another aspect of the ground water strategy is dealing with major sources of contamination. I can go through problems that have been detected nationally, but I don't think are fairly productive. Keep in mind that there are serious problems in ground water protection strategies dealing with most significant problems first.

Now, the framework for decision making in the ground water protection strategy does involve a classification system. Now, classification systems and decision making frameworks are interchangeable from the standpoint that the classification system that is specified in the ground water protection strategy does not mean that the states are required to go out and map aquifers and classify everything. It is a decision making process that occurs when the decision needs to be made on siting a facility or

making a regulatory decision having to do with a discharge to ground water. The program involves three tiers of classification, class one and I am just going through this very briefly.

Geographically limited high mobility, vital for drinking water or ecological sensitive areas. In other words, extremely high quality and very vulnerable. And the controls for the most part will go beyond the baseline inherent in our legislation and our regulations. Class one current potential sources of drinking water and water having other beneficial uses. This is going to be probably the vast majority of ground water in the United States, and these types of ground water will be afforded typical levels of protection. Class three, this is ground water not considered potential sources of drinking water or of a limited beneficial use. These are isolated aquifers affected pretty much in a big way with either natural or man made contamination. Of course, less stringent measures attached to class three. Class three, I will say is somewhat a sensitive area nationally with the implications that somewhat of a sacrifice area, I will just assure you that is not the case, but there will be regulations applied those class three. Right now the Agency is currently completing the guidelines and hopefully that will be out in the very near future.

Now, that is essentially the federal approach, the EPA approach to ground water protection. Of course, you can see there is a lot of criticism of that approach. I know in looking at the testimony of a recent Congressional hearing Governor Babbit of Arizona said it just is a voluntary program and therefore does not really push the states toward a national concensus; but at the same time, we say again, progress that we have made in Region 8 in getting our states to take somewhat of a consistent approach has been very good.

Let me introduce three other policy options. The first one is actually the second one; the EPA urges a strong federal role, and this is advocated by a conservation foundation report. The strong federal role provides for focusing on ground water research and technical assistance, and approval of state programs based on criteria establishing national legislation. This is very similar to all of our legislation. It recommends health base guidelines for uses in state classification systems, and that goes beyond traditional MCL approaches in the safe drinking water act, perhaps somewhat similar to the surface water quality standard. Periodic review of state programs ensures consistency with federal established guidelines. Again, very similar to a lot of our other environmental legislation. There is implication again in the Conservation Foundation report for federal ground water

policy to support state programs and minimum federal programs for those states which cannot or will not develop their own.

Aquifer classifications, participatory type programs. In other words, classification will be put in place long before regulatory decision has to be made involving ambient ground water standards. Authority to control potential ground water contamination and effective enforcement is provided. Some optional state program activities would would be surface use restrictions, including restrictions to use, and control of groundwater withdrawls, in other words, tying quantity/quality together. If EPA got involved on quantity, it would sink the ship, and I think to some extent, that may be the case, however, let me also state, and I think a couple of panel members mentioned it, that there is a relationship between quantity and quality. I think there is a tendency by the federal government in some instances to go high when that interface becomes obvious. I think there has to be a recognition by the federal government as water rights that have to be honored.

Another optional state program activity, coordinating ground water and surface water management. In other words, strong federal role advocated by those two organizations is fairly comprehensive. Let me just state that kind of program would be very resource intensive at both state and

federal levels. States in the West are not capable of handling this kind of activity. They are not aware of any western state which has a participatory classification system which essentially requires a lot of up front work.

The third policy option, this is pretty much laid out in the Mitchell/Baucus bill, the federal role is essentially a primary advisory to the states. In other words, it is a very voluntary kind of effort. It would be the federal government conducting research and publishing technical information on ground water. We would publish guidelines on how to conduct tests and how to develop a program, require states to set standards no less stringent than MCLS, however, no federal approval of those standards. It would establish monitoring programs, develop ground water management program strategies and develop control programs for resources, and have a compliance program. However, no federal program would be inserted in lieu of the state program. There would be grants from U.S.G.S. of $25 million dollars, 75% eligible. There would be 50 million dollars available from EPA at 50% program implementation. By the way, the USGS money would be available for conducting assessments and the EPA grant funds would be more broadly interpreted as program grant funds. EPA would be required to conduct clean up to state standards, although state standards again are going to be set by the state. The state could create

protection areas which have greater or less standards. So in terms of that particular piece of legislation, there are a lot of questions having to do with what implications they have for such federal statutes as CERCLA, which is probably a piece of legislation that doesn't necessarily tie into other state and federal requirements. Pretty much a fairly independent kind of clean up activity. So as you look at the Mitchell/Baucus bill, what kind of relationship would it have with CERCLA and also the bill has a tendency not to take a look at the fact that aquifers do not follow state boundaries.

The last policy option, particularly the federal government is to take a look at the Long Island example, which is essentially a local government program implemented at the local level, where there is no federal funding per se. And that responsibility for implementation lies at the local government level and gets involved in such things as zoning and land use decisions.

My staff had a note down here at the bottom of my materials that said, Max, if you need us to list the issues here, you are blind to the real world.

In terms of the local ground water districts, Dick Long, my ground water coordinator reminded me of some of the frustrations that local governments are going through. I guess the one that hits home is Lamont, Wyoming, which has

an uncontaminated underground source of drinking water. They have no alternative. In other words, they can't get surface water, probably cannot afford a treatment plant, and are too far removed from another aquifer. They are out of luck. In other words, I think we have to be somewhat realistic in saying that the state and federal government can walk away from local ground water problems. I think that is totally unrealistic. They need help.

So, in summary fashion, those are the four policy options as I see them.

PROFESSOR CAULFIELD: Our next speaker is Craig Bell from the Western States Water Council.

MR. CRAIG BELL: I appreciate the opportunity to be here. I am the Executive Director of the Western States Water Council. The Council is a water policy organization comprised of representatives appointed by the Governors of thirteen western states. Protection of ground water resources is an important concern of the state officials who serve as council members.

As you know, western states depend on ground water for 50% or more of their municipal needs, and as much as 80-90% in some aras. Irrigated agriculture, however, accounts for the vast majority of ground water use in the western states. Also, ground water is an important source of water used in industry, mining and electric power generation. Thus,

westerners appreciate the significance of ground water and are willing to take the steps necessary to assure that it is of sufficient quality to allow for its beneficial use.

Ground water managmeent -- the protection of its quality and its allocation for beneficial use -- requires coordination among all levels of government. Historic federal policies have emphasized the primacy of states in administering ground water allocation and quality protection Consistent with this policy of deference, the western states have established permitting programs to govern ground water rights and have created various legal systems to protect ground water quality.

Federal statutes also impact the management of ground water resources in western states. I am sure most of you are aware of the Environmental Protection Agency's Ground Water Strategy published in 1984. The strategy is aimed at coordinating federal ground water related actions under applicable federal statutes. To facilitate the implementation of the strategy, EPA formed a state/local/EPA ground water liaison group of which I am a member.

And, of course, there has been activity within Congress, as well. One bill has been introduced and other ground water quality protection bills are expected to be considered by Congress. As we analyze these proposals, I believe we should be careful to assure that they do not

contain elements that could increase the federal role in a fashion that would undermine the state programs. This could ultimately lead to less ground water quality protection, not more.

The western United states are geographically and economically diverse. Understandably, western state legal schemes for protection of ground water quality differ. However, it is important to realize that all western states have established legal authority to protect the quality of ground water resources.

Many state plans categorize ground waters into classes and establish standards, both discharge and ambient, aimed at protecting each class Some states designate critical ground water recharge areas and formulate regulations specifically aimed at their protection. Regulation of the underground injection of hazardous wastes is accomplished either under the federal Underground Injection Control Act or pursuant to state injection control laws. Also included in state ground water protection programs are regional enforcement mechanisms, interagency coordination among the various state agencies with jurisdiction over laws which effect groundwater quality, and public notice and participation practices.

In areas where ground water related problems have been particularly troublesome, such as in Arizona, states

have stepped forward to meet the challenge with innovative legal mechanisms. Arizona has enacted one of the more carefully conceived and far reaching ground water laws of any state. Enactment of the law involved difficult policy decisions. Its enforcement also presents challenges. Yet, the state has taken the legal precautions it believes necessary to properly administer its ground water resources.

In addition to state ground water quality programs, all western states, with the exception of Texas, have legal schemes to govern allocation of ground water. Generally, an application must be made before a well may be drilled. A state administrative official or body will rule on the application based on factors which differ from state to state. Once a permit is issued, the permittee is recognized as having a legal right, which is also a usufructuary property right, to withdraw a certain amount of ground water for beneficial use.

As proposals for federal programs to enhance ground water quality are evaluated, we would hope that this background of historical state responsibility for water quality and quantity regulation will be kept in mind. Any proposal should be measured by its impact on the state's role in protecting this vital resource. In this light, the Western States Water Council has made several recommendations.

Any federal policy should provide the necessary

flexibility for the states to develop programs appropriate in their respective states, with foundation elements which include aquifer protection standards or criteria to protect all legitimate interests, including federal for various water bearing zones; and mechanisms to assure their protection. It would be contrary to this principle to impose federal aquifer classification systems. Although such classification systems may bring uniformity in the implementation of federal programs, determinations as to the levels of treatment required for various water bearing zones could thereby be effectively transferred from the various states to the federal government. Such a federal aquifer classification system would implicitly establishing water quality criteria or standards for application to all ground water bodies or zones within a state. This would be available, asis often the case, to obtain and retain approval of state administration of various environmental protection programs relating to ground waters, state regulation would have to be at least as stringent as the requirements of the classification system. The overall effect of such a classification system so administered could amount to a long step towards reversing the historical congressionally approved federal and state roles.

The council submits that Congress, by empowering federal programs over the last decade to administer various

environmental protection regulations and clean up statutes, did not intend such a role change. However, such a result could accrue from the imposition of a nationally uniform classification system for ground water basins. Instead, federal programs should be supplementary to already existing state programs.

Flexibility is also important with respect to federal funding of state efforts. Such funding is desirable in promoting the objective of building and enhancing the strength and effectiveness of state programs. However, the use of such funds should not be restricted to program development. Use thereof for state implementation programs should also be allowed. Otherwise states that have already developed ground water programs would be ineligible for funding. The most effective return on the federal dollar invested would come from allowing funding not only for program development but implementation.

As a positive and necessary first step in the development of a federally supported state program of prevention and cleanup, there needs to be an inventory of inadequately addressed sources of gorund water contamination. The emphasis in the EPA strategy upon such an inventory is therefore commendable.

The Council has also commended EPA for establishing the special Ground Water Office within EPA. The Council

sees this as a means of providing improved liaison and valuable coordination between EPA and the states at a high level within EPA. The new office should also allow for proper focus within EPA so that all EPA ground water related activities are coordinated, especially in ensuring that they are conducted in accord with and in support of the dominant, comprehensive ground water quality program established by each state. We hope that the new office will provide each state with expeditious, effective access to EPA both in Washington, D. C. and regionally. This access, properly administered by EPA, will provide a coordination point leading to greater harmony in federal/state program implementation.

We also would recommend that any federal ground water quality protection program seek to insure the inclusion of a good neighbor policy that encourages all federal agencies to conduct their activities in accord with state ground water protection processes and requirements. Federal lands constitute a majority of all lands within several western states. Therefore, we think that the inclusion of such a good neighbor policy would be an important element of any proposal.

In conclusion, I would reiterate that the Western States Water Council has as a high priority the commitment to work with Congress and others to bring about enactments

and strategies at the federal level that support, not undermine, override or otherwise impair the successful administration of state ground water programs. Federal programs should be carefully tailored to support the states in their efforts to carry out state ground water quality laws as well as carefully designed to avoid interference with constitutionally protected property rights to the use of ground water.

Flexibility should be a key concept in any federal ground water legislation which is to receive the support of western state water officials. It would be inappropriate for Congress to enact ground water legislation which mandated that state programs meet rigid requirements and criteria which might not be applicable in the western United States. Further, it would be inappropriate for Congress to re-invent the wheel where state programs are in place and are functioning well.

Where some state programs have been less effective than others in achieving ground water protection goals, the underlying problem has nearly always been the lack of technical and financial resources. Generally, the western states would welcome the infusion of new federal funds into ground water protection efforts and the provision of increased technical support. Indeed, the Council recognizes that these recommendations are based on active, assertive,

effective state protection efforts. With the federal government providing its full backup support, we are confident that every member state of the Council will meet the challenge of providing these essential efforts. You may be assured that the Western State Water Council supports that objective. Thank you.

PROFESSOR CAULFIELD: Our next speaker is Gerald Dahl representing the Colorado Municipal League.

MR. GERALD DAHL: I am General Counsel for the Colorado Municipal League. I have been doing that now a little over a year. Previous to that time, I spent six years at Northwest Colorado Council of Governments up in Frisco, Colorado, and my role there was very different than my role with the CML. In CML, I represent all of the 263 municipalities in Colorado on a broad range of issues. For the previous six years however, I represented six counties and 26 towns primarily on the Western Slope west of the Continental Divide, and better than half of my time was spent defending lawsuits brought against those counties and towns by my good friend on the front range for whom you now work.

The Northwest COG has an interesting proposal for tying quantity and quality together under their 208 Plan, taking the position that transmountain diversions of water from the Western Slope to the Eastern Slope resulted in water

quality problems. It is only just that I, in my new job, am now working for a number of those Western Slope communities that used to be the plaintiff against my defendants in those cases. Anyhow, now I am in Denver and I work for the League, A good part of my time, especially when the legislature is in session, is spent over beneath the Golden Dome monitoring legislation on a number of subjects. Last year, I spent a good fraction of that time following a bill in the legislature which would have affected the 100 year old statute that Colorado has allowing municipalities to protect their water supplies. As Representative Fish will tell you, it took probably more of our time than it should have, and you don't want to talk about that briefly.

One joke I want to get off with deference to Representative Fish. When you work with legislators, there are two things they say you should never watch being made, sausage and legislation, because you don't want to know what goes into either one. And sometimes I think even this legislature and lobbyists don't want to know what goes in either one.

The speakers so far today have talked about what programs at the the state and federal level are in place to deal with ground water, not so much physical allocation, but its quality protection. My perspective on this issue is as

follows.

Local government, counties, towns and special districts are the ultimate providers of that ground water to domestic and municipal consumers in almost every case. At the same time, I think it is fair to state they are the least involved in the process in the existing system or any other system for ground water quality protection. We sell water to you people, but we don't have the regulatory authority necessary to insure that the raw water supplies, from ground water supplies are pure. We, of course, have the obligation when we find the supply to clean it up and before we sell it to you, that is an obligation that local governments are willing to take on.

However, increasingly our ability to protect those raw water sources from ground water supplies are threatened from outside of local government control. That is not necessarily a bad thing. I think it is probably right and true that you don't want to have in Colorado 260 towns and some 63 counties, where you have some 323 different ground water quality regulations. You don't want to have that. At the same time, I think it is probably fair to state that when you are the one on the hook for liability, you have a special and different and peculiar interest in how the regulations are developed. If you are regulating and not selling this, there is a gap there. And again, 323

sets of regulations, I don't think, ought to exist, but what I do want to say, is the fact responsibility to sell and responsibility to take liability for ground water problems at the ultimate end of the buck really does stop in between the customers, I guess, the ultimate consumer and the people that sell that water to them. It doesn't necessarily stop when the state or federal government takes an action to try to protect ground water quality.

I think we are already moved by the efforts of the state to consider the adoption of ground water quality regulations and in Colorado, because I think there is a growing need for that and I think we are all recognizing that.

I want to touch upon a couple of examples of how local governments interact with the state and federal government programs on ground water quality or water quality in general.

Now, it is true that a couple of these examples won't be ground water examples per se. I sort of can't help that, because there aren't a lot of local governments with regulatory authority in this area, but what I do want to point out, and I guess the only point I want to make here today is, that local governments ought to be allowed some kind of flexibility, and ought to be encouraged to work out arrangements. Some are very technical and legal and some

are very much more informal, but arrangements to work with the people that are setting standards for water, with the local government will then turn around and sell. It is kind of, let's approach each case on its facts and try to react to it and try to encourage any number of sort of informal or formal arrangements to bridge the gap that probably has to exist. The gap between regulations on the on hand for water quality and the responsibility to approve development projects, and that is a local responsibility. That is a local responsibility, as somewhere in those findings, when you approve a subdivision, you make a finding as a board of county commisioners or town council that there is adequate water in both quantity and quality. Ten years from now there is a ground water contamination problem, and 10 years ago you, as city council said, yes, I am making a finding before I approve this 30 lot subdivision, there is adequate water and quality and quantity, and 10 years later, it is adequate in terms of quantity, but as a discovery is made, as in the case in Wyoming, it is not adequate in terms of quality. If you are a home owner who are you going to sue. I would suspect you would sue the people that took the action that has a little plat note on the plat, that lists the property you bought, you are going to say you made the findings city council that this was okay, and it is not, and you are on the hook.

I am really not sure what an innovative lawyer for the city council would do at that point in time. I am sure they would immediately get hold of the state agency that would take the position as far as water quality, they are preempted by statewide systems, but you see the problem I am trying to raise. How do you bridge that. I think there are a couple of different ways that could be done.

There is statutory authority for municipal protection of water supplies. I passed out a handout, which you probably have. It is two pages out of the Supreme Court decision in 1984, involving a lawsuit with the Amax Mining Corporation and the Town of Crested Butte. In 1977 the Colorado Legislature in their first session adopted a statute that says, as you can see from the first side of that page, which was really page number 234, I guess, and over in the righthand column, it says, this particular statute allows municipalities to adopt ordinances to protect the watershed for their water supply, and what you do is you take that water intake and measure 35 miles out from the intake, and get aradius, and it is over that area, whether it be in the city or not, that you can adopt reasonable ordinances to protect water quality and, of course, that was enacted in a time when you had tanneries and feed lots and so forth up above a mountain community's water supply, and that was the fact that was addressed back

then.

Crested Butte took the position that mining proposal would similarly affect their water supply, and said Amax has got to get a water permit. Amax said we are not going to get a permit for several reasons, primarily for the fact we are running this operation under a federal mining law, and we are appropriating water rights, and water quality matters are preempted from local government control, and are given over to the state Water Quality Control Commission, therefore, Crested Butte, you can't require a permit for anykind of water quality matter. If you turn the page over, you see what the Colorado Supreme Court says about that. The court made a distinction, and a number of parties were amicus curie in the case, trying to see what the distinction of the point source discharge and non-point source discharges, and this is a non-point source control, land disturbance and so forth, and that could conceivably result in injury to water supply activities. You will note the Supreme Court seemed to buy that argument. You advance that as one really pretty narrow area in which municipalities can attempt to control or prevent injury to their water supplies, both surface and ground water. I believe the city council of Castle Rock is considering or has adopted an ordinance that essentially measures the radius five miles around

their municipal well. The point of intake doesn't necessarily have to be surface; it can easily be below ground. I think that is one example.

When we lobbied against the bill, that would have interfered with the change in statute and in the legislature last year; one of the key examples, I think, that came up, was the Martin Marietta ground water pollution approaching the Denver Water Department shallow wells, and the issue really became this; there is growing need for pre-activity permitting from municipalities' perspective, if you are relying to 50 to 90% on municipal wells. The issue in the legislature is, we can deal with these problems after they have happened. I guess I submit that the nature of the problem and the nature of the difficulty of dealing with the problem is very different from ground water contamination than it is for surface water contamination. As a result, all of the federal and state programs notwithstanding, if things happen, you sure wish you had maybe a permit process in place that requires people that are going to do things like store chemicals, whatever, within five miles of your well, to tell you at least that they were going to do that. That was some of the discussion that went on ad nauseum at the legislature, that the nature of ground water contamination from a municipal supplier's perspective is really different. That is how come we ought

to be able to have some sort of permitting and notification program ahead of time.

I agree that you can't separate quantity from quality or you shouldn't, and I am heartened, I think also by the efforts of the legislature in adopting Senate Bill 5, which as a ground water quantity statute essentially allocates and sets up the situation under which you can get water rights in non-tributary ground water, which will become increasingly municipal sources, and interesting in that legislation, there is specific provision for local governments and water suppliers to pass ordinances to achieve some sort of dominion over non-tributary ground water supplies beneath their territory. It is that kind of thing on the one hand, that statute, that allows municipalities to have some sort of permitting authority, and another example of a statute that allows municipalities and others to gain some sort of dominion over ground water supplies. I think any other kind of cooperative endeavors between the state and federal agencies on the one hand and the water providers on the other hand should be encouraged; otherwise, the regulatory authority will stop, and the regulations will be adopted, and from that standpoint, I think it is fine; then, it becomes our obligation to sell water, and 10 years later, you bought a house in the subdivision that relies upon a contaminated well.

It is that kind of interface, even though it is not a strict legal interface, that I think is very important and should be encouraged. Thank you.

PROFESSOR CAULFIELD: Our next speaker is Paul Frohardt of Holland and Hart.

MR. PAUL FROHARDT: I should tell you a little bit about what my perspective is in this issue. I am an attorney in private practice representing mostly, although people on both sides of the process, mostly industrial clients, the majority in the mining and mineral processing industry, and so my perspective is one of a practicing attorney who is trying to assist clients in dealing with the day-to-day realities of complying with the current programs, the environmental programs and interacting with the various federal and state agencies.

In trying to determine what the appropriate federal role should be in ground water quality protection, I think there is a real danger that sometimes the response to that question comes across as an abstract or philosophical discussion. To me, the issue is what should the federal government do right now today. I think that in answering that question you need to start with a thorough understanding of exactly what regulatory structure currently exists, and then decide where we go from here.

As has been touched on by a member of the panel earlier

today, there are several major federal ground water quality regulatory programs that are currently in place: RCRA regulations, hazardous waste and now underground storage tanks, Superfund, the Safe Drinking water Act and also quite a number of other federal statutes which have the aspect of ground water quality.

I think one of the handouts you got today goes through and enumerates all of those, and we have the EPA coordinating strategy that Max Dotson has described to you, and, of course, states are currently in a wide variety of situations as to efforts to develop and implement ground water programs.

Where does that leave us right now? How is that working? I think that it is important to look at two different issues, one what is happening on the remedial side to take care of the past ground water quality problems and second, what is happening on the preventitive side to avoid future problems.

On the remedial side at present, a lot of the time, money and energy are being devoted both by EPA and state agencies and private parties towards cleaning up existing contamination problems, especially under the federal hazardous statute, RCRA and CERCLA. Generally, it is my experience that in this process, and I think this is reflected somewhat in some of the comments that were made

by Alexandra Smith of EPA's historical perspective, and where they are in getting into expertise in this area. I think that everyone on all sides of the process is currently at a very early phase in the learning curve as to what remedial measures and technical measures, and what clean up is necessary if there are health and other environmental standpoints, and what clean up options are cost effective.

Overall, I think the scope of the authority under the existing programs, especially RCRA and CERCLA, the Superfund are very broad, and are indeed broad enough to address a tremendous percentage of the existing ground water quality problems.

Looking in particular at agriculture and mining, the specific areas that we are asked to focus on today, there was a fair discussion this morning about the status of efforts, not all at the federal level, but at both federal and state levels to address agriculture concerns with respect to mining wastes.

EPA just submitted a report to Congress on their views as to the need for regulating various types of mining wastes under RCRA, and now begin a debate and eventually presumably a rulemaking process, to determine what further specific controls maybe appropriate.

Overall, it seems to me that it is clear that the

primary concern or constraint on clean up is not the scope of existing regulatory authority, the availability of resources and information to implement that authority.

On the preventitive side, I think that it is fair to say, and it is certainly true from my experience in dealing with the clients, that the applicability and the potential for applicability of RCRA and the specter of Superfund liability down the line is starting to have a very real and major impact on how new industrial facilities are sited and designed. Current state programs and proposed state programs are also having an influence as far as how people design and construct new facilities.

With that current assessment of the situation, what do we need at present. At this point in today's discussion it is not a novel viewpoint, but it is also my viewpoint that we do not need a new comprehensive federal regulatory program or mandatory federal standard. The current programs are addressing the majority of the existing problems and the limits of the current knowledge and resources are being severely pressed in implementing those programs. It seems to me that the primary beneficiary of any new federal legislative initiative at this point in time would be lawyers who would be required to try to explain the new requirements to their clients, who hadn't thought things could get any worse.

I think indeed there is a danger that a new major federal legislative initiative at present would delay real progress towards solving and resolving our ground water quality problems because it would divert existing regulatory resources over at Max Dotson's shop from solving the current problems to developing more new regulations, and undertaking more analysis of how various programs in fact interrelate with each other.

I think the public would be better served if available federal resources were devoted to implementing existing programs fairly and consistently while we all gain experience with respect to solving real world ground water quality problems,so that we could determine what does work technically, economically and politically.

What about the future? I don't mean to suggest that this is a long term answer as to what the federal role should always be. I think that it is important to continually reassess that role over time. From my experience in environmental regulations, which has really mostly come about in the last 15 years, that is, whenever you have a new program, there is sort of a regulatory digestion period, and all of the people on all sides of the process have to try to figure out how this new program is supposed to work and how it can work best, and until one set of efforts is substantially underway and implemented, I

think it is very often very inefficient in every one's resources to move to the next level of detail and start passing more laws that simply tend to divert resources and complicate the process.

It may be that over the next five to ten years of experience with existing programs we will decide there are regulatory gaps that aren't being adequately addressed and the need to be addressed by the federal government. Or it may turn out that some individual states are unduly lax in protecting ground water and there is a need for more federal direction to assure adequate state protection. At present, however, it seems to me that the federal effort should be to focus on doing well the job of implementing existing programs in gaining more experience in that effort.

One of the handouts this morning, a summary sheet I noticed, contained the statement that in the U. S.Congress ground water protection is just emerging as the next environmental issue. I find statements like that a little scary, because I think as soon as something is identified as the next big issue then Congress feels like that means they need to do something about it. I am not sure that any major new initiative is going to be particularly productive in the overall process at this particular time. Politically I think it is always more exciting to pass a new law or set up a new program then to devote you efforts to more complex

and tedius tasks of implementing existing programs. But in terms again of making real progress in solving the problems, from my perspective dealing with these programs on a day-to-day basis it is clear to me they we are at a particular historical point where the need is for implementation and not for legislation. Thank you.

PROFESSOR CAULFIELD: Our next speaker is Mr. Ray Christianson of the Colorado Farm Bureau Federation.

MR. RAY CHRISTIANSON: I am sure everybody knows where they got their food from this noon, so I am not going to elaborate on the fact that all those good farmers out there are providing us with all this wonderful food.

I am not a farmer by the way. I am a staff person for the Colorado Farm Bureau. I am pleased to be here this afternoon and have the opportunity to address this ground water protection conference on behalf of the Colorado Farm Bureau.

First, let me identify the Colorado Farm Bureau as an organization that represents about 14,700 volunteer farmers and ranchers throughout Colorado, which does make our group the largest of the farm organizations. We are part of the 3.2 member Farm Bureau. I don't want to over emphasize that point. What I would like to say that is more important is that our organization establishes policy on agricultural related issues, including ground water. So my comments

today will be basically reflective of the policies and ideas of the farmers and ranchers.

You are all aware of the condition of the agricultural economy in America, but I don't want to dwell on that particular subject right now. My remarks will address specifics of ground water and some thoughts on how to protect it from contamination without putting farmers and ranchers, who use this precious resource, out of business.

What is the appropriate role for the federal government? Well, first, let me give you an example of a case where Connecticut farmers are facing a real challenge on this ground water issue. In 1984, Connecticut farmers faced a big challenge when low concentrations of EDB were found in some wells, which was years after the farmers applied it. These pesticides were used to fumigate tobacco fields to kill hematoids and weed seeds. Now, under Connecticut law land owners are assigned the liability for contaminating the ground water. The land owners must provide and pay for short term solutions, such as furnish bottle water to those whose water is unuseable, and possibly long term solutions such as redrilling a well, arranging for a hook up to a new water supply or buying water treatment facilties for those who have contaminated water supplies.

Now, many Connecticut farmers feared they would be

driven into bankruptcy if they had to provide these remedies. Obviously, no farmers set out to contaminate other people's water, yet, the law said that farmers are totally liable for applied chemicals even if the chemicals were used in accordance with the label's directions, and the product was authorized for use by the state and federal agencies.

Individual farmers could be paying anywhere from $20,000 to $30,000 dollars to pay for the bottled water and hydrological studies in affected areas.

One farmer had what they call water orders. If you could prove your water was damaged, then you could have a water order, so one farmer was assessed 18 water orders against him at a cost of $2,700 dollars for six weeks of use. That would total up to $15,000 dollars per year.

Now, in addition a lien could be placed on the farm property to ensure compliance. At this point the law said the only recourse for the farmer was an appeal. Now, farmers then had proposed a self imposed tax they could call a superfund to curtail any future liability.

My point is what happened in Connecticut could happen in other states. Today, I am told only six states expressly exempt farmers from liability when chemicals are properly used. I am not trying to suggest that farmers have to be totally unliable for these types of occurrences, but in the case of where they are following directions, you might need

to take a closer look at that point.

Ground water contamination, as we know, is only recently discovered, and also water was thought to purify itself through normal filtration. Now, we know that the quality is hard to monitor, and when it is contaminated it is even harder to clean up. So now farmers in their agricultural practices are increasingly being singled out as major causes of water contamination. As a result, they must take steps to prevent farm runoff and ground water contamination as they will face costly liability and state and federal regulations.

First, we better evaluate the condition of this precious ground water. Those of us in agriculture are extremely concerned about our contribution and whatever contamination exists in the aquifers. Here in Colorado the health department tells me they are concerned about chemigation as the gentleman from the health department said. I believe maybe even to a lesser degree there might be some concern over return flows and feedlots and application of fertilizers and pesticides, but we still may not know the magnitude of these agricultural activities which are contributing to ground water pollution, because we are also aware of the sources from the Rocky Mountain Arsenal and mill tailings and so forth. I have visited with farmers around the State of Colorado, and they do express

concerns for water quality. They are fully aware of the need to have good quality water for their own drinking and their own irrigation and for livestock water and so on. But you must remember that farmers and ranchers are guided by the efficiencies needed for their particular operation--what comes out of their pocket book, such as fertilizers and fuels and chemicals. They have no reason to over apply any of these materials except by accident.

Remember just a few years ago when Congress passed NEPA, the Water Pollution Control in 1972 and the Clean Water Act of 1977, and Max asked me not to take a shot at the EPA, but I can't help it here. It sounds like a swell idea when we had 208 state areawide water quality plans. It sounded like a good intentional way of protecting water quality, and I suspect in some states it is working; and I am suspecting that in some states the planned amendments have not beenmet. Why? Because of regulatory requirements to meet too restrictive standards and imposing impractical network and overlapping authority. You don't want the federal government establishing nationwide approaches to protect water quality, and then expect state and local governments to follow along or even meet the necessary financial and regulatory requirements. Of course, it has been said before that ground water doesn't follow state and local political division lines. Somehow we need

to localize our efforts as much as possible. We should try to obtain state laws for protection and development and administration of all ground water and still protect the rights of overlying land owners.

A few years ago the Colorado Department of Health produced a survey. I just want to relate some of the statistics to you, and the gentleman from the health department can correct me if I am wrong. The statement read, the state should leave protection of the quality of the ground water to the federal government, and 27% strongly disagreed with that.

Another statement, Colorado should protect the quality of ground water for existing beneficial uses, had 77% approval and Colorado should protect the ground water for beneficial users, 75% approval. So it is obvious everybody wants to protect the ground water but doesn't want the federal government to have a dominant role.

If we remember we looked at the coverage of ground water by existing regulatory programs which have already been mentioned, the federal pollution control amendment Safe Drinking water, the Surface Mining Control and Reclamation Act, Resource Recovery and Conservation Act, Federal Fungicide and Pesticide Act and, of course, Colroado water Quality Control Protection Act. We do want to look at the idea regarding ground water management

districts here in Colorado, and we do have some people here who are more attuned as to what the ground water management districts are up to these days. I think it is worth looking at because we are looking to attack this problem of ground water pollution, and whether or not the management districts have the authority, I think, is worth looking into. I believe they may have some authority in this area. Maybe they are the correct agencies to monitor groundwater. Forgive me for saying I don't want to have a permit to farm, but maybe in the area of the permitting we may have to look into that -- all these federal laws combined with state laws and the state law is really only basically an overlap of the federal law. More federal government control, each with its own area of responsibility just simply is not the answer. What we need in terms of answering agriculture's problems is we might need stricter labeling. We might need an improved applicator test, and we need research to use more effective chemicals with little or no adverse environmental effects and equipment design, and fourthly, our farmers need to have better record keeping.

Now, let me identify some of these that the federal government may have a role in. Stricter labeling and enforcement. I hope somebody might forgive me for this, for saying this, that this may be the role where the EPA needs to have a little bit stricter enforcement, possibly through

enforcement of stricter labeling by chemical or fertilizer statutes. This should be based on the application necessary for effective plant growth that avoids water contamination. Now, what we are really talking about here is economics. Why would farmers knowingly apply that extra inch when those costs are going up. You don't want these expensive additives passing through the plant root zone anyway, where it will not effectively aid the plants. Applications have significantly decreased over the last three to five years because of high energy costs, water costs, chemical and fertilizer costs, even though those costs have come down slightly over the past year. Applicator testing and improvement is needed.

I was glad to hear the remark by Mr. Raley regarding irrigation scheduling and some of the things which extensions can get involved in--training programs such as home study courses could stand more review, and improvement by the applicator of the commercial and private manufacturers and EPA.

Presently, I am aware that a section on chemigation has been included in that home study course, and that is a good first step.

The liability question, I think, is very important. We need to focus on reasonableness and some types of limits when lawsuits come up. Why should farmers, who follow the

direction on the label to a letter, be guilty of any ground water contamination. There might be that one percent out there that is guilty of this; yet, we write the laws that are applicable to them. I am aware that some farmers who fear this liability hire their own professional commercial applicators to apply chemicals. What can farmers do? Farmers can receive training through programs conducted by the extension services. Farmers need to keep better records. Record keeping of all manufacturer's labels, the sales slip showing the amounts of purchases, and the amounts applied to the fields and the yield and the planting acreages are all important. If the farmers follow the instructions and the records can prove it, the liability against him then will be reduced.

The other thing, of course, the equipment. We all know from talking about chemigation the need to apply the check valves to prevent the back flow of the chemicals through the system back to the ground water. I think real positive thinking is going on with farmers who realize that at a minimal cost they can install that check valve and greatly reduce the potential liability question.

So there is just one other thing I wanted to mention to you. There was a letter in the Denver Post yesterday that said, why don't farmers give up. It was a letter by a lady from Colorado Springs who grew up in the city and

decided to move to the farm. She says, "Would you want to be a farmer? Years ago, before I married a farmer and moved from the city to the country, I would have answered this question with a positive, yes. Now I answer by saying no one would work under such conditions for so little pay and still call it a job. I soon learned that a farmer's money goes back into the farm, unless there is extra, which there doesn't ever seem to be. Still,we did somehow manage to raise five sons with a minimum of discomfort. We never had a new house or furnishings, but that never seemed to matter. The farm was always home to us and relatives and we, with so many others, are faced with losing it. It was impossible for me to answer these questions as it is for you. What I do know is that as long as there is any hope at all, a farmer will fight to keep his land. His land becomes a part of him and he becomes a part of the land. When he loses, it is as if a member of the family has died. He feels he has just failed because he wasn't able to stay.

I just wanted to leave you with that thought.

PROFESSOR CAULFIELD: Our last speaker is Dan Luecke from the Environmental Defense Fund.

MR. DAN LUECKE: Down at the end of the table, Ray and I have been making book on how many people would be awake and how many would be left when it got to this

end of the table. Now, if three more of you go to sleep, or five more leave before I finish, I lose. I would like to take a moment to have everyone stand up and stretch.

One of the things I did in preparing my remarks this afternoon was to think about how far back you would have to go to say that the more we learn about a public health problem or the more we learn about an environmental problem, the less serious the problem. I would submit that we may well have to go back to Louis Pasteur and his work on contaminated milk. When he was able to establish the link between drinking contaminated milk and the spread of disease, tuberculosis as I recall, what he did was let the critics off the hook. We no longer believe that just by walking down the street and breathing air that we are likely to contact some sort of disease, but you have a hard time in modern times identifying a problem or when we learn more about it, we know that the problem is less serious. I think that is certainly the case with ground water.

One of the other things that I did in getting ready was go to through the statutes that have something to say about ground water and Max Dotson has talked about that this alphabet soup of statutes that we have out there. You can find virtually every letter in the alphabet in there I believe at least once, except perhaps Y and Z, and that is

only because we have no interest in controlling Zebras or regulating yodeling; but otherwise, they would be there for sure.

I would say that in addition to that, if you take a look at those statutes, the federal statutes, that the mining industry deserves a special award for artful dodging, because they have managed to keep themselves unregulated in this area inspite of the large number of statutes that we seem to have on the books.

What I would like to do is kick off some important issues -- what I see as some important issues associated with the nature of the ground water problem or with its solution perhaps, and then get to a couple of guiding principles that we all should have in mind, I believe, as we think about how to deal with the protection of ground water resources.

First, we are talking here about agriculture and mining. There is only one industry that handles more waste material than mining and that is agriculture, so we are talking about the two industries that handle more waste material than any others. I am not saying all of that waste material is necessarily hazardous, but a great deal of it can be.

With respect to ground water, we have a number of important technical problems. Understanding the geohydrology

is extremely important; being able to model aquifers and model their response to various kinds of input is still a challening technical problem. Monitoring in the unsaturated zone or monitoring in the beta zone, catching the contamination or pollution before it ever gets into the saturated zone again is a difficult problem, a technical challenge.

Once contaminants reach the saturated zones, once they are there, the resident time of those contaminants is very long. The half life is measured in terms of centuries, not in terms of years or decades.

We also know that the cost of clean up, the cost of correcting a mistake is orders of magnitude greater than the cost of protection in the first place. We have a wonderful example close at hand right now, and I am not even referring to the Arsenal. The Eagle Mine along the Eagle River, a tributary of the Colorado, has an old zinc mine there. Zinc mining started in the last century, and I would say that were the job done properly where the waste materials were removed, the tailings pond, the waste rock and the rooster piles were those removed, the cost of doing that, I am not suggesting by the way, Gary, that they not be removed, but were they removed, I would submit those costs would equal the value of the resource extracted in that area. Now, most of the contamination was done at a

time before we thought much about this, but it was probably the way business was done then, We do business differently now, but that is not to say we understand the consequences of doing it that way. We just do it. Economists have developed a concept of option value. The value that a community or society will place on the option of using a resource. They may never use it themselves. They may never see it, but just knowing that it is there,just knowing that they have that option is something people are willing to pay for. There are dramatic examples like the Grand Canyon. I would suggest that any of us would be willing to pay a fair amount of money just to ensure that should we choose to go to the Grand Canyon, it will be there. I am not saying that the protection of an individual ground water resource would fit in that category, but a remark was made by Ray that people are concerned for protection of ground water, and it is an option we would like to keep open. It is an option that society is willing to pay for.

The question is though, should society pay for that protection or should those whose activities potentially will pollute or threaten that resource be required to pay for it. One of the morning speakers suggested rather strongly, I would say, that human activity pollutes. There is no way around it, and that may be so, and I would say,

however, that for those activities that do pollute or that may pollute, that pollution is going to impose a cost on others, the community at large or other individuals or entities. It is the source of the pollution or the activity that pollutes that should be required to pay for protection or if a mistake is made, for clean up. If we don't give those kinds of economic signals, then we will not give the message that the resource we want to protect is valuable. Pollution will occur.

With respect to what I would see as guiding principles, I think that with groundwater we should be thinking about, should commit ourselves to non-degradation. To go back to the Federal Water Pollution Control Act, concerned primarily with surface waters, the guiding principle was not non-degradation. It was enhancement, or at least it was supposed to be enhancement. I don't think any of us believe we are going to go about improving the quality of ground water, but at the very least, we should commit ourselves to not degrading the quality of the ground water.

The classification systems that most states use do not establish that as a fundamental principle. What Colorado is discussing right now, even if one does not allow movement from reclassification, and there was never a reclassifciation where we upgrade a class, there will be only reclassification where we downgrade, but even in those cases where there is

no reclassification, there can be degradation.

Chris Shuey mentioned the fact that in New Mexico the thought is of limited degradation, but it is degradation nonetheless.

Another guiding principle I would think important here is concept of the burden of proof and the standard of that proof. I think the burden of proof for an activity or for its riskiness, if you will, should be placed upon those who are going to conduct the activity. Not only should they have the burden of proof, but should be held to a very high standard and that high standard should not be a reasonable doubt. It should be the preponderance of the evidence. It should be beyond a reasonable doubt if they can establish that their activity is not going to lead to pollution.

We think of ground water or our concern for ground water and try to develop a syllogism that may make some sense here. I think it is reasonable to say that valuable resources deserve protection. Ground water is a valuable resource. Ground water deserves protection. Thank you.

MS. BIRD: I have a couple of questions. First of all, Mr. Dahl, I find it interesting that you, representing local government, say there is nothing much you can do to prevent contamination, and at the national level,

the federal govenrment, really not much more we can do, because they are really all land use decisions in the end anyway. What do you have to say about that? Have any of your municipalities been looking at land use decisions, zoning ordinances, land use planning as a way of protecting the ground water?

MR. DAHL: It is a good question, and it is something we have looked at. Both of my previous jobs and the one I hold now maybe good examples. But first to answer your question, particularly in Colorado it is difficult to convince people of the legal theory that even though the local government has ultimate control for the land use development decision, does the subdivision get built, does the power plant go there or over there, even though they have that authority, it is difficult to convince people in Colorado or the Colorado courts that land use authority extends to permit conditions that would guarantee water quality or water quantity issues, or protection. That I think stems from a number of things. Probably the most troublesome or the most difficult obstacle for a local government to overcome if it is going to try to use its land use powers to effect a water protection plan, maybe the biggest obstacle is the Colorado Constitution, Article 16, Section 6. If I only had a nickel for everytime that section has been quoted to me

when I was on the other side of the case.

Here is an example. I represented a county, Grand County up on the Western Slope, who wrote some legislation. If you want to build a transmountain diversion system in this county you need a permit from the county, because what you will be doing is a land use activity. You are going to be putting in pipes and building buildings and stuff like that. Among the permit conditions, you got to demonstrate there won't be, and broadly stated the details, while interesting, are not important for this question. As part of the land use permit, you got to show conditions to protect the water quality. It is possible that the net effect of those conditions would have reduced the amount of water quantity that could be diverted by the project, because if you are going to reduce a water quality impact on the basis of the basin of origin one of the easy ways to do so is don't take as much water; leave more water for dilution. What you have just done through a land use permitting process, you have attempted to reduce or maybe that wasn't your intention, but the result is that you have reduced the amount of water they can divert.

In Colorado we are very, and have been for years, very serious about the constitutional rights to divert water without impairment. That is how come in trying to assert land use controls, when they have, and I think it

was Max that touched upon it when they have sort of secondary tertiary impact upon water quality, people just scream like mashed cats in Colorado, and you have real trouble getting that kind of regulatory scheme to apply. It seems to make sense, that the local government that is going to approve a project where people are going to live and where people are going to drink water ought to have authority to make sure that that water supply is pure and those water supplies aren't affected by other land use decisions that the local government has control over.

You run into what has traditionally been in the state a very tough obstacle, and that is the highly ingrained desire to protect the ability to appropriate water in Colorado. I think that made a lot of sense a hundred years ago, because if you stood in the way of some guy getting his way there was no development at all, and Colorado didn't develop. That is how come there is still a presumption in favor of the appropriator in this state -- to encourage development in the state. The problem is now, one-hundred years later, we have got a lot of people in Colorado and we have got the kinds of conflicts, but we are dealing with a legal system that hasn't progressed a lot in that regard. We maybe pushed it a little ways, by inserting land use controls to affect these things and maybe change some people's thinking. All those court cases,

some of them are six years old, and I had to retire out of the job without getting a Supreme Court decision on that end.

MS. BIRD: A number of people have suggested that perhaps what we need to do is to refortify perhaps the 208 plan process as a part of a national ground water program for a number of reasons, one of which being a way to facilitate the action for the use of the information. WE may have to try to deal with the question of fragmentation and also toget to the question of the local officials having a greater impact on ground water quality. Any member of the panel may wish to comment. Mr. Christianson mentioned in connection with farming and agriculture the contamination problems. What do you think of that suggestion?

MR. CHRISTIANSON: The first part of your question, are you referring to the 208?

MS. BIRD: Yes.

MR. CHRISTIANSON: Well, first of all, I believe that anytime you try to have a nationwide approach to saying what shall be a standard for certain management practices that you want to attain, that will be designed to attain certain water quality, I think you are going to automatically run into some difficulties. It may be well intentioned and it might be a good thought, but when you try to put it into practice, I think that is where it begins to break down. As I recall, I had something to do

with the 208 when I was in South Dakota, I was with the Department of Agriculture up there, so I am a little bit familiar with the 208 areawide management plan and concept. I just think that farmers and ranchers generally speaking are the stewards of the land. They are better than anybody else I know of. There might be that one percent out there that is not properly managing his property. He doesn't want to lose more than five tons of soil per acre per year. It costs him money and certainly doesn't want to over apply chemicals either. I think when it breaks down is when you have the central planners in Washington try to design that nationwide objective and try to make it apply over the country. It just simply is not manageable.

PROFESSOR CAULFIELD: I would like to add something on that. I was a member of the Larimer/Weld Areawide Waste Treatment 208 Program Advisory committee, and the point that I would like to make about that is, that obviously that group does not have great authority. The authority still resides in large part with the state and EPA, but the effect it had for the first several years while the federal government was still funding substantially was to bring together farmers,municipalities, environmentalists and so forth into a dialogue situation among the leading people in that area. There came to be common concensus as to what was desirable for this area,

including land use planning as well as location of sewage treatment plants and so forth. The program is still on the books legally speaking, but it has lacked funding of any importance for sometime, therefore, it has really gone down drastically in terms of its importance. Whether it would have succeeded very far if that support from the federal government and state government had continued, I don't know. At least, in the first few years when it was strongly supported, it seemed to me it was working in the right direction of getting a good deal of concensus at the local level among various factions, if you will, interest at the local level, and it might have succeeded if it had continued support.

MS. BIRD: Let me just say, that unfortunately, we have kind of run off, and I am going to have to leave shortly to catch the last plane back to Washington, but I hope that we will continue on with this discussion, but in case I don't get another chance, I wanted to say the panelists this morning and this afternoon and the audience, I would like to thank them for being so helpful in presenting your insights to us and if you don't get a chance to get on the record today, our address is in the information that you were given this morning and please feel free to send us any information materials whatever that you think would be helpful in helping us get some direction to this.

PROFESSOR CAULFIELD: Okay, we will have questions from the audience.

MR. FOSTER: If I can, I was on the panel this morning and I would like to make a quick response, if I can, on this 208 planning question that was earlier raised.

In some portions of Colorado 208 planning is alive and well . In the Denver Metropolitan area, in the Pike Peak area, in Northwest Colorado area, we are seeing significant 208 planning done on an annual basis -- the 208 plans that resulted in both point and non-point source control regulations providing for specific limitations for the purpose of protecting surface water quality bodies. We would expect that we will be seeing more 208 plans in the future that are not merely policies, but making recommendations to the Water Quality Control Commission for specific control regulations which would be adopted by the Commission and would apply to specific activities of a specific region in the way of effluent limitations or certain kinds of proceedings and policies to be followed.

The 208 plans have community level impact insofar as communities come up with erosion control plans, development plans that may define the densities that are necessary in order to protect the water quality of a water body that communities impact.

It is our expectation that insofar as storm drainage

pollution is concerned, that 208 planning maybe the direction of the future. We would be putting a greater emphasis on that rather than seeing an NPDES permit apply to each and every storm drain, which is the present direction of the EPA, and frankly, the Clean Water Act, so I would put a big hurrah for 208 plans. It has a direction and no doubt that more federal funding would be more appropriate if we are going to get into agricultural issues, federal funding is absolutely necessary. We are seeing a lot of municipalities paying the price for 208 planning and that is probably because most municipalities in Colorado are looking at advancedwaste treatment and they are trying to figure out who is going to pay the price of putting in advanced waste treatment. The 208 planning is a necessary precedent.

PROFESSOR CAULFIELD: Thank you.

MR. CHRISTIANSON: Maybe the correct approach if we are going to have 208, and because we are looking really at land management practices or best management practices, whatever you want to call them from surface run off, probably the best 208 would be to have a healthy agricultural economy in the country to begin with, and not see the massive plow out and land break out and this type of thing. I know the 1985 farm bill deals specifically with the conservation title or Sod Buster title, and maybe

that element is a good way to have water quality protection.

MS. BIRD: Let me follow up just briefly on that comment. In Kansas City last Saturday it seemed to be the concensus of the farmers who were there that the problems of agricultural chemigation were kind of part and parcel of the American farm policy, which had been over production basically. Is that the view of the Farm Bureau as well?

MR. CHRISTIANSON: Could you repeat the part you said for over production?

MS.BIRD: The emphasis on production--that it had caused not only economic problems, but that as a result farmers used too much pesticides and too much fertilizers and probably more than they needed to, even on the advice of the land grant colleges and the Extension Service and so forth.

MR.CHRISTIANSON: Agricultural problems have always been over production. Our over efficiency has led to some of our problems. One farmer can feed 80 people today. The natural behavior of a farmer is to produce as much as possible. Now, individually, that is what a farmer wants to do. Collectively, it is devastating when you put all the farmers together, and when they all try to produce as much as possible; the economics of it are there is not the demand there. It is a real problem anda real dilemma

for us.

MRS. HESTER McNULTY: I am Chairwoman of the Colorado 208 State Policy Group. What became evident there is that too much money was thrown in the metro areas that might have been right to do in the east, but not in the west, and very little money for the whole big part of the rest of the state. I think the state did a very good job with the little funding they had, so if you are going to look at this, at least in the west, don't throw all the money at the metropolitan areas, but throw more of it at the state government so that they can really do a good job.

I have been traveling around in some of the rural areas of the state, and to my surprise, 208 is still alive and well in the state as Tad said, and some municipalities do fund it, so it has not been a total loss, because some of the consultants got rich in Colorado, Paul Frohardt and a lot of other people by suddenly becoming 208 consultants and getting the big contracts, and I would not like to see that happen again.

Now, can I pose a question? Paul and I served together on the Ground Water Quality Advisory Group, and we tangled before. It seems to me that industry, and the Clean Water Act has been passed in 1972, how many, 14 years, the rest of them are coming on being 10 years old, you are asking for 15 more years to see how they work. Don't you

think industry can get their act coordinated, and what will happen if you wait 15 more years and what additional holes will be dug in the ground water. As I said in the Committee, this is people's drinking water that we are talking about.

MR. FROHARDT: I think the Clean water Act is a good example, Tess, because that has been in place for 15 years, and I think that now has become a fairly well established regulatory program and we are now in that program able to move to a great level of sophistication and consider further refinements. However, the majority of the programs, both federal and state that regulate ground water quality are much more recent in their implementation, and in fact, you find as people have commented today that EPA is just now developing the expertise internally to implement these programs. The implementation of those programs needs to go forward. It is happening now, and I think that as Colorado is doing, it is very appropriate for states, even now, to be looking for specific gaps in regulations where there may be problems that aren't adequately addressed and start addressing those. My comment was that I do not think it would be productive overall for the federal government to undertake a new legislative initiative at this time, the primary result of which I think is going to be a lot of debate about what that

means and how it should be implemented, diverting our private resources and Max's resources away from people going out in the field and spending time finding out where industries are complying with their requirements under current laws and making sure that those are being complied with and the problems are being resolved.

MS. McNULTY: So you wouldn't have a federal role for Colorado? Well, let me start over and try to restate that better. Okay? You wouldn't have a federal role for a recalcitrant state like Colorado might turn out to be.

MR. FROHARDT: No, I didn't say that. I specifically said that after we have a little more experience with what states do, thenitis very appropriate to continually re-examine the appropriate federal role over time. However, I think in most cases states, and Colorado is certainly a prime example, are at a phase in their implementation that it is too early to have the federal government start second guessing at the adequacy of that effort today.

MR. JIM WARNER: As person whose profession is ground water, I am very concerned about ground water contamination problems. On the other hand, I spend enough time overseas, and I am very appreciative of the great standard of living we have in this country from our

manufacturing society and from our farmers. One consequence of this high standard of living is we have chemicals to dispose of and we seem to be unable to with any certainty dispose of these chemicals without polluting the ground water system. I would agree with Dan Luecke's statement that mining companies have been artful dodgers. I have seen this practice; they have been barbaric in the past. I think we have passed a lot of laws. On the other hand, I look at the mining industry and see them in a state in which they are in total retreat, that they are moving overseas to avoid our environmental laws, and we pay a price for that through our balance of trade payment.

The question came up as to who is liable, who pays for this type of thing. I think it was your statement that the polluters should pay for the other society, and I would guess that my feeling would be society always pays for it. That is done through higher prices. Somehow that is going to be the ground water contamination problems being transferred back to the individual consumer, who will pay the higher prices.

I am concerned about agriculture. I think that maybe we are putting agriculture out of business and causing them to bolt and move overseas where they are going to go. On the other hand, I think they need to pay a liability for their action, for somebody has to have the liability.

I am going to address my question to Ray Christianson here. He spent a lot of time saying that the farmer, I think should not be liable if he follows the directions as outlined as far as pesticide application and what have you.

On the other hand, he did not say who would be liable. Is the chemical company -- are we going to be in the process of putting them out of business--or the federal government to be liable with a two hundred billion deficit.

MR. CHRISTIANSON: That is a loaded question, especially when we are in the liability and tort reform, and the insurance and a whole bunch we are facing here in Colroado as to who is liable. Obviously, it has got to be a partnership. We got to work up some reasonableness in the system. Farmers need to use the chemicals and manufacturers need to be be able to produce the chemicals, and we have to have, I suspect, some government regulations to try to say which chemicals are environmentally safe and yet effective aid to plant growth.

The liability question is certainly a debate this year I did state that farmers can't be totally exempt from liability, but I just raised the question, because, you know, how can you blame the farmer if he reads those directions and follows them to the letter, because of manufacturer's directions. I just don't see how we can fault whoever applies those pesticides according to the label,

but the liability question, certainly insurance comapnies are dropping clients left and right. The insurance premiums are going up so unGodly high we are not going to be able to insure anyway. I don't know. In our legislation we somehow need to create some reasonableness and limitations on where the liability question lies.

MR. LUECKE: The comment on the concern about standards of living reminds me of a joke that I saw one time. It was probably in the New Yorker. There were a couple of gentlemen standing on a curb in their hand tailored suits, and their camel hair coats, and their paisley ties, and expensive shoes, and they are in the city where foul air is swimming about and there is trash in the gutters. One of them turns to the other and says, well, there are trade offs you know.

To maintain the standard of living we have got to sacrifice a little quality of life, and I think that is what is being suggested here -- the private material well being that we are so concerned about, or the quality of life in the community as a whole. And further, I wouldn't direct this only at the agricultural community, but at all users of dangerous substances. When regulations are established, when statutes are written and then those regulations are established, you can be sure that those who would be regulated are in there trying to make those statutes

those regulations as lax as they can.

To make the argument then that because the regulations are lax and therefore application can lead to problems should release the user from any liability, I think is very very self serving. I don't mean to place the burden on the agricultural community. I think it is the sort of practice that is very widespread.

Finally, when it comes to costs to the consumer, I think the consumer ought to get the message too in terms of cost of products, as to what those things are made from or what kinds of external effects they generate. If it is pollution of one sort or another, then that ought to be incorporated into the cost of that product, because that affects the plan and that affects the activity that is in the ultimate source of pollution.

MR. DAVID KIMBALL: I guess my question is directed to Mr. Luecke. I came here, like many others, with the expectation of hearing some practical solutions. After the discussion by Mr. Luecke, I am somewhat concerned. How do you truly perceive beyond a reasonable doubt the non-degradation standard as a practical solution. I wonder how you can prove beyond a reasonable doubt that any activity will not impact ground water. Has your organization done any independent studies or have independent consultants, that have analyzed the practical impact of that type of

solution, or what impact it would have on society or a community?

MR. LUECKE: My organization has not done a study to determine the impact of such a standard of proof on the activity, but I would say that we have, as a society, conducted a number of natural experiments on standards that were considerably less stringent, and the price tag that we face as a society is extremely high. Cleaning up the mistakes is something that none of the private activities are prepared to take on. As a society we are trying to figure out how we are going to take it on. So, I would say that in suggesting such a burden of proof it is not a question of those who make the suggestions establishing that it doesn't have an adverse economic impact I would say if we could even come to the point where there is a balance beween the economic impact, a direct economic impact associated with the contamination and a new standard for future activities,we would be moving in the right direction.

MR. KIMBALL: Have you given much consideration as to whom such a burden of proof would be applied to? Does it apply to everybody's activities or do we restrict it to certain commercial activities or just certain industry activities, or should this be applied across the board?

MR. LUECKE: I think as a general principle

it ought to be applied to all those activities that have the potential for polluting ground water. We are talking about something other than surface, other waters. I am certainly not saying that any kind of activity that leads to pollution, you would want to do this. I would put ground water in a different category just because of the problems associated with cleaning up past mistakes or living with our past mistakes, but I would say that all of the activities, or those entities that do so should have that burden of proof.

Now, I wouldn't be opposed to some sort of caveats for some special activities, but don't ask me to mention what those might be.

MR. KIMBALL: What activities are you aware of that don't have the potential of impacting the ground water?

MR. LUECKE: I am not aware of, that is the problem.

MR. FROHARDT: May I follow up with a specific situation, because I have been curious every since Dan made his comment at the outset. We represent a number of mining companies, who undertake new mining projects. When you have a mining project that involves a tailing impoundment, there is an evolving technology in that area, and typically, the state requirements will require

a carefully engineered facility that is going to minimize seepage, in an attempt to collect any seepage to ground water, so that it does not leave the immediate vicinity of the impoundment. But in my experience, when you look at natural liners or artificial liners and the types of rigid environment where you find mines, even given the most aggressive consult I have come across, I don't know of any who would be willing to state that you could avoid any seepage, and therefore avoidall degradation of all groundwater beyond a reasonable doubt.

I am curious then where Dan would take the position that we should have no new mining projects or would in fact allow an exemption for limited degradation in the immediate vicinity of the impoundment?

MR. LEUCKE: I would say that there well might be some circumstances where one would want to say, if it cannot be established beyond a reasonble doubt, when you must establish a contingency that makes sure that if your design does not perform as it is advertised, that you are going to be able to catch and control that contamination, or that you are going to accept full liability for any damage that is done in association with that contamination. I think that we are nowhere near that sort of position right now.

To go back to your previous question, can I identify

for you one activity, one economic activity that doesn't lead to ground water pollution of some sort. I would suggest perhaps professional sports, but I can't think of anything beyond that. I am not even sure of that.

MR. KIMBALL: They play on a field.

MR. LUECKE: Artificial.

PROFESSOR CAULFIELD: Let's get on to another question. I plan to call this meeting to a close at 20 minutes of four; we got five speakers left. We have concluding remarks to make, and so we have about 17 minutes.

MR. OWEN DELONG: We have written a number of articles in the current issue that we are showing today, dealing with the farm situation and pesticide and herbicide and fertilizers in particular in the general area of Kansas, but in the midwest in general.

My question is, directing this to Mr. Christianson, but also to Dan Luecke's remarks, that is to say, we talked with many farmers throughout the State of Kansas on the question of liability and related matters. What we think keeps coming up with that is more a question of responsibility than liability, in the sense the farmers are showing a greater and greater desire to take responsibility for everything they are doing in terms of their way of life. Those that are not are coming under some pressure from other farmers to take a wider look at what

the effect of the chemicals which we are using is on the environment in which they are all living, and in which their wives are living and which their children are being raised and so forth.

Someone spoke of a practical solution. My question to you is this: the land grant universities have not been teaching very much about alternatives to the current chemical and petrochemical methods of farming, and yet, many farmers have found that using much smaller quantities than are recommended by the fertilizer companies, or are recommended on the labels, will still make it possible to make the same kind of money, even if they produce less crops, because they are using much smaller quantities of the chemicals that have been costing them so much. Does the farm Bureau have any programs of its own which are encouraging farmers to make these kinds of experiments, or at least to investigate the possibility that there are alternative ways of doing the same kind of work and still come out economically.

MR. CHRISTIANSON: To answer your question briefly, I think the market economics basically will tell you as an individual farmer what is best for your management plan and for your particular farming operation.

At the Farm Bureau, we have no programs, we have more or less discussions. We have conferences that deal with

natural and environmental program policies and issues. We tend to try to bring our farmers together to discuss all these operations with staff from the Environmental Protection Agency, and with staff from various agricultural departments and extension service and it is a continuing thing. We strive for efficiency.

I can say that farmers are guided by their own efficiencies and what works for the individual and what hits them in the pocketbook in the long run is what we will strive for.

Now, the farmer is concerned about his own community. I think that it would behoove a farmer in an area overlying say an aquifer, that it is not going to do any good for one guy to put a check valve on when the rest of them don't. They have got to be responsible for their actions, no question about that. It is tough to get farmers to necessarily agree on anyone particular plan, but I think we just have to strive for more education, the key to it.

MR. DELONG: That is the question; are you engaged in extensive educational activities. As we have found out anyway quite a failing of the land grant institutions, perhaps because of some connection with the chemical companies themselves, is all we can figure out at this point to provide this education to the farmer because they are still getting it from the extension service, but

now the present administration wants to get rid of the Extension Service under the budget cuts. Who is going to be left if the Extension Service is out of it, and the land grant universities are not providing it?

MR. CHRISTIANSON: Definitely there is a role for the Extension Service and a role for the Soil Conservation Service. They are the two primary and most locally affected federal government agencies that I know of that at least work directly with agriculture. It is very important to us that these two agencies have the ability that are redirecting their priorities to these particular areas.

MR. DON CASTLE: I am Don Castle with the Wyoming Outdoor Council in Cheyenne.

My question I suppose most logically would be answered by Ray or Dan, but they have been getting most of the exercise lately; maybe the others would like to answer or comment on it. The gentleman from Kansas anticipated my question, which has to do with organic farming. Nobody has said that yet, and it is curious to me why in a conference of this sort, which has been focusing on agriculture and mining, it is only within the last 20 minutes of the conference that this consideration comes up.

To just point out a couple of things that are obvious I am sure to all of us, organic farming would eliminate most

if not all of the contaminant at their source, and it would address itself to a special clientele, a special market, which I think has been demonstrated is willing to pay a premium price for crops that are grown that way. Why isn't this relevant? Why isn't there more discussion of organic farming at this point? Why isn't this a part of some kind of solution?

PROFESSOR CAULFIELD: Any volunteers?

MR. CHRISTIANSON: Let me answer part of it. I believe organic farming, there are people trying it. I don't believe right now that we would be able to produce nearly what we can produce if we went to organics.

MR. CASTLE: We are burdened with surplusses.

MR. CHRISTIANSON: Well, that is true. It is our natural behavior to be that way. We need more.

MR. CASTLE: To behave irrationally?

MR. CHRISTIANSON: What we need are more Refrigerator Perrys around. We do have some people who are experimenting with organic farming. You might have watched the NBC nightly news last week with a member of the Farm Bureau from Saguache, Colorado. He has produced chemically free beef. Now, we are getting into fully another subject here, I think, but he is setting a standard, and we will see what the marketplace will determine.

MR. DON BEAKEY: I am Don Beakey from the

agricultural community in Burlington. If we are to meet your schedule, we will have to have one big question and a one minute answer.

PROFESSOR CAULFIELD: Right.

MR. BEAKEY: Ray, what can rural Colorado cities do in connection with agriculture to help protect this ground water that our cities use and our farmers pump on to the crops?

MR. DAHL: I think that Ray has already said one of the tough things is getting farmers to agree together. One of the things is making sure that there is a sense of community, and that is the farm community and the city itself. It would seem to me that one thing rural communities could do out there is the rural areas really don't have that many opportunities to get together. It seems to me that a role for what the local government could do is to host these kind of public meetings and encourage the kinds of education that Ray is talking about.

I only will answer half of this question that Ray is saying his people are so anxious to have. I would say then that is fine. Municipal government has got the facilities available, set up the meetings, bring in the people from the Extension Service and have the information available and take them up on their promise.

MR. GREG LYONS: I can also tell you by virtue

of my experience and the politics of these issues, specifically ground water quality is perhaps more discomforted by this specter that it is, and I don't mean to slant anyone of the gentlemen on the panel, because I am unacquainted with each and everyone of them, but it is necessarily the same folks who would argue against a strong federal role by maintaining the states can do it who also appear in the courts or in the state legislature arguing against those very programs by which the states could do it. The history of environmental programs in this country, I think, is consistent with my interpretation, and that is, in very few areas that states have taken the initiative in the absence of the federal pressure. Most of the vast majority of the environmental programs and vast majority of the states were the results of federal pressure.

Some on the earlier panel and this panel have extolled the virtues of my statement of the Arizona Ground Water Act which goes to the issue of water quantity, enacted only under the pressure of the cut off of the CAP Funding. We are currently looking to rectifying the inadequacies of the ground water law, to prompt three attorney general opinions over a number of years pleading to the legislature to do something about it. In each and every instance those pleas were ignored, and now this session we may do something with the prospect of the citizen initiative.

Another gun aimed at our heads. So while conceptually and theoretically I would agree with these gentlemen, I would specifically agree that the availability of the resources and willingness to enforce is at least as important as the strength of the law, but the point is, I do not share the same degree of confidence that the states will, and can move in this area.

PROFESSOR CAULFIELD: The Chair will take that as a comment and not a question.

MR. JOHN ROLD: I am John Rold, Colorado State Geologist.

I heard quite a bit of discussion about how we are going to regulate this, and the question has been on my mind every since this morning. Do we have enough information, enough scientfic information that we can do a reasonable and fair job of regulation? Only one person all day today has mentioned the word hydrology or lack of information. Dan Luecke and I have a real concern that we don't have enough about the underground aquifers and we don't know enough about the movement of the fluids within those aquifers. We don't know enough about the geochemical changes, natural as well as man made, to those fluids, to really do a good fair and reasonable job of regulating. I don't say we shouldn't do regulation, but I would say as we regulate we should keep in mind there

is a considerable lack of information and a need for information and design those regulations so that they will take that into account.

Farmers can do one thing over the Pierre Shale with no problem at all that may cause great problems over the Ogallala Aquifer. Now, if anybody on the panels thinks we do have enough information to do a reasonable job of regulating, I would like for them to speak out and why.

PROFESSOR CAULFIELD: Let's take that as a comment.

MR. DAHL: I think it is important, of course; you want to have the best information you can. The Denver Water Board watching that stuff coming down from Martin Marietta aproaching within feet of their wells probably would take the position that, as you said, you got to wait until you have the best information possible before you get started, and if that is your point, I very much agree with you. At the same time, I don't think you can allow problems to develop that you can't at least make a stab at. I am certain the Water Department is making whatever stabs it can at that issue, and it would be very remiss of them not to, because that is a chunk of Denver's water supply that is being threatened, so I very much agree you need the best input you can get. I also agree really down on the learning curve about how that

stuff operates and the examples you give are good ones. At the same time we have some water supplies really being threatened and I don't think you are saying walk away from it until we are completely ready. I guess I am saying you got to do both things at the same time and in a reasonable fashion.

A VOICE: I don't know whom to ask,Max, Dan or Ray, but I will give it a shot. This ground water contamination, what kind of acreage are we talking about?

MR. DOTSON: I didn't get the question. Could you repeat it?

A VOICE: Whenever the DEA goes in and destroys a marijuna crop, wherever theyare growing it at, is there any type of ground water contamination resulting, and if so, how many acres are we talking about? Maybe another question: is EPA giving standards or whatever to the Drug Enforcement Agency to destroy crops?

MR. DOTSON: I am not aware of any involvement of EPA in that particular activity. Are you talking about the defoliation activity?

A VOICE: Right.

MR. DOTSON: The only comment I would make, it is a herbicide, so there is a distinct possibility it could be impacting not only on ground water but surface water as well. I don't know if there has been anykind of

comprehensive evaluation of that impact.

A VOICE: If so, does the Federal Government take responsibility?

MR.DOTSON: Yes. It is a good question. You might ask some of our pesticide people what is going on.

PROFESSOR CAULFIELD: Thank you very much.

MR. CHRISTIANSON: I read in the papers just the other day that marijuna crop is the largest cash crop in America It is replacing corn and wheat, but I don't know what the exact acreage of it is. I don't think anybody knows.

PROFESSOR CAULFIELD: The last two questions and then I have a question.

A VOICE: I don't know whether it is appropriate for me to speak following the comment you just made. I am a farmer. I don't farm marijuna. I am not from Colorado, which is unique. I am from Texas. I am from the high plains.

I sat here and listened to the farmers. I thought Ray was certainly a minority in this thing. I come from an area where we do irrigate. We don't have much sprinkler irrigation. We have no problems so far as I know in regards to your detoxification to the control valve into the aquifer. In the first place, our aquifer is not that big, and our wells are not that big. I come from an area with a

different problem and I want to say to you, as you plan for anykind of federal regulations, that I believe it is paramount that you legislate from a state and local level, and not from a federal level. I think the application of the incentives from the federal level is very appropriate. The application I cannot understand. I have enough problems. I live in the panhandle of Texas and we are step children. It is so far from Austin that I come to Denver easier. But we have enough problems with the state, and we certainly don't want the thing to get out of control.

Now, in regards to the federal agency, we have talked about methods of contamination here today. We are facing one of the greatest concerns, and those of you who drink water from the Ogalalla should be advised that the Department of Energy proposes to store high level nuclear wastes in the midst of the Ogallala Aquifer with holes from 12 to 22 feet in diameter, and a mined out 2,000 acre salt dome and store also above ground in that area, and if you live anywhere close to Amarillo, you know the wind can blow and does blow in Amarillo. I believe that we must expect from our federal agencies, and I got to take a shot at the EPA, and I am real sorry to have to do so, but Max already has a disclaimer. Recently under the Nuclear Waste Policy Act the EPA had to release rules and regulations in regards to the location of respositories. The initial

draft took a very strong position in relation to potable water progressively through eight working drafts until the final draft. At that point they set up within that some classification systems for aquifers. And ladies and gentlemen, it gives zero protection to rural America. I think it is important that we note that at this point in time, because this is the first attempt that I know of by the EPA to set up classification of aquifers on a national level. I think it is vital that we be concerned about it.

I want to express appreciation to Ray. He did a good job for representing agriculture. I want to say to you, we are not a bunch of bad guys, although we have been designated one of these people that can't agree with anybody. I think maybe we can agree on a few things if you come around and talk to us about them. I thank you for this opportunity to comment.

MR. LUECKE: May I comment with respect to the liability problem that was mentioned here in terms of storage of high level radioactive wastes; it is directly the result of federal involvement some years ago in the establishment of the limits on liability in the nuclear industry. This was at the time when there was an effort to get commercial reactors underway. The only way utilities would get into it was if there were limited liability, and the

Federal Government agreed to limit liability and we now are reaping that harvest. What do we do with all of those spent fuel rods and what do we do with all of those abandoned mill tailing ponds that are scattered throughout the West. It is a wonderful example of what happens when liability for control or contamination of certain very hazardous materials is limited and substantially limited. We often end up with a more serious problem than that which we began with.

PROFESSOR CAULFIELD: Thank you.

MR. RICHARD HAMILTON: On the 16th of January 1980, I petitioned the Secretary of the Interior under Section 601 of the Surface Mine Control Act to designate certain lands in South Park County Colorado as unsuitable for mining. The reason I tried to have the Secretary of the Interior initiate the designation of lands in South Park as unsuitable for mining was a uranium resource that would be in fact solution mining right in the middle of about 45% of the stored and delivered water to the Denver Metro area. It was my concern that the uranium solution mining would move from the ground water regime into the surface water and that the receiving systems, the City of Denver and so forth would chlorinate those uranium oxides making physiologicalabsorption into children's bones very very much enhanced, and would induce significantly more

cases of leukemia.

The EPA supported the investigation and the Bureau of Land Management did. The Governor of Colorado did not. The Colorado Department of Natural Resources did not. My question basically goes to Max. Max, have there been in Colorado or in Region VIII any Section 601 designations of lands not suitable for mining predicated on the basis they would cause irreparable anddistinct human health impacts?

MR. DOTSON: Well, as far as I know, in terms of EPA designating any area in the manner that you are indicating, I do not think so. That is not to say that the Nuclear Regulatory Commission or Office of Surface Mining or Mined Land Reclamation folks in the State of Colorado have not undertaken a designation of this type, so in terms of our involvement, I know of no designation.

MR. HAMILTON: Do you know of any designation of 601 kinds of lands that would have ever been held unsuitable for mining because of potential impacts on human health or public health concerns?

MR. DOTSON: I am unaware of any.

MR. HAMILTON: I am unaware of it too. I think it is a sad consequence. If anyone would wish any materials concerning that passage of the Colorado Land Use Commission item, I will be more than happy to submit them. I still wish somehow that that designation hearing would investigate

the potential of that uranium impact on the City of Denver's water supply. Thank you.

PROFESSOR CAULFIELD: I would just like to bring up one point, because the focus of this exercise has been on the question of what the federal government should do at this time legislatively. I would like to refer back to 1936 and to the principle thereof, which calls for the establishment of legislation which would say each state shall establish numerical standards found in the ambient ground water. Thereare more provisions implementing that, but I think that I would like to ask the panel very briefly if anybody would like to comment. I think the organization that sponsored this, the Environmental and Energy Study Institude would appreciate getting any written comments that you would like to make after this meeting with respect to that particular provision, because in terms of this rather limited piece of legislation that is before the Congress, sponsored by any number of senators in both parties, that is a key substantive provision which would add to the arsenal of the EPA and the states. So if anybody would like to briefly make a comment on that and would supplement their remarks for the record to the Institution.

MR.DOTSON: Well, let me give you a little background, and I think it will hopefully answer your question. In terms of establishing a standard, let me

reflect for a minute just on the water quality standard for surface water. EPA developed a basic criteria and then works with a state as they establish and approve the water quality standard. They have eventually come to the EPA for approval and that is the process that has well served, not only the individual states, but EPA and the nation in total. I think a similar approach in ground water maybe as important as it is with surface water. One thing that I would guard against, however, is driving a state towards developing ground water drinking water standards in lieu of a federal mandated or federal promulgated standard. I am not that particularly familiar with the Mitchell/Baucus bill in this area, but as you know EPA has put added emphasis on getting out some numbers so to speak, some maximum contaminant levels, and we have just to this point promulgated a handful in terms of the universe. Vic Keim, the past office director for the Office of Drinking water, refers to the universe as a list of about 600 contaminants in total, and I can foresee a problem if all of those were found in ground water. The states would have to develop standards, and there would be an absolute absence of the federal government guidelines or federal standards, and what state would independently go out and deal with that. I would say that would be major new legislation if that occurred for obvious reasons. Consistency and the cost to

the states and something that John Rold mentioned, considerable lack of information from state to state information.

PROFESSOR CAULFIELD Anyone else on the panel like to speak to this question?

As you know a lot of the state officials are tired of the approach that the federal government establishes a fairly well defined set of parameters within which the states have to work, and if they do, they receive money, and if they don't or ignore it, they are sued. We would like to think that maybe this time, that the approach should be to supplement and strengthen state programs rather than mandate a set of federal standards and guidelines.

Is there anyone else who would like to comment?

MR. CHRISTIANSON: It is in our proposal for the Farm Bureau in 1986, at least the state Farm Bureau here is addressing the issue of ground water management and ground water quality. We will be taking a look at that this year and seeing what direction we will be working in that area.

MR. MURPHY: Since we have run off, I am going to say thank you for your insight and ideas and we hope to bring it back to Washington and make the coming process more rationale and more informed. I want to thank the panelists and speakers and I especially want to thank the three other

organizations who made this event possible, especially John Ehrmann of the Keystone Center and Norm Evans of the Colorado Water Resources Research Institute. Thank you.

(Conference concluded.)