Dr. Terry Lash N.R.D.C.

It says, you won't put a repository where there is valuable natural resources. It definitely does not say we can put a repository where there are valuable natural resources if we can cook up a mining scheme that lets us get it out without hurting the repository. We are just doing this thing ass backwards. We should have followed the criteria from the beginning and if we did, we wouldn't bick whip. There is not only the ~~fine~~ pot ashes, oil and gas below. They have the Sandia folks saying, "Well, we will slant drill underneath the repository to get the oil and gas." Now that is just....you are just destroying the credibility, the whole scientific process here. If the criteria means a god damn thing, they mean that you don't try to put a repository where you have this kind of problem.

Bernie Cohen

The United States said that we should burn all the coal we can get ~~our hands on~~, out of the ground, essentially, that means it is an acceptable risk. And of course this is a minor, minor risk. (Laughter).

Last

Unnamed Scientist

Well, I,....your political understanding is not mine. I do not consider it because the President of the United States says that we should burn more coal and convert to coal as opposed to burning oil. Uh, that he was saying

that the risk, the current risk that we are accepting in ~~terms~~ of releasing uranium from that coal is ~~assessible~~ acceptable. We do not share that view. A We do not share it in part because we have demonstrated examples right here along the front range, like the Schwartz-Walder mine, where water supplies being consumed by human beings are being highly contaminated by alph emitters ~~meters~~, we have examples on the west slope of well water supplies being highly contaminated by tailings affluents from uranium mills. And we have of course reason to believe to be concerned about the industrial uses and abuses of plutonium as you all know.

unknown SCIENTIST

... f ~~As~~ having defined this various levels of safety, what is acceptable? That is not a technological question, facts don't provide values, and you are going to have to go outside your own profession in order to gain the necessary public education, for what is inevitably going to be, congressional and therefore a public decision of these matters. I don't think the ethical questions can be resolved until the technical ones are clarified. I think it is really stupid and hogwash to pop off on an emotional basis until the technological questions are furtheron to prove your hard work and research. That leads me to one kind of conclusion as a layman and as a voter and I would be very reluctant to vote for a decision about long term

Dr. Michael Hamilton Nat'l Cath.

disposal because I don't think even you are ready to know what you are going to advocate. I would like to keep them on the surface as long as we could, before we made a decision that we cannot ~~even~~ easily change.

The problem with WHIP is that its mission changes all the time. First it was the commercial repository, then it was only military waste, then it was only transuranic waste which ~~is~~ are not hot, then it was transuranic waste with 1,000 spent ~~pure~~ fuel rods but only 1,000 spent ~~pure~~ fuel rods, then the New Mexico people say that if you, (and others) if you put 1,000 in there that is the camel with his head in the tent and they are going to put the.... you know, you are licensed to ~~put~~ for 1,000 ~~in~~ and it passed, and then they put more. So, part of the problem is WHIP is a very bad repository for high level waste. And, for reasons I said earlier, but.... ¶ The purpose of a repository is to keep the radioactivity from getting back to the biosphere and there are really 2 principal ways that that can happen. One , is you can have some sort of water flow from an aquafier through the repository and back out ~~through~~ to the biosphere. Another way is to have some sort of human activities, solution mining, whatever, future human intrusion. ¶ I see potentially or rather severe, public relations problem with the transportation of waste. For example, if we have an

Dr. Tom Cochran NRDC

Cochran

interim storage facility in one place because we have not built our final repository in time, and then later we build the final repository and you have to move all of this waste from the interim facility to the final repository, you are going to have shipments daily, all going down the same path, ~~same~~ the same track ~~of~~ or the same road, ~~the~~ bed, and people along that path are just not going to be happy with that idea. And ~~the~~, ... when there is an accident whether it is a severe accident or not, there is going to be a lot of press association with it, a lot of public outcry about it, ~~after it~~ efforts to stops the shipments and so forth. ¶ The problem I think stems from the fact that the predecesor agency, the Atomic Energy Commission, have a long history of lying to the public, deceiving them, promoting nuclear activity without being candid about the risk involved, covering up failures and so forth. And, the current bureaucracy, the Department of Energy, and ~~the~~ to a lesser extent the Nuclear Regulatory Commission, are having to live with the sins of the past and because there are, on occasion, still evidence of coverups and so forth, that this distrust continues even today. Particularly I think with the Department of Energy which has more of a promotional role than the Nuclear Regulatory Commission. But it is there in both cases. ¶ If I can refer you to the recent inter-agency review group report, it pointed out, and I will concur with this, that the

institutional problems are equally as important as the technical problems. The... if you have institutional failure you can make bad technical mistakes and I think that is the basic problem that we confront.

The point is that after about 500 years, this material will not be very toxic. For example, if we consider the material generated by an all nuclear power system in the United States, the toxicity of 500 year old waste is 1000 times less than the toxicity of arsenic that we import into the country, every year. And another comparison is that when you burn coal, there is a certain amount of radioactivity waste because coal contains small amounts of uranium and the ... when you burn coal this uranium is released and this waste from burning coal then turns out to be quite comparable to the nuclear waste after about 500 years. Another example is there is a lot of uranium and phosphorous and so when you mine phosphorous there is a lot of uranium released into the environment. This is again a radioactive waste from mining phosphorous. And it turns out that this again is quite comparable to the intoxicity to the toxicity to the 500 year old nuclear waste. So my point of view then is that it is really only a 500 year problem, that after 500 years or so, we don't have to be terribly worried about this.

Bernie Cohen

The problem with this radioactive waste situation is that you can always make it safer by spending more money and spending more time on it, putting more scientific expertise to work on the problem, and the question is where do you stop? Now, one index of where you stop is, where...if you can spend the money much more affectively in other ways. For example, we can save a lot of lives in this country by improving highway safety, or improving medical treatment, or medical.... doing more medical research, things like that, and you get to a point where, in fact, we are far past the point now, where we are spending more money on doing better with the nuclear waste handling problem is really wasting money that could be better spent in other areas. The government does not try to optimize expenditures of money for human health and safety. They temper these judgements by the public concern on the problem and that, is the nuclear situation is the extreme example of that situation.

Dr. M. Hamilton

... The political and ethical that has to consider 1,000 years ahead before it is finished. And unfortunately the political process is geared to short term decisions. Why? Because the politicians have to be re-elected in a relatively short period of time. And they are re-elected by people who are not themselves going to live for 1,000 years, and whose love extends to their children, and their grandchildren, but

it is pretty hazey beyond that. I think we have got a lot of public education to be done, I think the sense of goodwill is really being tested. I mean how valuable do we think our descendants really are 500, 600, or even 200 years from the time that we live? I think the public is very frightened of accidents. There has been enough. In spite of the assurances of safety, by people who like yourselves, there has been a number of unexpected and rather frightening accidents. I quite agree they are not as dangerous as coal polution has been for generations, but these are novels. I am frightened again, the public is frightened because when some of those things that transport mobile homes across the state of New Mexico, innocent with a wide load on them, are really apparently according to a recent New York Times thing, are really carrying nuclear material within them, hidden in deception. Deceiving, I find that a very less likely to engage the public trust than if you put on a great big sign. I think those motor homes are doing more damage than they would if they were done in frankly, well guarded tanks or something. The whole issue of deception is a dangerous one ~~when~~ for you to embark on ~~it~~, gentlemen. Because in order to get the public trust and the vote, you really can't afford to be anything else but open and honest. I think that the serious fear which needs to be enhanced, let me say, the fear of not having of not what we are going to get, through nuclear

energy. I don't think the public realizes that we have such a crisis in energy, that maybe really forcing us to take risks that we would prefer not but the alternatives ~~themselves~~ in terms of of using coal and pollution, or the ~~possibility~~ alternatives of having to cut down and conserve beyond that which normal industry needs in order to maintain our standard of living are new fears that I would like to see the public engendered. Not that I think ultimately the fear is the best arbitor of political decision, but I don't see why it shouldn't be a valuable motive amongst others. Well, A many areas in which the vast American population has never been exposed are given a perspective to the nuclear trend in context with all the other threats with which we live. And I think that I submit, is a particular ~~matter~~ mind set of the industry that says newspapers and T.V. and those people were brought up in a certain group of schools and they have been given this mind set ~~threat~~. Now one has to deal with that fact, that is a reality, and how we deal with it, I submit, is a question of public education in values and public education in substance. Until we can deal with those two, we are not going to have a more reasonable society.

Dr. Rustum Roy

Considerations for long term disposal of those high level wastes ~~or~~ are to send them to a waste to depository, a federal waste depository such as WHIP. Now in doing that, we have several alternative forms to send to such a federal depository.

INEL assh. gen. mgr. Harry Larowski Allied Chemical

They may be the ~~cow sign~~ calcine that we have now in dry granular form, it may be put in a glass formation, it may be put into concrete, it may be put into a metal matrix. But I think the important aspect is that those high level wastes right now which are in the Idaho Falls chemical processing plant, are dry solid, in stainless steel bins, ~~with~~ in reinforced concrete, just below ground level. And this is one of the aspects of the overall waste management functions in DOE. The same type of evaluation is being done at Richland, the Hantford site, and also at Savana River.

Bernie Cohen?

The tailings are still on the surface. To add to that the tailings are ... have traces of other chemical toxins, things like salinium which is the one we hear most about in New Mexico, or molybdenam, which is the one of the things you hear most about in Texas, these produce poisoning of cattle, and things like that. And the volume of tailings is enormous. Compared to the volume of the high level waste that would correspond to them. That is why I say the tailings are our big problem. Most people in New Mexico and Texas probably recognize this is a silk mantel for a gasoline lantern. This mantel is approximately as radioactive as mill tailings. That is it has about the same number of disintegrations per second per gram of material. Why is this radioactive? Because the element that produces the bright white light in

Dr. Graham Foster L.A.S.L. Nuclear Physicist

those gasoline lanterns is thorium. And thorium often occurs in the same ores as uranium. And it is radioactive. Now if you had acres and acres piled 30 feet high, of gasoline lantern mantels you would in fact have a significant radioactivity problem. They... those tailings piles are enormous. Most industrial problems are big. The problem is to cover them over in some way so that they don't blow around and don't get into the streams. It is a manageable problem. It is one that nobody has paid enough attention to so far. It is an international problem and it is being considered on an international scale. But the real problem is to do it as cheaply as possible with the maximum safety to the public. Uh, low level waste particularly in the volcanic tuft that we sit on here in Los Alamos is very affectively isolated by burying it 20 feet underground. Uh, we are because Department of Energy regulations require it, We are storing the stuff that has plutonium contamination in it, we are storing that near the surface that we can bury it more deeply somewhere else, possibly at the waste isolation pilot project. Uh, when another repository is available, but as far as we are concerned, it is perfectly safe here.

Schueler (Sandia)

We have had about nine public hearings to date. We started in Carlsbad, came to Albuquerque, Santa Fe, we've had additional hearings in Roswell, hearings in Texas, and one of the purposes of

a little bit more on

those hearings was to advise the public of what the real purpose of the facility was, both in its magnitude and what its mission was. It also is designed to give the public an opportunity to come back to the Department of Energy and say, "Hey, our concerns are." And from that we have learned several things. One of the primary concerns to the people is the transportation issue. As a result of the identification of those concerned, the Department of Energy is allocated this coming fiscal year, where in this fiscal year that we are currently in, starting the 1st of October, and about 5 million dollars is being set aside to look specifically at the transportation issue. One of the early concerns identified was the question of retrievability. And with the initial identification of that issue, the mission was modified to point out to the public that we would indeed install and design for and accommodate with equipment and operational techniques, the ability to retrieve that material, should the problem be identified in the process.

Dr Kerry Lash ... As it relates to the generation of the radioactive waste. The principal issue now facing nuclear power should we continue to generate electricity with nuclear power plants when we don't have a waste disposal facility available for getting ... concerning radioactive... The two major issues concerning radioactive waste that will involve the public

Lash

very heavily are the future licensing of nuclear power plants and the siting of a geological repository for permanent disposal waste created at nuclear power plants. So far we have not tied the licensing of nuclear power plants to the development of the means for disposing of the waste. I think that situation should and will change in the near future. There should be no more nuclear power plants unless there is adequate guarantees that we will be able eventually to dispose of those wastes safely. Those are the wastes that are created in nuclear power plants. We have had nuclear power in one form or another for over 30 years now and it is time that we say we can produce no more of those wastes unless we have a repository available in the near term. The second area has to do with the siting of such repositories themselves. There has been inadequate solicitation of the views of state governments, local governments and the general citizenry in areas where the federal government has proposed federal repositories. I think the Congress will pass legislation giving the states essentially a veto over the siting of any federal repository within their borders unless the state is fully satisfied that the public's health will be protected by the design and location of that repository. 71 Also have this problem of waste disposal. I am hopeful that we can find a satisfactory way of disposing of existing waste

be given the extreme difficulty and so far, in fact the possibility of finding a single site for safely disposing of waste, I think it is unlikely that in the coming decade we will be able to find many, a dozen, two dozen, three dozen, different sites....

I'm concerned that that research becomes window dressing.
I don't want it to be window dressing. I want it to be research. I want to make sure that when they find a site that it is the best site. And I want to find out... I want to make sure that we know about what happens with radioactive waste. There is a panel of geologists that met on radioactive waste disposal from the Environmental Protection Agency and they said that they were rather discouraged and dismayed that after 35 years in dealing with radioactive waste, very little was known about the interaction of waste and the geological formations. I think ... I guess what I am saying is I'm conservative.
that I want to be as conservative as possible because this material is very dangerous. The man who founded it called it highly toxic, or fiendishly toxic, was the words he used. A man by the name of Glen Seaborg who was the former head of the Atomic Energy Commission. I am concerned that we have only had this material in our ..." I would like to see the WHIP projects stopped, in terms of an on-line, full-scale major facility because it is not a pilot project. And I would like to see the current waste, the wastes that are up there leaking or that have... I think they

Jeff Nathanson S.W. Research Lab

Nathanson have chosen New Mexico because it was politically viable. Because New Mexico is a small congressional delegation, because 58% of the population is people of color. Because they didn't feel they could put it anywhere else. And because 11 other states have said no in one way or another and there are a number of states who ~~were~~ are considering saying no one way or another. And I think they chose New Mexico because they thought it was going to be a push over. ~~And it~~ ....

Dr. Norman Rasmussen In terms of any risks to them I think the fear is exaggerated but understanding human nature a little bit it is not surprising to me because they don't know and understand very well what is going on in that plant and what still may go on. They are apprehensive about the unknown as people have been about every unknown threat that they have received. And so it is not surprising that there is still people that are apprehensive. But I don't personally believe that they have any reason to be concerned if they knew and understood the facts. ¶ I personally think that waste disposal is the least serious of all the risks of nuclear power and as you have correctly pointed out, the public perceives it as one of the biggest. As an engineer, I see that is way down on the list of things that are a serious concern to me. The proliferation issue and the reactor safety issue are way above that on the list. It doesn't mean

Rasmussen

that waste is trivial but I... what I mean is I think it can be handled with very little risk to the public by techniques now understood. Now unfortunately we are not doing that, as you who have looked into waste full well know. And we are not doing it because the federal government by law has the responsibility, has not sent into motion the program necessary to ultimately dispose of the waste that they themselves generated in the production of nuclear ~~waste~~ weapons. And that waste by volume at least is a significant fraction of all the waste we have today. So although the engineering technology and understanding we need to safely dispose of, seem to me to be well enough in hand that I feel confident that it can be handled with a very minimal risk whether it will or not depends on government agencies and political actions which I am not so confident to predict nor so at ... the rate they have been dragged out, one has to always be concerned.

In most of the literature and the anti-WHIP campaign does appeal to people's emotions and their lack of understanding rather than to the technical facts. # I personally think the main issue Weart ~~Rasmussen~~ today are political. And that is not to be rate or belittle the political problem. It is a serious political problem in this country. To find good, sound, sites for disposal of nuclear waste which are also are acceptable to the states and to the people surrounding the sites and states

involved.

Dr. Robt. Jefferson

There have been accidents involving the shipments of waste. Those accidents because of the kind of containers that are used have not created releases that have caused any problems. In fact, they have not created any releases at all. ¶ Equipment that is being used for transporting radioactive wastes was designed and built about ten years ago, and there are improvements that have come along since then. There are new materials that are available. They have new design techniques that are available. I expect that what we will eventually use to ship waste will be better equipment than we have now.

Pat Bruno

Will it make it that much more safe that things as they are, are not safe?

Well, when you say that much more safe, it is a matter of whether you invest your money in a bank or savings and loan. Uh, they are both safe. Uh, how far, how safe do you want to be? ¶ If we could have used most anything of a general character of shipping casks, so we used old ~~whole~~ shipping casks, that have been retired from the service simply because they were cheap. We did the whole program for 2 million dollars and today to buy one of these would run you 4½ million dollars. Uh, by the time you buy that kind of equipment and wreck it, it gets too expensive. So we have a series of films on that

Jefferson

activity, which show crashing a tractor trailer rig with one of these casks on an wall at 60 mph. The wall now is not the ordinary wall, it is 690 tons of concrete, heavily reinforced, backed up with 1760 tons of earth. The same cask, it was not damaged in the first test. Some external piping was broken which we had predicted would happen, but that is not part of the modern casks anyhow. So we ~~kept~~ capped the piping and used the same cask so we did it again and this time at 84 miles per hour and we predicted that there would be some deformation of the cask and the cask in fact was deformed as we predicted. We predicted that there would be a leak in the head of the cask. The leak did not occur until we pulled the cask out of the wreckage and put a strain on it and then it leaked about tea cup full of liquid. It contains about 40 liters of liquid and you allowed to leak the whole 40 liters because the radioactive content of the liquid is very inconsequential and as I said before, you are trying to package this stuff in some way that is related to its hazard.

Hamilton

It is based upon unreasonable fears or greedy hopes or inadequate facts. And so ~~this whole~~ there is always a huge burden upon the press, upon the scientists, upon every institution in which is involved, to get into a serious exchange of information and dialoge before the final, and this case,

Hamilton

Congressional decision or executive decisions are made. ~~There comes a time....~~ are much more extensive than the others. And how ... what value do we put on human life. I mean, how many canisters are we going to put around our dried out waste disposals, is a very difficult question. How deep we are going to put it in the ground. Some people would argue that we should spend as much as we can in order to make the whole system 95% safe. But if you are going to spend your money in doing that, what about the other pressing needs on our society in terms of the delivery of medical care, raising the standard of living, there are still some very poor people in our country, underprivileged, providing adequate education for all, not to mention the equally pressing demands upon our nation and our neighbors overseas. This is one world, it is ultimately one family, are we justified in having our highly expensive waste disposal projects which will cost say $300,000 to save one life when there are 300,000 dollars would feed an awful lot of other lives right now. It is a very difficult balance of how we use our resources. I don't think anybody has the answer. But the only way to get at the answer is to discuss them openly.

Cochran

Overriding priority which is to insure the survivability of the nuclear option, rather than the priority of insuring the health of future generations. We are dealing with a narrow

technical subject and if you make institutional mistakes it can lead you to bad technical solutions and one for instance of being driven by ... uh, overriding priorities which is to insure the survivability of the nuclear option rather than the priority of insuring the health and safety of future generations by safely managing the program. When those two priorities collide, organizations like the Department of Energy will should make decisions based on, not on the appropriate waste form but on salvaging the nuclear power. The idea is that you don't want to ... a single failure of one component of a system to lead to the failure of the entire system. So, in order to prevent that and provide for some backup reliability, one introduces a system of multiple barrier system, such as the failure of any one barrier will not lead to the failure of the system, and you will have these other backups. As applied to the waste management activities, the barriers would be, one barrier would be the matrix in which the waste is contained, such as a glass block, the second barrier would be a canister that contains the glass, the third the packing around the canister, the fourth barrier the geological formation within which the waste is placed and in the fifth, the overlying geologic strata over the repository. The problem or the concern is how the nuclear regulatory commission will implement this multiple barrier concept. Will they require stringent performance criteria for each of the

barriers separately be met or will they take ~~the~~ a position that is closer to what I call a multiple siv approach and that is these are not considered independent but you line up a series of sivs in order that the overall leakage through them is less than some overall systems performance objective.

Rick Wilcox (Canyon, Tx. attorney)

In this part of the world, our public health, public water supplies come from the Ogalalla Aquifer and some deeper aquifers. Those would, if the DOE goes ahead with their waste dump plans as outlined, would be above the waste dump. And there is a very serious possibility I think with the kind of heat buildup they are talking about, in the waste dumps, something on the order of 300 degrees Celcius. You could have ficshers open up from the heat and pressure and either get the public water supply contaminated or possibly even worse, have them seep into the ~~variable~~ burial chamber or turn to steam and give you some kind of significant cataclysm.

Wilcox

Until you have a safe way to dispose of literally millions of gallons of liquid waste and literally thousands of cubic meters of solid waste, some of which will be lethal for periods of time as long as perhaps a quarter of a million years, it is insane I think to go ahead with nuclear power development.

.....By opponents of the WHIP side, is this a valid accusation and if so, why was the government negligent? If it is not valid, then why... how do you defend that?

Foster LASL

I think I would have to say that the government has been at least marginally negligent. It is a matter of priorities. The government has a limited amount of money and an enormous number of things that would like to do. ¶ We are in a realistic bind in that some reactors have stored fuel that is almost filled their storage basin, because the program has dragged more than it should have. But it is not that the subject has been ignored, it just has not been pursued as fast as many people feel it should have been and I agree. I think it should have pushed faster. But it has not lead us into any particular extra hazards, it has just left us in the politically uncomfortable position. ¶ In all that time, we have never had (what the Department of Transportation refers to as type B containers. That is, accident resistant containers.) We have never had nuclear materials leak as the result of an accident from one of these type B containers. Uh, so we would have to say that 30 years of experience shows that we know how to move the stuff without causing harm to people.

Schueler

The ~~Bryan~~ brine migration consideration is being closely evaluated

Schueler by ourselves and the U.S.G.S. at the present time. We are going to start some in situ experiments down in the Carlsbad area that are going to be specifically addressed as ~~Bryan~~ the brine migration in that type of an area. The moisture in that .... in that rock, in the salt, is not adequate enough to collect and bring in aquifers and pools. It, uh,.... and we do not believe that you are ever going to end up with the problem of overheating of a specific area, because of that.

Back to transportation, ...

Schueler ..Two conditions, one the Southwest Research calculations and their statements are, they border on hysterical in the sense of if you listen to Dr. Hyder he will set up the scenario of accidents across Texas that goes right through Dallas and has a 20 mile circle in the middle of Dallas claiming that the government is ultimately going to have to buy Dallas. The statistics that he uses are refuted in a document prepared by the Department of Energy which I will be happy to provide you. But, the experiments that he is quoting from, were conducted here in Albuquerque by the Sandia laboratory. If Southwest Research has made allegations and inference in some of their recent advertisements that we would be transporting liquid materials. There would be no liquid waste in transport. All of that material ~~is~~ would be solid and fixed before it was transported on the

highways. The spent fuel itself is a dry transport and is a dry material. To my knowledge, there is not. ¶ Well, the materials before they are shipped anyplace are generally fixed. For example, that material, and here again we talk about the shipping regulations being under the jurisdiction of the Department of Transportation and also under surveillance by the Nuclear Regulatory Commission that stipulate how that material is transported. ¶ To my knowledge, there are no liquid wastes shipped through either New Mexico or Texas. ¶ The accident percentage that Dr. Hyder and Dr. Montague identify and come from national statistics which if you apply them across the board you can say, you know, in so many miles everybody has an accident. You and I have accidents. That is why we have insurance. But the ... to do as they have done and spot those accidents evenly across any particular state and any particular mileage, I think it is very dangerous.

Schueler

You said a while ago that the danger is not that great for the transportation so basically you think that the information from the public hearings, all you need to do is just distribute a little public education and people will accept the WHIP ~~sign~~ site?

Pat Hic

Schueler I think we have done a very poor job of public information in the last 20 years of the nuclear industry in the United States, that's my own personal opinion. Uh, we are doing what we can to improve that but we have to do it on a very limited basis. The generation of the nuclear age came in the form of the weapons program and as such a very classified stigma surrounding that and the general public was essentially told ~~them~~, It is none of your business. That is a dangerous way to approach the public. We have to get out and better advise the public as to what the hazards are. Some of the work we are doing in that area is being twisted unfortunately and we have to get out and better advise the public of what the hazards are. The recent Roger Anderson report of the geology ... the public meetings are doing a very similar thing to us. They are raising, in other than the transportation, other issues that we believe the public is very rightfully say, Hey, I got a problem, I got a question in these areas. The Price Anderson consideration and the responsibility, the liability responsibility of the federal government, as it applies to defense materials and over commercial, has gotten to be a major issue that has been raised. If we continue to do this effort in that same format, the policy of the government to protect the public. And those people that make up the government

like myself and the people who work in my office all have their own families and children here in the state and across the country. And they are not about to compromise their future any more than our immediate future. ¶ The longer we keep that material where it currently is, and it is being stored under balloon warehouses in an area where the water table is only 30 feet below it, it can't stay there for the rest of its life. ¶ It is a waste of money.

Schueler

The... you are next going through the corrosion laboratory but the final room that you are going to see is a large, what we call salt block experiment in which we have placed a heater in the center of a cylinder and that experiment is directed at looking at the migration of how they behave in salt, but also what parameters are reasonable and what consequences they have which is in a sense, criteria. That is, we try to decide how much is an acceptable amount of brine and how much (unaudible).... the combination of all these.

Fisher Bureau of Economic Geology this is voice over core

The first presumption of this particular study is aerial feasibility studies. The basic criteria in terms of thickness of salt, purity of salt, depths at which it occurs, size of the salt body, that would have to be met before you can make any kind of judgements as to

Fisher starts here

whether it was even feasible to pursue for site work. So there is, at this particular point, we are not ~~bound~~ down to any kind of site recommendation at all. That may come later on or it may come ... or be our conclusion fairly early on in the game, that there is not the presence of salt in ample thickness, the kinds of depth, the kinds of general hydrologic security, that would even warrant any additional site investigation so, this kind of program can abort at any one particular point. It The conditions exist there, ~~that~~ match the criteria. We will make the determination if in fact there is salt, the minimal amount of thickness that has to be present, whether the behavior of that salt as it exists there, would meet the kind of designs that exist in the criteria for waste isolation as we know it today. Those are subject to change. They are generally become tighter and tighter criteria as we go along. And all of this is the kind of work that would precede any kind of consideration of licensing through the NRC, the state permitting processes, and so on. That is the sort of thing that would come substantially down the road. If, in fact all the other criteria had progressively more and more demanding detail are met.

~~Schuster~~ Bill Fisher U.T.

Jerry Wermund U.T. Bureau of Economic Geology

We are looking for something called a Field Confirmation Study Area. Now what that basically means is that we are

not for sites, we are looking
looking for areas first in which it might be feasible to look for something....

Uh, I share those, obviously, because we would not be doing the kind of field work, but our problem is one in which we have got these materials, now we already have a legacy whether we like it, we can't stick our head in the sand and say, Go Away. There is what, 9½ million cubic feet of high level radioactive waste that is setting out in the containers above ground. Uh, that is not a very secure place for it, to be sure. So it is really not tied necessarily to the issue of the developed nucler power extensively, we may or we may not. That is aside from this particular issue. We have already got a legacy of waste. We have got to find some mechanism if it is possible, to safely and securely isolate the wastes. Uh, The ~~level~~ can to assure anyone that there will not be any recommendation for waste being stored there or anywhere else in the state of Texas, that we have anything to do with, Unless we are 100% sure that it would be safe. We are in no position to say that now. We don't know that yet. Now, at the present time, it would appear, based on the conventional wisdom that we have at this moment, what we understand it, this is something ~~that~~ to changes as half a million dollars worth of research is going on in the country each year. There are going to be changes all the

way. Right now, it isn't a question of salt being necessarily viable, the presumption that there is going to be salt, it is the salt that it is a little more feasible at this point than some other things. The other alternative you have got is to put it in very, very deep wells, 40,000 feet. That is one possibility as there are some ~~to the~~ problems with that. Another is to shoot it into space in the face of the sun. There are some problems with that. There are options that have been mentioned about deep oceanic burial. Going into very deep portions of the ocean and dropping this to penetration. And that kind of isolation and the other possibilities from a geologic standpoint are in massive granites. This is what primarily ~~triggered~~ the Canadians. Of course, largely because they have lots of granite, and not much in the way of salt. So, they have predecated most of their research effort around granites. Some other parts of the world that don't have granite or salt have such thing as shale, very massive amounts of shales. The principal reason for being salt, is that it is an unpermeable substance, and when salt is very soluble, obviously, it has been out there for many, many millions of years. So, that suggests, that they have not been subject to solution by ground water and so on. So that kind of security is from a hydrologic standpoint. Other factors of salt is its insulation of heat, the generation of heat. Salt is a poor conductor of heat. And so, it is primarily with those two factors about salt

Fisher

that we know that lend some of the ideas now that salt may be our best possibility here. But we are a long ways from proving the case, That salt will work, as indeed we are a long ways from proving that anything will work. We don't know. I don't think anybody can say.

Another appeal for salt is that we know that it is inclined to heal itself. In geologic times, we actually see fractures in salt that have healed themselves over a long period of time. And we don't see this in other rocks as often. Usually a fracture in other kinds of rocks will continue to transmit ~~through it~~ fluid whereas in salt it won't. So that is another factor now. And we are looking at that problem. That is one of our major concerns.

Fisher

That has to be one of the most principal things that you can find a secure geological area in the salt but that is a possibility or even a remote possibility that some waters moving through the subsurface will come into contact with that, that would violate one of these criterias. It has to have what we call hydrologic security. You can't have water in contact. You get water in contact with it, then water is a good mechanism for the spread of contamination. So you can't have that. That is one of the very rigorous criterias. Whether that actually exists we don't know yet.

But, we are looking at depths on down to about 4,000 feet and the Ogalalla and your ground water aquifers are much higher up. The depth is about 1,000 feet.

In New Mexico, it is called Santa Rosa, and it is more like the equivalent of what we call docom here in Texas and the docom is immediately underneath the Ogalalla and the HIgh Plains area. And....

That is what we are trying to do. But at the same time we are not going to try and solve the problem in any kind of cavalier fashion and I don't think there is anyone around that has any kind of credibility at all. That is approaching in a cavalier fashion. Uh, whether we are designing things at 0 risk, if that is what we are doing, I don't know. I don't think so. I think our knowledge at this point is we should presume something approaching 0 risk, and that is what we are doing. Now the other end of the spectrum of course is ... that... what is going on out there in waste disposal. See, one of the things before ... one of the criteria for a site, among all the other things I mentioned, it cannot be an area of any existing or potentially existing mineral resource. So if there is a possibility of an oil trend out yonder, you can't put it over it. How are you going to tell whether there is a possibility of an oil trend? Well, that is another

big part of the study, Is a complete evaluation of all the oil and gas possibilities in the Palo Duro Basin.

I don't have a technical solution to the waste disposal problem and from our understanding neither does anybody else. Obviously you would have to put them in some kind of permanently stable formation and in containers that would not leak, and some guarded perpetuitary such that radioactive waste could not leak out and get into the atmosphere, water supply, food chain, etc., or living things directly. Then what as citizens are we to do? Uh, obviously we have to make some kind of democratic decisions about energy situation. It is something that just can't be decided by a small number of experts but when I see the scientific community divided like this, I think as a citizen the best thing that we should do is err on the side of caution. Uh, when we have better alternatives available, a more efficient system, conservation, the use of....

If the WHIP is built, most of the waste that would come to the WHIP, is from existing stock piles now being stored temporarily in Idaho. And so the routes generally would be from the north. Now Sandia has established a transportation center to study in much more detail the impact of transporting

waste over these routes and to design and develop new containers and new transportation systems for the waste. If you talk with Dr. Jefferson this afternoon who is in charge of this, he will be giving you a much more detailed description than I can because WHIP is for transuranic waste with the exception of a very small few amounts of waste for high level experiments, we think that these wastes will come only from facilities like the Idaho National Engineering Laboratory, in Idaho, where they are now being stored temporarily, from Rocky Flats which is the primary generator of these wastes, and perhaps smaller quantities from places like Los Alamos, where transuranic wastes are being stored today. And perhaps smaller quantities from other defense installations. The primary source will be Rocky Flats in Colorado, Los Alamos and Idaho.

I saw a pamphlet.....

We would not expect any significant shipments over those routes through Texas except possibly for routes down through the panhandle because that is a possible route for waste from Idaho. I guess I would expect that because we have already seen it happen in some states with... we perceive as being the real issues, are often not the things that the general public perceives as being the problem. The general public often used anything associated with the words

radioactive or nuclear as conjuring up in their minds a catastrophic event like Hiroschima or Nagasake. It is difficult for them to conceive of the nuclear accident perhaps of being a very small and innocuous kind of occurrence, rather than a catastrophe. And it is difficult often to get to the route of people's real concerns.

...In the public arena there are several kinds of levels of concern. One level is that many people are unaware of the real hazards and concerns about handling nuclear materials, radioactive wastes, and presenting the information to them, on how carefully it is taken care of, the concern which we handle it, and goes a long ways towards relieving some of their concerns. And they are seriously interested in getting information. There is another level of opposition, who They may be quite aware technically, of the issues related to nuclear waste disposal, but they wish to appeal to the emotions of people, because their goal is to stop disposal, and perhaps stop thereby nuclear power. And so ....

Not be concerned about setting the overall policy, but once a nuclear facility is established in a state, then we have the responsibility for the radiation monitoring, to determine whether the thing is being operated safely. We would make the background studies to establish the level before the plant went into operation so that if they did have an incident we would then have some benchmarks we could measure

Wukasch

the increase of something, that might be potentially hazardous and the air or the water or the soil. ¶ But several..... ¶ however, the Health Department, we are interested in the integrity of the containers, the form in which something is shipped, we know serve as the eyes and ears for the Department of Transportation which I think is grossly understaffed ¶ and no one can predict what the future of ~~regulative~~ legis bodies will do, I do know this. The trend is for the federal government to look more to the state. The states have shown a more increasing interest in areas of this type and the federal agencies that are involved have promised the states that they would be given a full opportunity and all the agencies within the state to review their particular interests in some type of a proposal. There are some 14 state agencies now in Texas that review things such as the proposal of nuclear power plants and I am sure that they will be also interested in some future if it were to come up, or a fuel processing plant or a waste disposal site. ¶ We've been privy to Sitting in on all the earlier discusions we have had representative here, and all the hearings that have been held, and we have had an opportunity to review what has been proposed. I am not apprehensive that we have an immediate problem because from what my engineering knowledge and everything, I think they have selected a very excellent site. I just don't see how there is any conceivable chance of anything ever leaking

out. From the type of plans that we have for storing radioactive waste. They are not just indiscriminately ~~built as~~ dumped in a hole in the ground. They are talking about taking waste and consolidated form and concentrating them and perhaps putting them in impervious ceramic wafers or some type of thing and they would not be soluable by the ground fluids. They are talking about going down to a greater depth ~~by~~ thru impervious geologic structures that have existed for millions of years, that have had no change, and then going through a layer maybe of several hundred or a thousand feet of this layer and chambering out something and then these packaged radioactive wastes would be carried down and stored in a container which would be retrievable if necessary. These things are not just dumped # mixed into the earth to allow to be affected by underground streams or such. 97 Keeping abreast of all the things, nothing has been decided yet. And of course, no one could put a plant in Texas unless it would be put on land that belonged to the governmental agency and unfortunately, I mean, for the people that are considering things, there is no mechanism now. It would require an active~~ly~~, of some future legislature to approve a proposal and to... for the state to take title to the land. Disposal sites of this type must be on governmental land, either state or federal. And until there is some mechanism about which Texas could receive title,

Wukasch (still)

these things are just strictly in the planning stage. There are a lot of people who have not understood this in the past and they thought that some plant could be constructed in the next six months right in their back yard. And it just does not work that way.

(mill tailings)

We have no particular problems in Texas. A lot of publicity was given to New Mexico problem, because one of the mill tailings, one of mills had some tailings leaked into a receiving screen near Grants and this is ... excited some people living around there. Now there is new legislation passed for the Congress recently, next month I am going to a meeting in Denver....

Representative Joe Hanna

Wutasch

There is a lot of education to be done. My main concern is that we don't do something hastily as prohibit all waste to be deposited in Texas. I don't think that is very responsible position to take and yet I am not at the point that I want to say any and everything can be deposited at any particular place.

Joe Hanna
Rep. Legislature
Chairman
Nat. Res. Comm.

I think nuclear (unaudible) itself is a very technical thing. And I am certainly not going to stand here and tell you that I am a nuclear expert or anything like that. We have to listen to the experts and tell us, the legislature, what in their opinions would be the best thing to do and we have to rely on those kind of people. We rely on the nuclear people in

our colleges and universities in Texas to educate us.

I feel that perhaps Texas is in quite a unique position. I think that we might be trading our natural gas in return for being named the nuclear waste storage facility of the country. I feel that perhaps Texas is in quite a unique position. I don't believe that is a fair trade. I don't think that is what people say to Texas and people in the country really envision.

Keese
Tx. Legisl.

"Toxic Texas"
Song. (Waste, transportation, cancer, satire (2 guitarists) (includes edits) cover)

Rad. Reviews

Subject to different legal interpretations, but based on my review of the situation, if a state takes appropriate legislative means either within the legislature or the legislature established in a referendum process, for the people of the state to approve or disapprove a waste depository, then I think they have that right. I don't see any way you can deny them that right. If They said no you don't have that right, I think the states would go ahead and contest it. Now I am not sure how the courts would work. But I think the most important thing that we have to do is not force the states into that position. And what we are doing right now by our present limited powers is that we tend to be forcing the states into the position of having to make that decision, yes or no. And

Sen. Harrison Schmidt D- N.M.

we don't know how that decision is going to go. State
Schmidt
regulatory commissions have within their borders have
a great deal of atonomy. That is the way the federal
system was established. And we have to be very careful,
if we start to erode the federal system as we have been,
but I don't think we want to erode it anymore, as a matter
of fact, ~~I think~~ we need to strengthen it, that is strenghten
the authority and the responsibility of the state because
the federal government obviously cannot handle all of the
things that it has been trying to handle over the past
couple of decades. The states are going to have to do more.
And the rights of the states to regulate various activities
are almost certainly going to have to be strengthened there is
legislation that, was in the session last year, uh, basically
the tendency has been for the fedearl government to assume
most if not all of the financial responsibility for these wastes.
Uh, I don't recall the final terms of the measure, how it
came out. I would have to ask you to check on that. But
the important thing that I think is that we are able to build
in to that is the recognition that there is value in these
tailings, and that even though a prudent corporation would
not go work the tailings for a profit, although in two cases
in Colorado, Ranchers Exploration of Albuquerque is in fact,
processing the tailings at a profit. They are getting uranium
out and they are making money on it, but in many other instances,
that won't be possible. But there is still is value. And you

can reduce the cost of the federal government or to the state, in cleaning up these wastes if you extract using present technology the.....

R. Comm. Thomas Kennedy

The sooner we can properly develop and see the criteria that we have to apply. Moreoever, if you are doing a responsible job of regulation, whoever it is is going to submit an application to you and let me note that we do not have before us an application for a waste disposal or a waste depository at this time. But if you are doing responsible regulation, whoever it is who is going to submit to you a request for a license and wants your regulatory review, ought to have some idea in the first instance of the things you are going to want to know and the basis on which you are going to make your decision. For he will develop his proposal to meet those criteria. It would be foolish of him to do otherwise. So regulations are a two way street, you see. I would use the word negligent but I would have to say I would think it has been a little slow. No. I think the approach that is being taken, I think the approach which the Interagency Review Group, has proposed is quite the opposite. It is a deliberate and a cautious approach, looking for a variety of potential technology, see what the most likely optimum solution might be. We will be doing and the NRC the same sort of thing.

As those concepts are developed we will be looking to see what we can do about developing a regulatory basal regime that can be applied to review the license and purpose of them. What I would like to see and I hope will be achieved, is a process in which we are able to work in tandum with those who are developing waste disposal approaches so that when they are ready to put before us a proposal for licensing, we are ready with criteria and an understanding of that situation and system, to review it, and take into account appropriately what we have to do, for the protection of the public health & safety and environment.

In my opinion, gentlemen, nothing you will ever do is going to satisfy this particular segment of our population. Let me emphasize that since 1972, our sole successor ERDA, and their successor DOE, ...

Going back to what I said and worked with these fine people from the federal government and Sandia for several years and thought we were responsible people, thought we were average in intelligence, and had made sure that the reports and all the data looked pretty good, and were going on the assumption that the local people at least had enough sense to evaluate the program, we were a little

errels

bit concerned when all of a sudden, in 1976, in the legislative session, a protest movement occurred originating in the northern part of New Mexico. Three hundred miles from the site, by people that we have never heard of. They had never been down here. We didn't know exactly how to approach this and we realized after a while and visiting with the state legislators, that there was lot of half truths and things that hadn't been reported, and we also realized that it wasn't a ~~woeful~~ local situation anymore. It was a state situation and a national situation. It is a problem that has got to be solved. It is a problem that is not going to go away. It has made us even more think and advocate that if low level transuranic or nuclear waste can be safely isolated, we need to do it. If it can be done here, we need to do it here, but if it can't be done here, we need to do it somewhere. So because we are addressing a problem that has to be answered. ¶ ..In Santa Fe, on the fact that it will ruin the tourist industry and Carlsbad. The tourist people in Carlsbad are for this project. and so It has been so testified. in hearings in Santa Fe I might say the number one tourist attraction in the state of New Mexico by far is the city of Santa Fe. They have had nuclear waste stored 20 miles from Santa Fe in shallow pits for 25 years. ¶ Well, if I had a lease out there on that area, I would be glad to sell it for 25 million dollars and not have to drill a well. But there is no reason that in the future if there is oil or gas under this area, which

is a relatively small area, it cannot be developed, ~~in the~~ by off set drilling, and the oil people realize that fact. Grazing permits, there has been some comment by some people that don't know what they are talking about, that it would ruin the cattlemen in that area. They are only talking about fencing off 60 acres. They are not going to disturb the grazing on the rest of the area. It is all owned by the federal government and if somebody wants to get on the side of the cattlemen and grazing cattle in the area and have those permits, they better go to the BLM because the BLM just last week chopped the grazing permits in the area by 50%. And it is now classifed as their lowest productive area, 8 cow units per section, that is 640 acres and they have cut that 50%.

I am a member of the organization that represents the viewpoint of citizens of opposed to the WHIP project. We call ourselves the Carlsbad Nuclear Waste Forum and we began working together as a group 18 months ago when it became clear that the institution created to work for our interests was in fact embracing a project that we think is unsound as presently conceived. We [illegible] as undemocratic as site selection process which is actively discouraged involving citizen involvement and we believe this is a decision to be made with or suspend further development of the WHIP project in southeast New Mexico should preside with the citizens of

New Mexico and in a form of a state wide referendum. (clapping) The forum also objects to the classification of the Carlsbad site as a test facility. The scale of the project indicates that it is intended as a full scale repository for both low and high level nuclear wastes. The five hundred million dollar price tag would also support this conclusion. In no sense of the word is this a "pilot" plant. We the undersigned, ~~have~~ are opposed to the importation and dumping of radioactive waste in New Mexico. Today, we have collected the names of approximately 1500 residents who have been eager to express themselves in this fashion. On the basis of the ~~rej~~ reactivity, we think it is fair to say that between 60 ~~to~~ + 70% of our fellow residents oppose the placement of WHIP near Carlsbad. I have some of our petitions here with me today and I point out to the members of this panel that these people represent the sources of power that you exercise. It is behalf of the citizens of Carlsbad that you meet with us today and we demand that their opposition to this project be acknowledged and included along the basis scientific data upon which a decision of the WHIP Project is based.

Carlsbad business man

We feel that if it is in the opinion of the experts that this is the place that would be best suited, then this is an opportunity to the citizens of Carlsbad to serve their state and nation, by taking the lead in welcoming the

government to Carlsbad and work with them to solve a problem that is plaqued our nation for some 35 years. For those that continue to make accusations of the Grady businessman, I take exception and feel that I know most of the supporters of this project here in Carlsbad and have known them for as long as anyone, having lived here for 29½ years. That you accuse these men,,myself included, of being willing to sacrifice the safety of another human being, for a dollar, is completely out of line. Most of these people have children and or grandchildren either living in Carlsbad or visiting Carlsbad on occasion and believe me, no one in their right mind is willing to put the safety of his loved ones in jeopardy for a dollar bill.

... Preferable to a widely scattered shallow burial pits which we presently have all over this nation. We are in favor of WHIP. Now speaking for myself, I am appalled,absolutely appalled, to think that some 23 years have gone by since the burial in salt was first proposed. And we are no farther than we are here today. We are still bickering, we are still fighting. I am convinced that a waste storage facility without the capability of storing high level wastes, is no facility at all. For pete's sakes, get on with it, and do provide for storage of high level wastes. Finally, I have heard objections here today,

that this is not to be a pilot plant at all. That it will be a semi-permanent or a permanent facility. I sincerely hope that wherever we spend five hundred million dollars that it will be permanent. Thank YOu.

'arlsbad girl very emotional)

You come across the thing that this deadly radioactive waste can be retrieved. But yet you have never tried to retrieve hot radioactive waste from one half mile below the earth's surface before. You down play the dangerous properties of radioactive waste. You deliberately cut, have covered up reports which reveal high cancer rates among workers at nuclear facilities and people exposed through other government projects. You say out of one side of your mouth that we the people in New Mexico will have a veto power and out of the other side of your mouth to the nuclear industry, you will have the waste in the ground by 1985 or 1986. And you have gotten the way with the New Mexico state legislature which in my opinion is not representative of the people's opinion in this state. They have set up this concurrance consultation committee which the chairman and the vice chairman are from Carlsbad and are very much in favor of the WHIP project, of the other six men on the committee, there is only one person who has taken a firm anti-WHIP stand. Now, it is not a.... that's not a representative of what the people in New MExico feel. They have the rubber stamp ready to give you your consultation and concurrence. And we are

not as ignorant as you think. We are fed up with this defeat and we are... and you are not going to get away with it. I think Senator A.R. Schwartz of Galveston, Texas, said it best when he said, that there ain't.

The only difference between the AEC and the DOE is the name. James Schlesinger and others were an integral part of the AEC and now Mr. Schlewsinger is the head of the DOE. A rose by any other name smells just as sweet. Or in this case, as rotten.

We are here to voice our opposition to an outrage the DOE on the waste isolation pilot plant will not be deterred, will not tire, will not give up until the DOE realizes that we are speaking for the majority of New Mexicans and the DOE (applause)..... The DOE shall be convinced that (unaudible)..... And in regards to the question I am anticipating, what do I think would be the best alternative and I believe it should be left where it is, where it can be monitored, until you truly do have a safe and scientifically and sensible solution to the problem.

NUCLEAR WASTE DOCUMENTARY

Dr. Terry Lash N.R.D.C.

It says, you won't put a repository where there is valuable natural resources. It definitely does not say we can put a repository where there are valuable natural resources if we can cook up a mining scheme that lets us get it out without hurting the repository. We are just doing this thing ass backwards. We should have followed the criteria from the beginning and if we did, we wouldn't bick whip. There is not only the ~~fine~~ pot ashes, oil and gas below. They have the Sandia folks saying, "Well, we will slant drill underneath the repository to get the oil and gas." Now that is just....you are just destroying the credibility, the whole scientific process here. If the criteria means a god damn thing, they mean that you don't try to put a repository where you have this kind of problem.

Bernie Cohen

The United States said that we should burn all the coal we can get ~~our hands on~~, out of the ground, essentially, that means it is an acceptable risk. And of course this is a minor, minor risk. (Laughter).

LASH

Unnamed Scientist

Well, I,....your political understanding is not mine. I do not consider it because the President of the United States says that we should burn more coal and convert to coal as opposed to burning oil. Uh, that he was saying

that the risk, the current risk that we are accepting in ~~terms~~ of releasing uranium from that coal is ~~assessible~~ acceptable. We do not share that view. A unknown SCIENTIST We do not share it in part because we have demonstrated examples right here along the front range, like the Schwartz-Walder mine, where water supplies being consumed by human beings are being highly contaminated by alpha ~~meters~~ emitters, we have examples on the west slope of well water supplies being highly contaminated by tailings effluents from uranium mills. And we have of course reason to believe to be concerned about the industrial uses and abuses of plutonium as you all know.

... ~~As~~ of having defined this various levels of safety, what is acceptable? That is not a technological question, facts don't provide values, and you are going to have to go outside your own profession in order to gain the necessary public education, for what is inevitably going to be a congressional and therefore a public decision of these matters. I don't think the ethical questions can be resolved until the technical ones are clarified. I think it is really stupid ~~and hogwash~~ to pop off on an emotional basis until the technological questions are furtheron to prove your hard work and research. That leads me to one kind of conclusion as a layman and as a voter and I would be very reluctant to vote for a decision about long term

Dr. Michael Hamilton Nat'l Cath.

disposal because I don't think even you are ready to know what you are going to advocate. I would like to keep them on the surface as long as we could, before we made a decision that we cannot ~~even~~ easily change.

The problem with WHIP is that its mission changes all the time. First it was the commercial repository, then it was only military waste, then it was only transuranic waste which ~~is~~ are not hot, then it was transuranic waste with 1,000 spent ~~pure~~ fuel rods but only 1,000 spent ~~pure~~ fuel rods, then the New Mexico people say that if you, (and others) if you put 1,000 in there that is the camel with his head in the tent and they are going to put the.... you know, you are licensed to ~~put~~ for 1,000 ~~in~~ and it passed, and then they put more. So, part of the problem is WHIP is a very bad repository for high level waste. And, for reasons I said earlier, but.... ¶ The purpose of a repository is to keep the radioactivity from getting back to the biosphere and there are really 2 principal ways that that can happen. One , is you can have some sort of water flow from an aquafier through the repository and back out ~~through~~ to the biosphere. Another way is to have some sort of human activities, solution mining, whatever, future human intrusion. ¶ I see potentially or rather severe, public relations problem with the transportation of waste. For example, if we have an

Dr. Tom Cochran NRDC

Cochran

interim storage facility in one place because we have not built our final repository in time, and then later we build the final repository and you have to move all of this waste from the interim facility to the final repository, you are going to have shipments daily, all going down the same path, the same track or the same road, bed, and people along that path are just not going to be happy with that idea. And, the, ... when there is an accident whether it is a severe accident or not, there is going to be a lot of press association with it, a lot of public outcry about it, efforts to stop the shipments and so forth. ¶ The problem I think stems from the fact that the predecesor agency, the Atomic Energy Commission, have a long history of lying to the public, deceiving them, promoting nuclear activity without being candid about the risk involved, covering up failures and so forth. And, the current bureaucracy, the Department of Energy, and to a lesser extent the Nuclear Regulatory Commission, are having to live with the sins of the past and because there are, on occasion, still evidence of coverups and so forth, that this distrust continues even today. Particularly I think with the Department of Energy which has more of a promotional role than the Nuclear Regulatory Commission. But it is there in both cases. ¶ If I can refer you to the recent inter-agency review group report, it pointed out, and I will concur with this, that the

institutional problems are equally as important as the technical problems. The... if you have institutional failure you can make bad technical mistakes and I think that is the basic problem that we confront.

The point is that after about 500 years, this material ~~will not~~ is be very toxic. For example, if we consider the material generated by an all nuclear power system in the United States, the toxicity of 500 year old waste is 1000 times less than the toxicity of arsenic that we import into the country, every year. And another comparison is that when you burn coal, there is a certain amount of radioactivity ~~waste~~ released because coal contains small amounts of uranium and the ... when you burn coal this uranium is released and the ~~waste~~ radioactive from burning coal then turns out to be quite comparable to the nuclear waste after about 500 years. Another example is there is a lot of uranium and phosphorous and so when you mine phosphorous there is a lot of uranium released into the environment. This is again a radioactive waste from mining phosphorous. And it turns out that this again is quite comparable to ~~the~~ in toxicity to the toxicity to the 500 year old nuclear waste. So my point of view then is that it is really only a 500 year problem, that after 500 years or so, we don't have to be terribly worried about this.

Bernie Cohen

The problem with this radioactive waste situation is that you can always make it safer by spending more money and spending more time on it, putting more scientific expertise to work on the problem, and the question is where do you stop? Now, one index of where you stop is, where...if you can spend the money much more affectively in other ways. For example, we can save a lot of lives in this country by improving highway safety, or improving medical treatment, or medical.... doing more medical research, things like that, and you get to a point where, in fact, we are far past the point now, where we are spending more money on doing better with the nuclear waste handling problem is really wasting money that could be better spent in other areas. The government does not try to optimize expenditures of money for human health and safety. They temper these judgements by the public concern on the problem and that, is the nuclear situation is the extreme example of that situation.

Dr. M. Hamilton

... The political and ethical that has to consider 1,000 years ahead before it is finished. And unfortunately the political process is geared to short term decisions. Why? Because the politicians have to be re-elected in a relatively short period of time. And they are re-elected by people who are not themselves going to live for 1,000 years, and whose love extends to their children, and their grandchildren, but

it is pretty hazey beyond that. I think we have got a lot of public education to be done, I think the sense of goodwill is really being tested. I mean how valuable do we think our descendants really are 500, 600, or even 200 years from the time that we live? I think the public is very frightened of accidents. There has been enough. In spite of the assurances of safety, by people who like yourselves, there has been a number of unexpected and rather frightening accidents. I quite agree they are not as dangerous as coal polution has been for generations, but these are novels. I am frightened again, the public is frightened because when some of those things that transport mobile homes across the state of New Mexico, innocent with a wide load on them, are really apparently according to a recent New York Times thing, are really carrying nuclear material within them, hidden in deception. Deceiving, I find that a very less likely to engage the public trust than if you put on a great big sign. I think those motor homes are doing more damage than they would if they were done in frankly, well guarded tanks or something. The whole issue of deception is a dangerous one ~~when~~ for you to embark on ~~it~~, gentlemen. Because in order to get the public trust and the vote, you really can't afford to be anything else but open and honest. I think that the serious fear which needs to be enhanced, let me say, the fear of not having of not what we are going to get, through nuclear

energy. I don't think the public realizes that we have such a crisis in energy, that maybe really forcing us to take risks that we would prefer not but the alternatives ~~themselves~~ in terms of of using coal and pollution, or the ~~possibility~~ alternatives of having to cut down and conserve beyond that which normal industry needs in order to maintain our standard of living are new fears that I would like to see the public engendered. Not that I think ultimately the fear is the best arbitor of political decision, but I don't see why it shouldn't be a valuable motive amongst others. Well, A many areas in which the vast American population has never been exposed are given a perspective to the nuclear trend in context with all the other threats with which we live. And I think that I submit, is a particular ~~matter~~ mind set of the industry that says newspapers and T.V. and those people were brought up in a certain group of schools and they have been given this mind set ~~threat~~. Now one has to deal with that fact, that is a reality, and how we deal with it, I submit, is a question of public education in values and public education in substance. Until we can deal with those two, we are not going to have a more reasonable society.

Dr. Rustum Roy

Considerations for long term disposal of those high level wastes ~~or~~ are to send them to a waste ~~d~~depository, a federal waste depository such as WHIP. Now in doing that, we have several alternative forms to send to such a federal depository.

INEL asst. gen. mgr. Harry Larowski Allied Chemical

They may be the ~~cow sign~~ Calcine that we have now in dry granular form, it may be put in a glass formation, it may be put into concrete, it may be put into a metal matrix. But I think the important aspect is that those high level wastes right now which are in the Idaho Falls chemical processing plant, are dry solid, in stainless steel bins, ~~with~~ in reinforced concrete, just below ground level. And this is one of the aspects of the overall waste management functions in D.O.E. The same type of evaluation is being done at Richland, the Hantford site, and also at Savana River.

Bernie Cohen?

The tailings are still on the surface. To add to that the tailings are ... have traces of other chemical toxins, things like salinium which is the one we hear most about in New Mexico, or molybdenam, which is the one of the things you hear most about in Texas, these produce poisoning ~~in~~ of cattle, and things like that. And the volume of tailings is enormous. Compared to the volume of the high level waste that would correspond to them. That is why I say the tailings are our big problem. Most people in New Mexico and Texas probably recognize this is a silk mantel for a gasoline lantern. This mantel is approximately as radioactive as mill tailings. That is it has about the same number of disintegrations per second per gram of material. Why is this radioactive? Because the element that produces the bright white light in

Dr. Graham Foster L.A.S.L. Nuclear Physicist

those gasoline lanterns is thorium. And thorium often occurs in the same ores as uranium. And it is radioactive. Now if you had acres and acres piled 30 feet high, of gasoline lantern mantels you would in fact have a significant radioactivity problem. They... those tailings piles are enormous. Most industrial problems are big. The problem is to cover them over in some way so that they don't blow around and don't get into the streams. It is a manageable problem. It is one that nobody has paid enough attention to so far. It is an international problem and it is being considered on an international scale. But the real problem is to do it as cheaply as possible with the maximum safety to the public. Uh, low level waste particularly in the volcanic tuft that we sit on here in Los Alamos is very affectively isolated by burying it 20 feet underground. Uh, we are because Department of Energy regulations require it, We are storing the stuff that has plutonium contamination in it, we are storing that near the surface that we can bury it more deeply somewhere else, possibly at the waste isolation pilot project. Uh, when another repository is available, but as far as we are concerned, it is perfectly safe here.

Schueler (Sandia)

We have had about nine public hearings to date. We started in Carlsbad, came to Albuquerque, Santa Fe., we've had additional hearings in Roswell, hearings in Texas, and one of the purposes of

a little bit more on

those hearings was to advise the public of what the real purpose of the facility was, both in its magnitude and what its mission was. It also is designed to give the public an opportunity to come back to the Department of Energy and say, "Hey, our concerns are." And from that we have learned several things. One of the primary concerns to the people is the transportation issue. As a result of the identification of those concerned, the Department of Energy is allocated this coming fiscal year, where in this fiscal year that we are currently in, starting the 1st of October, and about 5 million dollars is being set aside to look specifically at the transportation issue. One of the early concerns identified was the question of retrievability. And with the initial identification of that issue, the mission was modified to point out to the public that we would indeed install and design for and accommodate with equipment and operational techniques, the ability to retrieve that material, should the problem be identified in the process.

(1979)

Dr Kerry Lash ... As it relates to the generation of the radioactive waste. The principal issue now facing nuclear power should we continue to generate electricity with nuclear power plants when we don't have a waste disposal facility available for getting ... concerning radioactive... The two major issues concerning radioactive waste that will involve the public

Lash very heavily are the future licensing of nuclear power plants and the siting of a geological repository for permanent disposal waste created at nuclear power plants. So far we have not tied the licensing of nuclear power plants to the development of the means for disposing of the waste. I think that situation should and will change in the near future. There should be no more nuclear power plants unless there is adequate guarantees that we will be able eventually to dispose of those wastes safely. Those are the wastes that are created in nuclear power plants. We have had nuclear power in one form or another for over 30 years now and it is time that we say we can produce no more of those wastes unless we have a repository available in the near term. The second area has to do with the siting of such repositories themselves. There has been inadequate solicitation of the views of state governments, local governments and the general citizenry in areas where the federal government has proposed federal repositories. I think the Congress will pass legislation giving the states essentially a veto over the siting of any federal repository within their borders unless the state is fully satisfied that the public's health will be protected by the design and location of that repository. Also have this problem of waste disposal. I am hopeful that we can find a satisfactory way of disposing of existing waste

be given the extreme difficulty and so far, in fact the possibility of finding a single site for safely disposing of waste, I think it is unlikely that in the coming decade we will be able to find many, a dozen, two dozen, three dozen, different sites....

[I'm concerned that that research becomes window dressing.

Jeff Nathanson S.W. Research Lab

I don't want it to be window dressing. I want it to be research. I want to make sure that when they find a site that it is the best site. And I want to find out... I want to make sure that we know about what happens with radioactive waste. There is a panel of geologists that ~~are~~ met on radioactive waste disposal from the Environmental Protection Agency and they said that they were rather discouraged and dismayed that after 35 years in dealing with radioactive waste, very little was known about the interaction of waste and the geological formations. I think ... I guess what I am saying is that I'm conservative. I want to be as conservative as possible because this material is very dangerous. The man who founded it called it highly toxic, or fiendishly toxic, was the words he used. A man by the name of Glen Seaborg who was the former head of the Atomic Energy Commission. I am concerned that we have only had this material in our ... " I would like to see the WHIP projects stopped, in terms of an on-line, full-scale major facility because it is not a pilot project. And I would like to see the current waste, the wastes that are up there leaking or that have... " I think they

Nathanson

have chosen New Mexico because it was politically viable. Because New Mexico is a small congressional delegation, because 58% of the population is people of color. Because they didn't feel they could put it anywhere else. And because 11 other states have said no in one way or another and there are a number of states who ~~were~~ are considering saying no one way or another. And I think they chose New Mexico because they thought it was going to be a push over. ~~And it~~ ....

Dr. Norman Rasmussen

In terms of any risks to them I think the fear is exaggerated but understanding human nature a little bit it is not surprising to me because they don't know and understand very well what is going on in that plant and what still may go on. They are apprehensive about the unknown as people have been about every unknown threat that they have received. ~~had~~. And so it is not surprising that there is still people that are apprehensive. But I don't personally believe that they have any reason to be concerned if they knew and understood the facts. I personally think that waste disposal is the least serious of all the risks of nuclear power and as you have correctly pointed out, the public perceives it as one of the biggest. ~~most serious~~. As an engineer, I see that is way down on the list of things that are a serious concern to me. The proliferation issue and the reactor safety issue are way above that on the list. It doesn't mean

(TMI)

Rasmussen

that waste is trivial but I... what I mean is I think it can be handled with very little risk to the public by techniques now understood. Now unfortunately we are not doing that, as you who have looked into waste full well know. And we are not doing it because the federal government by law has the responsibility, has not sent into motion the program necessary to ultimately dispose of the waste that they themselves generated in the production of nuclear ~~waste~~ weapons. And that waste by volume at least is a significant fraction of all the waste we have today. So although the engineering technology and understanding we need to safely dispose of, seem to me to be well enough in hand that I feel confident that it can be handled with a very minimal risk whether it will or not depends on government agencies and political actions which I am not so confident to predict nor so, at ... the rate they have been dragged out, one has to always be concerned.

Wear T Rasmussen

In most of the literature and the anti-WHIP campaign does appeal to people's emotions and their lack of understanding rather than to the technical facts. # I personally think the main issues today are political. And that is not to be rate or belittle the political problem. It is a serious political problem in this country. To find good, sound, sites for disposal of nuclear waste which are also are acceptable to the states and to the people surrounding the sites and states

involved.

Dr. Robt. Jefferson

There have been accidents involving the shipments of waste. Those accidents because of the kind of containers that are used have not created releases that have caused any problems. In fact, they have not created any releases at all. ¶ Equipment that is being used for transporting radioactive wastes was designed and built about ten years ago, and there are improvements that have come along since then. There are new materials that are available. They have new design techniques that are available. I expect that what we will eventually use to ship waste will be better equipment than we have now.

Pat Bruno

Will it make it that much more safe that things as they are, are not safe?

Well, when you say that much more safe, it is a matter of whether you invest your money in a bank or savings and loan. Uh, they are both safe. Uh, how far, how safe do you want to be? ¶ If we could have used most anything of a general character of shipping casks, so we used ~~whole~~ old shipping casks, that have been retired from the service simply because they were cheap. We did the whole program for 2 million dollars and today to buy one of these would run you 4½ million dollars. Uh, by the time you buy that kind of equipment and wreck it, it gets too expensive. So we have a series of films on that

Jefferson

activity, which show crashing a tractor trailer rig with one of these casks on an wall at 60 mph. The wall now is not the ordinary wall, it is 690 tons of concrete, heavily reinforced, backed up with 1760 tons of earth. The same cask, it was not damaged in the first test. Some external piping was broken which we had predicted would happen, but that is not part of the modern casks anyhow. So we ~~kept~~ capped the piping and used the same cask so we did it again and this time at 84 miles per hour and we predicted that there would be some deformation of the cask and the cask in fact was deformed as we predicted. We predicted that there would be a leak in the head of the cask. The leak did not occur until we pulled the cask out of the wreckage and put a strain on it and then it leaked about tea cup full of liquid. It contains about 40 liters of liquid and you allowed to leak the whole 40 liters because the radioactive content of the liquid is very inconsequential and as I said before, you are trying to package this stuff in some way that is related to its hazard.

Hamilton

It is based upon unreasonable fears or greedy hopes or inadequate facts. And so ~~this whole~~ there is always a huge burden upon the press, upon the scientists, upon every institution in which is involved, to get into a serious exchange of information and dialoge before the final, and this case,

Hamilton

Congressional decision or executive decisions are made. ~~There comes a time~~ Fare .... much more extensive than the others. And how ... what value do we put on human life. I mean, how many canisters are we going to put around our dried out waste disposals, is a very difficult question. How deep we are going to put it in the ground. Some people would argue that we should spend as much as we can in order to make the whole system 95% safe. But if you are going to spend your money in doing that, what about the other pressing needs on our society in terms of the delivery of medical care, raising the standard of living, there are still some very poor people in our country, underprivileged, providing adequate education for all, not to mention the equally pressing demands upon our nation and our neighbors overseas. This is one world, it is ultimately one family, are we justified in having our highly expensive waste disposal projects which will cost say $300,000 to save one life when there are 300,000 dollars would feed an awful lot of other lives right now. It is a very difficult balance of how we use our resources. I don't think anybody has the answer. But the only way to get at the answer is to discuss them openly.

Cochran

Overriding priority which is to insure the survivability of the nuclear option, rather than the priority of insuring the health of future generations. We are dealing with a narrow

technical subject and if you make institutional mistakes it can lead you to bad technical solutions and one for instance of being driven by ... uh, overriding priorities which is to insure the survivability of the nuclear option rather than the priority of insuring the health and safety of future generations by safely managing the program. When those two priorities collide, organizations like the Department of Energy ~~should~~ will make decisions based on, not on the appropriate waste form but on salvaging the nuclear power. The idea is that you don't want to ... a single failure of one component of a system to lead to the failure of the entire system. So, in order to prevent that and provide for some backup reliability, one introduces a system of multiple barrier system, such as the failure of any one barrier will not lead to the failure of the system, and you will have these other backups. As applied to the waste management activities, the barriers would be, one barrier would be the matrix in which the waste is contained, such as a glass block, the second barrier would be a canister that contains the glass, the third the packing around the canister, the fourth barrier the geological formation within which the waste is placed and in the fifth, the overlying geologic strata over the repository. The problem or the concern is how the nuclear regulatory commission will implement this multiple barrier concept. Will they require stringent performance criteria for each of the

barriers separately be met or will they take ~~the~~ a position that is closer to what I call a multiple siv approach and that is these are not considered independent but you line up a series of sivs in order that the overall leakage through them is less than some overall systems performance objective.

Rick Wilcox (Canyon, Tx. attorney)

In this part of the world, our public health, public water supplies come from the Ogalalla Aquifer and some deeper aquifers. Those would, if the DOE goes ahead with their waste dump plans as outlined, would be above the waste dump. And there is a very serious possibility I think with the kind of heat buildup they are talking about, in the waste dumps, something on the order of 300 degrees Celcius. You could have ficshers open up from the heat and pressure and either get the public water supply contaminated or possibly even worse, have them seep into the ~~variable~~ burial chamber or turn to steam and give you some kind of significant cataclysm.

Wilcox

Until you have a safe way to dispose of literally millions of gallons of liquid waste and literally thousands of cubic meters of solid waste, some of which will be lethal for periods of time ~~as~~ perhaps as long as a quarter of a million years, it is insane I think to go ahead with nuclear power development.

.....By opponents of the WHIP side, is this a valid accusation and if so, why was the government negligent? If it is not valid, then why... how do you defend that?

Pat Nic

I think I would have to say that the government has been at least marginally negligent. It is a matter of priorities. The government has a limited amount of money and an enormous number of things that would like to do. ¶ We are in a realistic bind in that some reactors have stored fuel that is almost filled their storage basin; because the program has dragged more than it should have. But it is not that the subject has been ignored, it just has not been pursued as fast as many people feel it should have been and I agree. I think it should have pushed faster. But it has not lead us into any particular extra hazards, it has just left us in the politically uncomfortable position. ¶ In all that time, we have never had (what the Department of Transportation refers to as type B containers. That is, accident resistant containers.) We have never had nuclear materials leak as the result of an accident from one of these type B containers. Uh, so we would have to say that 30 years of experience shows that we know how to move the stuff without causing harm to people.

Foster
LASL

Schueler

The ~~Bryan~~ brine migration consideration is being closely evaluated

Schueler

by ourselves and the U.S.G.S. at the present time. We are going to start some in situ experiments down in the Carlsbad area that are going to be specifically addressed ~~as Bryan~~ the brine migration in that type of an area. The moisture in that .... in that rock, in the salt, is not adequate enough to collect and bring in aquifers and pools. It, uh,.... and we do not believe that you are ever going to end up with the problem of overheating of a specific area, because of that.

Back to transportation, ...

Schueler

..Two conditions, one the Southwest Research calculations and their statements are, they border on hysterical in the sense of if you listen to Dr. Hyder he will set up the scenario of accidents across Texas that goes right through Dallas and has a 20 mile circle in the middle of Dallas claiming that the government is ultimately going to have to buy Dallas. The statistics that he uses are refuted in a document prepared by the Department of Energy which I will be happy to provide you. But, the experiments that he is quoting from, were conducted here in Albuquerque by the Sandia laboratory. ~~T~~ Southwest Research has made allegations and inference in some of their recent advertisements that we would be transporting liquid materials. There would be no liquid waste in transport. All of that material ~~is~~ would be solid and fixed before it was transported on the

highways. The spent fuel itself is a dry transport and is a dry material. To my knowledge, there is not. # Well, the materials before they are shipped anyplace are generally fixed. For example, that material, and here again we talk about the shipping regulations being under the jurisdiction of the Department of Transportation and also under surveillance by the Nuclear Regulatory Commission that stipulate how that material is transported. # To my knowledge, there are no liquid wastes shipped through either New Mexico or Texas. # The accident percentage that Dr. Hyder and Dr. Montague identify and come from national statistics which if you apply them across the board you can say, you know, in so many miles everybody has an accident. You and I have accidents. That is why we have insurance. But the ... to do as they have done and spot those accidents evenly across any particular state and any particular mileage, I think it is very dangerous.

Schueler

You said a while ago that the danger is not that great for the transportation so basically you think that the information from the public hearings, all you need to do is just distribute a little public education and people will accept the WHIP ~~sign~~ site?

Pat Hic

Schueler I think we have done a very poor job of public information in the last 20 years of the nuclear industry in the United States, that's my own personal opinion. Uh, we are doing what we can to improve that but we have to do it on a very limited basis. The generation of the nuclear age came in the form of the weapons program and as such a very classified stigma surrounding that and the general public was essentially told ~~them~~, It is none of your business. That is a dangerous way to approach the public. We have to get out and better advise the public as to what the hazards are. Some of the work we are doing in that area is being twisted unfortunately and we have to get out and better advise the public of what the hazards are. The recent Roger Anderson report of the geology ... the public meetings are doing a very similar thing to us. They are raising, in other than the transportation, other issues that we believe the public is very rightfully say, Hey, I got a problem, I got a question in these areas. The Price Anderson consideration and the responsibility, the liability responsibility of the federal government, as it applies to defense materials and over commercial, has gotten to be a major issue that has been raised. If we continue to do this effort in that same format, the policy of the government to protect the public. And those people that make up the government

like myself and the people who work in my office all have their own families and children here in the state and across the country. And they are not about to compromise their future any more than our immediate future. ¶ The longer we keep that material where it currently is, and it is being stored under balloon warehouses in an area where the water table is only 30 feet below it, it can't stay there for the rest of its life. ¶ ~~It is a waste of money~~.

Schueler

#

Fisher Bureau of Economic Geology this is voice over cover

The... you are next going through the corrosion laboratory but the final room that you are going to see is a large, what we call salt block experiment in which we have placed a heater in the center of a cylinder and that experiment is directed at looking at the migration of how they behave in salt, but also what parameters are reasonable and what consequences they have which is in a sense, criteria. That is, we try to decide how much is an acceptable amount of brine and how much (unaudible).... the combination of all these.

Fisher starts here

The first presumption of this particular study is aerial feasibility studies. The basic criteria in terms of thickness of salt, purity of salt, depths at which it occurs, size of the salt body, that would have to be met before you can make any kind of judgements as to

whether it was even feasible to pursue for site work. So there is, at this particular point, we are not ~~bound~~ down to any kind of site recommendation at all. That may come later on or it may come ... or be our conclusion fairly early on in the game, that there is not the presence of salt in ample thickness, the kinds of depth, the kinds of general hydrologic security, that would even warrant any additional site investigation so, this kind of program can abort at any one particular point. ¶ The conditions exist there, ~~that~~ match the criteria. We will make the determination if in fact there is salt, the minimal amount of thickness that has to be present, whether the behavior of that salt as it exists there, would meet the kind of designs that exist in the criteria for waste isolation as we know it today. Those are subject to change. They are generally become tighter and tighter criteria as we go along. And all of this is the kind of work that would precede any kind of consideration of licensing through the NRC, the state permitting processes, and so on. That is the sort of thing that would come substantially down the road. If, in fact all the other criteria had progressively more and more demanding detail are met.

~~Schuchter~~ Bill Fisher U.T.

We are looking for something called a Field Confirmation Study Area. Now what that basically means is that we are

Jerry Wermund U.T. Bureau of Economic Geology

not looking for areas first in which it might be feasible to look for sites, we are looking ~~look for something~~....

Uh, I share those, obviously, because we would not be doing the kind of field work, but our problem is one in which we have got these materials, now we already have a legacy whether we like it, we can't stick our head in the sand and say, Go Away. There is what, 9½ million cubic feet of high level radioactive waste that is setting out in the containers above ground. Uh, that is not a very secure place for it, to be sure. So it is really not tied necessarily to the issue of the developed nucler power extensively, we may or we may not. That is aside from this particular issue. We have already got a legacy of waste. We have got to find some mechanism if it is possible, to safely and securely isolate the wastes. Uh, The ~~level can~~ to assure anyone that there will not be any recommendation for waste being stored there or anywhere else in the state of Texas, that we have anything to do with, Unless we are 100% sure that it would be safe. We are in no position to say that now. We don't know that yet. Now, at the present time, it would appear, based on the conventional wisdom that we have at this moment, what we understand it, this is something ~~that~~ to changes as half a million dollars worth of research is going on in the country each year. There are going to be changes all the

Fisher

way. Right now, it isn't a question of salt being necessarily viable, the presumption is that there is going to be salt, it is the salt that it is a little more feasible at this point than some other things. The other alternative you have got is to put it in very, very deep wells, 40,000 feet. That is one possibility as there are ~~to the~~ some problems with that. Another is to shoot it into space in the face of the sun. There are some problems with that. There are options that have been mentioned about deep oceanic burial. Going into very deep portions of the ocean and dropping this to penetration. And that kind of isolation and the other possibilities from a geologic standpoint are in massive granites. This is what ~~triggered~~ primarily the Canadians. Fisher Of course, largely because they have lots of granite, and not much in the way of salt. So, they have predecated most of their research effort around granites. Some other parts of the world that don't have granite or salt have such thing as shale, very massive amounts of shales. The principal reason for being salt, is that it is an unpermeable substance, and when salt is very soluble, obviously, it has been out there for many, many millions of years. So, that suggests, that they have not been subject to solution by ~~around~~ ground water and so on. So that kind of security is from a hydrologic standpoint. Other factors of salt is its insulation of heat, the generation of heat. Salt is a poor conductor of heat. And so, it is primarily ~~about~~ with those two factors about salt

that we know that lend some of the ideas now that salt may be our best possibility here. But we are a long ways from proving the case, That salt will work, as indeed we are a long ways from proving that anything will work. We don't know. I don't think anybody can say.

Another appeal for salt is that we know that it is inclined to heal itself. In geologic times, we actually see fractures in salt that have healed themselves over a long period of time. And we don't see this in other rocks as often. Usually a fracture in other kinds of rocks will continue to transmit ~~through it~~ fluid whereas in salt it won't. So that is another factor now. ~~And we are looking at that problem. That is one of our major concerns.~~

Fisher

That has to be one of the most principal things that you can find a secure geological area in the salt but that is a possibility or even a remote possibility that some waters moving through the subsurface will come into contact with that, that would violate one of these criterias. It has to have what we call hydrologic security. You can't have water in contact. You get water in contact with it, then water is a good mechanism for the spread of contamination. So you can't have that. That is one of the very rigorous criterias. Whether that actually exists we don't know yet.

But, we are looking at depths on down to about 4,000 feet and the Ogalalla and your ground water aquifers are much higher up. The depth is about 1,000 feet.

In New Mexico, it is called Santa Rosa, and it is more like the equivalent of what we call docom here in Texas and the docom is immediately underneath the Ogalalla and the HIgh Plains area. And....

That is what we are trying to do. But at the same time we are not going to try and solve the problem in any kind of cavalier fashion and I don't think there is anyone around that has any kind of credibility at all, That is approaching in a cavalier fashion. Uh, whether we are designing things at 0 risk, if that is what we are doing, I don't know. I don't think so. I think our knowledge at this point is we should presume something approaching 0 risk, and that is what we are doing. Now the other end of the spectrum of course is ... that... what is going on out there in waste disposal. See, one of the things before ... one of the criteria for a site, among all the other things I mentioned, it cannot be an area of any existing or potentially existing mineral resource. So if there is a possibility of an oil trend out yonder, you can't put it over it. How are you going to tell whether there is a possibility of an oil trend? Well, that is another

big part of the study, Is a complete evaluation of all the oil and gas possibilities in the Palo Duro Basin.

I don't have a technical solution to the waste disposal problem and from our understanding neither does anybody else. Obviously you would have to put them in some kind of permanently stable formation and in containers that would not leak, and somehow guarded in perpetuitary such that radioactive waste could not leak out and get into the atmosphere, water supply, food chain, etc., or living things directly. Then what as citizens are we to do? Uh, obviously we have to make some kind of democratic decisions about energy situation. It is something that just can't be decided by a small number of experts but when I see the scientific community divided like this, I think as a citizen the best thing that we should do is err on the side of caution. Uh, when we have better alternatives available, a more efficient system, conservation, the use of....

If the WHIP is built, most of the waste that would come to the WHIP, is from existing stock piles now being stored temporarily in Idaho. And so the routes generally would be from the north. Now Sandia has established a transportation center to study in much more detail the impact of transporting

waste over these routes and to design and develop new containers and new transportation systems for the waste. If you talk with Dr. Jefferson this afternoon who is in charge of this, he will be giving you a much more detailed description than I can because WHIP is for transuranic waste with the exception of a ~~few~~ very small amounts of waste for high level experiments, we think that these wastes will come only from facilities like the Idaho National Engineering Laboratory, in Idaho, where they are now being stored temporarily, from Rocky Flats which is the primary generator of these wastes, and perhaps smaller quantities from places like Los Alamos, where transuranic wastes are being stored today. And perhaps smaller quantities from other defense installations. The primary source will be Rocky Flats in Colorado, Los Alamos and Idaho.

I ~~saw a~~ pamphlet.....

We would not expect any significant shipments over those routes through Texas except possibly for routes down through the panhandle because that is a possible route for waste from Idaho. ~~I guess I would expect that because we have already seen it happen in some states with...~~ we perceive as being the real issues, are often not the things that the general public perceives as being the problem. The general public often used anything associated with the words

radioactive or nuclear as conjuring up in their minds a catastrophic event like Hiroschima or Nagasake. It is difficult for them to conceive of the nuclear accident perhaps of being a very small and innocuous kind of occurrence, ~~Whether~~ rather than a catastrophe. And it is difficult often to get to the route of people's real concerns.

In the public arena there are several kinds of levels of concern. One level is that many people are unaware of the real hazards and concerns about handling nuclear materials, radioactive wastes, and presenting the information to them, on how carefully it is taken care of, the concern which we handle it, and goes a long ways towards relieving some of their concerns. And they are seriously interested in ~~information~~ getting information. There is another level of opposition, ~~They~~ who may be quite aware technically, of the issues related to nuclear waste disposal, but they wish to appeal to the emotions of people, because their goal is to stop disposal, and perhaps stop thereby nuclear power. And so ....

Not be concerned about setting the overall policy, but once a nuclear facility is established in a state, then we have the responsibility for the radiation monitoring, to determine whether the thing is being operated safely. We would make the background studies to establish the level before the plant went into operation so that if they did have an incident we would then have some benchmarks we could measure

Wukasch

the increase of something, that might be potentially hazardous and the air or the water or the soil. ¶ ~~But several.....~~ ¶ however, the Health Department, we are interested in the integrity of the containers, the form in which something is shipped, we know serve as the eyes and ears for the Department of Transportation which I think is grossly understaffed ¶ and no one can predict what the future of ~~regulative~~ legis bodies will do, I do know this. The trend is for the federal government to look more to the state. The states have shown a more increasing interest in areas of this type and the federal agencies that are involved have promised the states that they would be given a full opportunity and all the agencies within the state to review their particular interests in some type of a proposal. There are some 14 state agencies now in Texas that review things such as the proposal of nuclear power plants and I am sure that they will be also interested in some future if it were to come up, or a fuel processing plant or a waste disposal site. ¶ We've been privy to Sitting in on all the earlier discusions we have had representative here, and all the hearings that have been held, and we have had an opportunity to review what has been proposed. I am not apprehensive that we have an immediate problem because from what my engineering knowledge and everything, I think they have selected a very excellent site. I just don't see how there is any conceivable chance of anything ever leaking

out. From the type of plans that we have for storing radioactive waste. They are not just indiscriminately ~~built as~~ dumped in a hole in the ground. They are talking about taking waste and consolidated form and concentrating them and perhaps putting them in impervious ceramic wafers or some type of thing and they would not be soluable by the ground fluids. They are talking about going down to a greater depth ~~by~~ thru impervious geologic structures that have existed for millions of years, that have had no change, and then going through a layer maybe of several hundred or a thousand feet of this layer and chambering out something and then these packaged radioactive wastes would be carried down and stored in a container which would be retrievable if necessary. These things are not just dumped # mixed into the earth to allow to be affected by underground streams or such. ¶ Keeping abreast of all the things, nothing has been decided yet. And of course, no one could put a plant in Texas unless it would be put on land that belonged to the governmental agency and unfortunately, I mean, for the people that are considering things, there is no mechanism now. It would require an actively, of some future legislature to approve a proposal and to... for the state to take title to the land. Disposal sites of this type must be on governmental land, either state or federal. And until there is some mechanism about which Texas could receive title,

Wukasch (still)

these things are just strictly in the planning stage. There are a lot of people who have not understood this in the past and they thought that some plant could be constructed in the next six months right in their back yard. And it just does not work that way.

(mill tailings)

We have no particular problems in Texas. A lot of publicity was given to New Mexico problem, because one of the mill tailings, one of mills had some tailings leaked into a receiving screen near Grants and this is ... excited some people living around there. Now there is new legislation passed for the Congress recently, next month I am going to a meeting in Denver....

representative Joe Hanna

~~Wuttesch~~

There is a lot of education to be done. My main concern is that we don't do something hastily as prohibit all waste to be deposited in Texas. I don't think that is very responsible position to take and yet I am not at the point that I want to say any and everything can be deposited at any particular place.

Joe Hanna
Tex. Legislature
Chairman
Nat. Res. Comm.

I think nuclear ~~(unaudible)~~ itself is a very technical thing. And I am certainly not going to stand here and tell you that I am a nuclear expert or anything like that. We have to listen to the experts and tell us, the legislature, what in their opinions would be the best thing to do and we have to rely on those kind of people. We rely on the nuclear people in

our colleges and universities in Texas to educate us.

I feel that perhaps Texas is in quite a unique position. I think that we might be ~~treating~~ trading our natural gas in return for being named the nuclear waste storage facility ~~in~~ of the country. ~~[I feel that perhaps Texas is in quite a unique position.]~~ I don't believe that ~~'~~is a fair trade. I don't think that is what people say to Texas and people in the country really envision.

Keese
Tx. Legisl.

"Toxic Texas"
Song. Waste, transportation, cancer, satire (2 guitarists)
(includes edits)
cover

Rad. Review

" Subject to different legal interpretations, but based on my review of the situation, if a state takes appropriate legislative means either within the legislature or the legislature ~~established~~ ing in a referendum process, for the people of the state to approve or disapprove a waste depository, then I think they have that right. I don't see any way you can deny them that right. " if They said no you don't have that right, I think the states would go ahead and contest it. ~~Now~~ and I am not sure how the courts would work. But I think the most important thing that we have to do is not force the states into that position. And what we are doing right now by our present limited powers is that we tend to be forcing the states into the position of having to make that decision, yes or no. And

Sen. Harrison Schmidt D- N.M.

we don't know how that decision is going to go. ¶ State
Schmidt regulatory commissions have within their borders have
a great deal of atonomy. That is the way the federal
system was established. And we have to be very careful,
if we start to erode the federal system as we have been,
but I don't think we want to erode it anymore, as a matter
of fact, ~~I think~~ we need to strengthen it, that is strenghten
the authority and the responsibility of the state because
the federal government obviously cannot handle all of the
things that it has been trying to handle over the past
couple of decades. The states are going to have to do more.
And the rights of the states to regulate various activities
are almost certainly going to have to be strengthened ¶ .... there is
legislation that, was in the session last year, uh, basically
the tendency has been for the fedearl government to assume
most if not all of the financial responsibility for these wastes.
Uh, I don't recall the final terms of the measure, how it
came out. I would have to ask you to check on that. But
the important thing that I think is that we are able to build
in to that is the recognition that there is value in these
tailings, and that even though a prudent corporation would
not go work the tailings for a profit, although in two cases
in Colorado, Ranchers Exploration of Albuquerque is in fact,
processing the tailings at a profit. They are getting uranium
out and they are making money on it, but in many other instances,
that won't be possible. But there is still is value. And you

can reduce the cost of the federal government or to the state, in cleaning up these wastes if you extract using present technology the.....

NR. Comm. Thomas Kennedy

The sooner we can properly develop and see the criteria that we have to apply. Moreoever, if you are doing a responsible job of regulation, whoever it is is going to submit an application to you, and let me note that we do not have before us an application for a waste disposal or a waste depository at this time. But if you are doing responsible regulation, whoever it is who is going to submit to you a request for a license and wants your regulatory review, ought to have some idea in the first instance of the things you are going to want to know and the basis on which you are going to make your decision. For he will develop his proposal to meet those criteria. It would be foolish of him to do otherwise. So regulations are a two way street, you see. I would use the word negligent but I would have to say I would think it has been a little slow. / No. I think the approach that is being taken, I think the approach which the Interagency Review Group, has proposed is quite the opposite. It is a deliberate and a cautious approach, looking for a variety of potential technology, see what the most likely optimum solution might be. We will be doing and the NRC the same sort of thing.

As those concepts are developed we will be looking to see what we can do about developing a regulatory basis regime that can be applied to review the license and purpose of them. What I would like to see and I hope will be achieved, is a process in which we are able to work in tandum with those who are developing waste disposal approaches so that when they are ready to put before us a proposal for licensing, we are ready with criteria and an understanding of that situation and system, to review it, and take into account appropriately what we have to do, for the protection of the public health & safety and environment.

In my opinion, gentlemen, nothing you will ever do is going to satisfy this particular segment of our population. Let me emphasize that since 1972, our sole successor ERDA, and their successor DOE, ...

Going back to what I said and worked with these fine people from the federal government and Sandia for several years and thought we were responsible people, thought we were average in intelligence, and had made sure that the reports and all the data looked pretty good, and were going on the assumption that the local people at least had enough sense to evaluate the program, we were a little

Gerrels

bit concerned when all of a sudden, in 1976, in the legislative session, a protest movement occurred originating in the northern part of New Mexico. Three hundred miles from the site, by people that we have never heard of. They had never been down here. We didn't know exactly how to approach this and we realized after a while and visiting with the state legislators, that there was lot of half truths and things that hadn't been reported, and we also realized that it wasn't a ~~woeful~~ local situation anymore. It was a state situation and a national situation. It is a problem that has got to be solved. It is a problem that is not going to go away. It has made us even more think and advocate that if low level transuranic or nuclear waste can be safely isolated, we need to do it. If it can be done here, we need to do it here, but if it can't be done here, we need to do it somewhere. ~~Because~~ So we are addressing a problem that has to be answered. ..In Santa Fe, on the fact that it will ruin the tourist industry and Carlsbad. The tourist people in Carlsbad are for this project. ~~It has been~~ and so testified. in hearings in Santa Fe I might say the number one tourist attraction in the state of New Mexico by far is the city of Santa Fe. They have had nuclear waste stored 20 miles from Santa Fe in shallow pits for 25 years. Well, if I had a lease out there on that area, I would be glad to sell it for 25 million dollars and not have to drill a well. But there is no reason that in the future if there is oil or gas under this area, which

is a relatively small area, it cannot be developed, ~~in the~~ by off set drilling, and the oil people realize that fact.

Grazing permits, there has been some comment by some people that don't know what they are talking about, that it would ruin the cattlemen in that area. They are only talking about fencing off 60 acres. They are not going to disturb the grazing on the rest of the area. It is all owned by the federal government and if somebody wants to get on the side of the cattlemen and grazing cattle in the area and have those permits, they better go to the BLM because the BLM just last week chopped the grazing permits in the area by 50%. And it is now classifed as their lowest productive area, 8 cow units per section, that is 640 acres and they have cut that 50%.

Carlsbad woman

I am a member of the organization that represents the viewpoint of citizens of opposed to the WHIP project. We call ourselves the Carlsbad Nuclear Waste Forum and we began working together as a group 18 months ago when it became clear that the institution created to work for our interests was in fact embracing a project that we think is unsound as presently conceived. We label as undemocratic as site selection process which is actively discouraged ~~involving~~ citizen involvement and we believe this is a decision to be made with or suspend further development of the WHIP project in southeast New Mexico to should preside with the citizens of

New Mexico and in a form of a state wide referendum. (clapping) The forum also objects to the classification of the Carlsbad site as a test facility. The scale of the project indicates that it is intended as a full scale repository for both low and high level nuclear wastes. The five hundred million dollar price tag would also support this conclusion. In no sense of the word is this a "pilot" plant. We the undersigned, ~~have~~ are opposed to the importation and dumping of radioactive waste in New Mexico. Today, we have collected the names of approximately 1500 residents who have been eager to express themselves in this fashion. On the basis of the ~~rejectivity~~ receptivity, we think it is fair to say that between 60 to 70% of our fellow residents oppose the placement of WHIP near Carlsbad. I have some of our petitions here with me today and I point out to the members of this panel that these people represent the sources of power that you exercise. It is behalf of the citizens of Carlsbad that you meet with us today and we demand that their opposition to this project be acknowledged and included along the basis scientific data upon which a decision of the WHIP Project is based.

Carlsbad business man

We feel that if it is in the opinion of the experts that this is the place that would be best suited, then this is an opportunity to the citizens of Carlsbad to serve their state and nation, by taking the lead in welcoming the

government to Carlsbad and work with them to solve a problem that is plagued our nation for some 35 years. For those that continue to make accusations of the Grady businessman, I take exception and feel that I know most of the supporters of this project here in Carlsbad and have known them for as long as anyone, having lived here for 29½ years. That you accuse these men, myself included, of being willing to sacrifice the safety of another human being, for a dollar, is completely out of line. Most of these people have children and or grandchildren either living in Carlsbad or visiting Carlsbad on occasion and believe me, no one in their right mind is willing to put the safety of his loved ones in jeopardy for a dollar bill.

Carlsbad Man ... Preferable to a widely scattered shallow burial pits which we presently have all over this nation. We are in favor of WHIP. Now speaking for myself, I am appalled, absolutely appalled, to think that some 23 years have gone by since the burial in salt was first proposed. And we are no farther than we are here today. We are still bickering, we are still fighting. I am convinced that a waste storage facility without the capability of storing high level wastes, is no facility at all. For pete's sakes, get on with it, and do provide for storage of high level wastes. Finally, I have heard objections here today,

that this is not to be a pilot plant at all. That it will be a semi-permanent or a permanent facility. I sincerely hope that wherever we spend five hundred million dollars that it will be permanent. Thank YOu.

Carlsbad girl (very emotional)

You come across the thing that this deadly radioactive waste can be retrieved. But yet you have never tried to retrieve hot radioactive waste from one half mile below the earth's surface before. You down play the dangerous properties of radioactive waste. You deliberately cut, have covered up reports which reveal high cancer rates among workers at nuclear facilities and people exposed through other government projects. You say out of one side of your mouth that we the people in New Mexico will have a veto power and out of the other side of your mouth to the nuclear industry, you will have the waste in the ground by 1985 or 1986. And you have gotten the way with the New Mexico state legislature which in my opinion is not representative of the people's opinion in this state. They have set up this concurrance consultation committee which the chairman and the vice chairman are from Carlsbad and are very much in favor of the WHIP project, of the other six men on the committee, there is only one person who has taken a firm anti-WHIP stand. Now, it is not a.... that's not a representative of what the people in New MExico feel. They have the rubber stamp ready to give you your consultation and concurrence. And we are

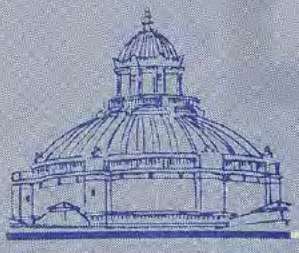
not as ignorant as you think. We are fed up with this defeat and we are... and you are not going to get away with it. I think Senator A.R. Schwartz of Galveston, Texas, said it best when he said, that there ain't.

Carlsbad (Las Cruces) pregnant women

The only difference between the AEC and the DOE is the name. James Schlesinger and others were an integral part of the AEC and now Mr. Schlewsinger is the head of the DOE. A rose by any other name smells just as sweet. Or in this case, as rotten.

We are here to voice our opposition to an outrage the DOE on the waste isolation pilot plant will not be deterred, will not tire, will not give up until the DOE realizes that we are speaking for the majority of New Mexicans and the DOE (applause)..... The DOE shall be convinced that (unaudible)..... And in regards to the question I am anticipating, what do I think would be the best alternative and I believe it should be left where it is, where it can be monitored, until you truly do have a safe and scientifically and sensible solution to the problem.

Issue Brief



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NUCLEAR WASTE MANAGEMENT

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ISSUE DEFINITION

The development of nuclear energy as a source of commercial power in the United States involves several controversial issues. Among the most enduring has been the disposal of intensely radioactive wastes from used nuclear fuels. Disposal practices of other, less radioactive waste materials have also been criticized. Can high-level wastes be disposed of so that surveillance and monitoring while they remain dangerous will not be necessary? If not, what is to be done with the millions of gallons of similar wastes already produced by the military weapons program and currently stored in surface tanks that must be monitored continuously to see that they do not leak? Assuming safe and reliable technology can be developed, what is the optimum role of the Federal Government, the States, and industry in managing both high-level and low-level wastes? Will storage capacity for spent nuclear fuel be adequate until a waste management program is adopted and functioning, or will some operating reactors be forced to shut down? Two points are at issue. The first is the adequacy and timing of the Federal Government's nuclear waste management program. The second is the development and expansion of nuclear power: whether it should be delayed or halted until a satisfactory means of solving the waste disposal problem can be demonstrated.

BACKGROUND AND POLICY ANALYSIS

INTRODUCTION

Nuclear energy supplied about 13% of the electric power consumed in the United States in 1978. Generation fell to 11.5% in 1979, following the accident at the Three Mile Island II plant in March. Despite a pause in licensing new reactors following the accident, however, construction of numerous new plants already issued construction permits continues.

The operation of these reactors will produce large amounts of intensely radioactive waste material. The most serious disposal problems are presented by so-called high-level wastes, contained in nuclear fuel after it is removed from a reactor. When it is first put in a reactor, fuel consists of pellets of uranium, consisting of 3% uranium-235 and the rest uranium 238, enclosed in a strong metal cladding. In the reactor, some of the U-235 is split, or fissioned, producing heat that is used to generate electricity and leaving highly radioactive elements such as cesium-137 and strontium-90, which are called fission products. At the same time, some of the U-238 is converted into plutonium and several other very heavy elements that do not occur in nature.

When the fuel has been in the reactor about 3 years, the concentration of U-235 remaining -- about 1% -- is too small to sustain the fission process, and the spent fuel is removed from the reactor and replaced with fresh fuel rods. The spent fuel is stored temporarily in specially built pools of water to remove the heat generated by the highly radioactive fission products.

Two options exist for dealing with spent fuel after it has been stored under water for a number of years to allow some of its most active radioactive elements to decay. Under one option -- the so-called

once-through system -- the spent fuel would be emplaced in a permanent repository intact. Under the other, the fuel would be shipped to a reprocessing facility, where the elements would be chopped up and the fission products would be separated from the remaining uranium and the plutonium that had been created. Since plutonium can be used as a fissionable nuclear fuel, and the uranium can be processed to increase its concentration of U-235 again, these materials would be recycled as fuel for other nuclear plants. The remaining fission products would be solidified and converted into a stable form, and would then be placed in a permanent repository.

The fission products, which form the bulk of the high-level wastes, have relatively short half-lives (30 years is typical), and 700 years can be used as the end point of practical concern for most of them. But mixed in with them will be a certain amount of plutonium -- about 0.5% of the total amount in the spent fuel -- as well as some other so-called transuranic elements: radioactive atoms heavier than uranium, such as americium and curium. Most of these transuranic elements remain radioactive for extremely long periods of time: Plutonium-239, for example, has a half-life of almost 25,000 years. For this reason, it has been argued that wastes must be kept out of the environment for time periods that, from the perspective of human history, can be considered infinite. Others believe that 1,000 years is a more realistic time period to consider, on the grounds that after that time the reprocessed waste will have decayed to about the same level of activity as the initial natural uranium from which it was produced.

On Apr. 7, 1977, President Carter announced a policy of deferring "indefinitely" commercial reprocessing of spent fuel and recycling of plutonium as a nuclear fuel, on the grounds that commercial use of plutonium would contribute to the proliferation on nuclear weapons. If such a policy was adopted on a permanent basis, waste management would probably consist of disposing of spent fuel elements containing fission products, plutonium, and unused uranium.

The lack of progress in developing a clear and convincing waste management program (See "High Level Waste Management Program," below) has become a major issue in the licensing of nuclear powerplants. Critics of the policy have recommended that demonstration of waste management technology be linked to the licensing process, and legislation has been introduced with that end in mind. The role of the States in determining the location of a waste repository is also a controversial issue.

VARIOUS TYPES OF RADIOACTIVE WASTES

While the problem of disposing of high-level radioactive wastes or spent fuel from commercial reactors has attracted the most attention, several other problem areas also exist:

(1) Military high-level radioactive wastes. The nuclear weapons program, now under the Department of Energy, has been producing radioactive waste material since the 1940s. The high-level wastes produced since that time have been stored at three sites: Hanford (Richland, WA); Savannah River (Aiken, SC), and Idaho National Engineering Laboratory (Idaho Falls, ID).

Until recently, these high-level wastes were in liquid form; millions of gallons were being stored at the three sites in about 200 stainless steel or carbon steel tanks of various capacities. The anticipated life expectancy of these tanks was more than 50 years; however, because of the high levels of

thermal, radiation, chemical, and mechanical stresses, several failures that resulted in leaks of highly radioactive liquids have occurred. At Hanford alone, over 423,500 gallons of high-level wastes leaked from 16 tanks. The largest leak occurred on June 8, 1973, when Tank 106T leaked a total of 115,000 gallons, amounting to over 54,000 curies of radioactivity. Savannah River has recorded at least one serious leak, but the National Reactor Testing Station (NRTS) in Idaho has recorded none. These leaks were the cause of some embarrassment to the Atomic Energy Commission, which was responsible for them at that time,and required remedial action. According to the AEC, no contamination of the environment (other than the ground immediately below the tank farms) occurred as a result of these leaks because the radioactive materials were immobilized in the soil.

To reduce the chances for future leaks, the AEC embarked upon a program to transform liquid wastes to solid form. The ultimate disposal of these wastes, however, has remained an unanswered question. The solidification process is a stop-leak measure that will make the wastes more manageable.

The high-level wastes at Hanford and Savannah River result from the operation of nuclear reactors designed to produce plutonium for nuclear explosives. (The Hanford N-Reactor also feeds 850 megawatts of electricity into the commercial grid.) Those at Idaho are produced by the reprocessing of fuel from nuclear submarines and other naval propulsion reactors.

Because of the long history of reprocessing of fuel from military programs, the waste is in a variety of chemical and physical forms, some of which may complicate their handling and disposal. As a result, it is not clear what measures will be taken for the ultimate disposal of these wastes.

(2) Low-level wastes, both commercial and Government-generated. In addition to the high-level wastes from spent fuel or military plutonium production processes, Government and commercial nuclear operations produce other wastes that are slightly contaminated with various radioactive materials. These wastes are composed largely of paper, rags, plastic items, and discarded equipment, and at present are disposed of at selected burial sites. Much of the material derives from medical uses of radioactive isotopes.

Low-level wastes are disposed of in shallow land burial sites. Between 1962 and 1971, six such sites were licensed by the Atomic Energy Commission for operation by private companies, but three have been shut down permanently, another is temporarily closed, a fifth was closed for more than a month in 1979, and the sixth has restricted its intake.

The three burial sites that are closed down are located in West Valley, New York; Maxey Flats, Kentucky; and Sheffield, Illinois. The West Valley site, licensed in 1963 by Nuclear Fuel Services Company near its pilot commercial fuel reprocessing plant, was closed in March 1975 after seepage of contaminated water was detected within the site. NFS later abandoned its plans to operate the West Valley reprocessing plant, and its low-level waste facility was never reopened.

The Maxey Flats facility, licensed in 1963, was also found to have some leakage problems, and in December 1977 the State of Kentucky bought the site back from the operating company, Nuclear Engineering Co., and closed it down. The Sheffield facility, also operated by NECO, closed in 1978 when existing trenches were filled and the company was unable to obtain a license from the Nuclear Regulatory Commission for an expanded operation.

The Beatty burial ground, operated by NECO, was licensed in 1962. It was closed briefly in 1976 when it was discovered that radioactively contaminated equipment had been taken off-site instead of being buried. In October 1979 both the Beatty site and the commercial burial ground at Hanford, Washington, were temporarily closed on the ground that radioactive wastes were arriving via improper transportation or were poorly packaged.

The only site remaining open was the burial ground at Barnwell, South Carolina, and the State announced that it planned to restrict the facility to accept waste only from the Southeastern region of the country — the role originally planned for the facility when it was licensed in 1971 and three other sites were operating East of the Rockies.

In November 1979 Washington Governor Dixy Lee Ray reopened the Hanford site, primarily on the basis that a waste facility was needed for wastes from medical uses of radioactive materials. Nevada Governor Robert List asked the State Department of Human Resources to petition the State Board of Health for a permanent shut-down of the Beatty site, but the Board rejected the petition in December, and the facility was reopened. The governors of the three States with operating low-level facilities have insisted that other regional or State burial grounds be opened.

Five low-level burial sites are maintained by DOE for disposing of low-level wastes produced by Government programs, mostly weapons programs. These sites are at Hanford, the Idaho National Engineering Laboratory, the Los Alamos Scientific Laboratory in New Mexico, the Oak Ridge National Laboratory in Tennessee, and the Savannah River plant.

Early in the nuclear weapons program, low-level solid wastes were disposed of in the ocean. That practice has been suspended by the United States, but several European countries continue ocean dumping.

A 1976 report by the National Academy of Sciences, reviewing the status of low-level radioactive waste management, concluded that "there has been, and will be, no measurable harm to man from past and present practices of land burial of solid low-level radioactive wastes." But it added that it was "not convinced that current practices should be continued indefinitely into the future."

Under the Atomic Energy Act, States may sign an agreement with the Nuclear Regulatory Commission under which they will regulate certain activities concerning radioactive health and safety. Commercial low-level waste burial grounds are included in these activities, and five of the six commercial sites — all but Sheffield, Illinois -- were or are regulated by "Agreement States." Because of the controversy that has arisen over nuclear waste management, it has been suggested that waste burial grounds be regulated directly by NRC, or that they be operated directly by the Government instead of by commercial companies. However, the uncertain role of State and local authorities in the location of high-level waste repositories has complicated the consideration of NRC authority over low-level facilities. From the standpoint of public and political sensitivities, there tends to be confusion between high-level and low-level waste management.

(3) Uranium mill tailings. Uranium ore contains substantial quantities of radium, which decays into a radioactive gas called radon. Exposure to the radioactive decay products of radon, called radon daughters, has been associated with greater incidence of lung cancer among uranium miners,

particularly those who smoke.

Although concentrations of radon in tailings from uranium mills are not as heavy as in some uranium mines, the gas is produced by the natural radioactive decay process. Some mill trailings were used as construction material in Grand Junction, Colorado. Radioactivity levels were later discovered to be above accepted limits in some of these structures, and they are being rebuilt or torn down. A potential problem also exists in a number of inactive mill tailings deposits.

The Uranium Mill Tailings Radiation Control Act of 1978 (P.L. 95-604) directed the Department of Energy to take remedial action on inactive processing sites. Since the Act was signed into law in November 1978, DOE has proposed priorities for remedial actions for 22 sites, and has identified 48 additional sites on Federally owned or acquired property which contain residual radioactive materials or other radioactive wastes.

HIGH-LEVEL WASTE MANAGEMENT PROGRAM

The handling of high-level wastes from civilian nuclear powerplants (as distinct from those produced in the weapons systems) is currently regulated by the Nuclear Regulatory Commission. The regulations appear in Title 10 of the Code of Federal Regulations, appendix F of 10 CFR 50. They require that the inventory of high-level liquid waste at a licensed fuel reprocessing plant be limited to that produced in the prior 5 years, and that it be converted to solid form and be transferred to a Federal repository within 10 years of its separation from the irradiated fuel. The development and operation of a Federal repository to receive these wastes is, under present regulations, the responsibility of DOE.

No commercial reprocessing facilities are now licensed to operate, and if President Carter's deferral of reprocessing becomes permanent, these regulations would be irrelevant. NRC also regulates the storage of spent fuel at reactor sites and other licensed facilities. The Administration has proposed legislation allowing for Government ownership of spent fuel stored in away-from-reactor (AFR) storage facilities. (See LEGISLATION, below.)

A pilot commercial reprocessing facility at West Valley, N.Y., was operated from 1966 to 1972 by Nuclear Fuel Services, Inc. before it was shut down for modification and expansion. During that period, 612,000 gallons of liquid high-level waste was produced; this material is currently stored at the site. Nuclear Fuel Services has abandoned its plans to reopen the West Valley reprocessing facility, and the State of New York is faced with the problem of dealing with the waste.

The Department of Energy has indicated that it will contribute to solving the waste problem at West Valley, and legislation introduced by Mr. Lundine would establish a waste solidification demonstration plant at the site (See LEGISLATION, below).

At the present time, the most thoroughly researched plan for isolation of high-level radioactive nuclear wastes in the environment calls for its placement in geologically stable salt beds. The AEC began considering bedded salt formations for this purpose in 1955 and initiated feasibility studies in 1959. During 1966 and 1967, simulation studies were conducted in abandoned salt mines in central Kansas. In 1970, the AEC announced that the abandoned Carey Salt Mine near Lyons, KS, had been selected as a demonstration facility

for waste emplacement and, it was implied, a National Radioactive Waste Repository would be established in central Kansas by the mid-1970s. This plan was strongly challenged in Congress, and there were other expressions of concern by residents and State officials about the suitability of that particular site because the abandoned mine had numerous drill holes and shafts. The opposition also reflected a general unwillingness to have dangerous materials stored nearby. The AEC subsequently abandoned the Kansas facility and postponed its decision on the selection of a permanent repository. Nevertheless, DOE still considers placement in bedded salt as the most viable current solution for long-term disposal and is continuing its efforts to select and demonstrate the suitability of such a site.

While the bedded salt concept still looked to be the most satisfactory, AEC decided that other permanent solutions to the problems should be investigated. Among the possibilities were disposal in other geological formations, such as granite and domed salt; transportation to outer space; disposal under the ocean floor; or transmutation of long-lived radioactive elements into less troublesome forms. While these options were being investigated, AEC proposed that the wastes from the commercial sector could be stored in a surface facility in retrievable form, and plans for a large Retrievable Surface Storage Facility (RSSF) were drawn up.

In April 1975, however, ERDA, just formed out of part of the AEC, decided to review the waste management program, and the RSSF was later abandoned.

In February 1978 DOE issued a draft report of a special Task Force for Review of Nuclear Waste Management which spelled out in detail the current waste management program. The major facility being proposed was a Waste Isolation Pilot Plant (WIPP) near Carlsbad, New Mexico, an area consisting of large bedded salt deposits. The main purpose of the WIPP facility would be to dispose of military transuranic wastes, with R&D disposal in retrievable fashion of commercial spent fuel and perhaps some high-level waste from the military Savannah River, South Carolina, facility. The task force also recommended accelerated R&D in the disposal of high-level waste in basalt formations near the Hanford, Washington, facility. Environmental impact statements discussing the various options for dealing with both commercial and military radioactive wastes were to be prepared.

Following the issuance of the task force report, President Carter appointed an Interagency Review Group (IRG) on Nuclear Waste Management, consisting of representatives of 14 government departments and agencies. The draft report of this group was issued in October 1978, and, after extensive public comment was reviewed, the final report was issued in March 1979. The major significance of the IRG was that its report represented a consensus of opinion of a broad range of government agencies, instead of being the output of a single agency as had previous waste management policies.

The IRG report reflected a growing debate over the disposal technology that has been studied most in the United States: conversion of high-level waste to a solid, encapsulation in a glass medium, and disposal in bedded salt. Both the salt medium and the glass encapsulation of the waste have been challenged. On the other hand, the IRG found that "present scientific and technological knowledge is adequate to identify potential repository sites for further investigation," and that "no scientific or technical reason is known that would prevent identifying a site that is suitable for a repository." A "suitable" site was defined as one which "would provide a high degree of assurance that radioactive waste can be successfully isolated from the biosphere for periods of thousands of years."

Release of the final IRG report was expected to be quickly followed by a Presidential statement on nuclear waste policy, but issuance of that statement was delayed until Feb. 12, 1980 (see below). In the meantime, the Environmental Protection Agency issued criteria for radioactive waste disposal, and the Nuclear Regulatory Commission developed licensing procedures for geologic repositories. The Department of Energy continued its massive R&D program in nuclear waste management.

DOE's WIPP project ran into political difficulties. Originally conceived as a repository for military TRU wastes, its conceptual role was expanded to R&D on disposal of high-level reprocessed wastes, and of a limited number of commercial spent fuel elements. It was also thought that WIPP could be used, in the IRG's phrase, to "exercise the licensing system."

This approach drew criticism from the House Armed Services Committee, which refused to fund the project if DOE insisted on licensing it and if State concurrence in the project were made a requirement. The project was revived in a compromise between the House and Senate Armed Services Committees that provides for an "agreement for cooperation" on WIPP construction between the Federal Government and the State of New Mexico. However, this proposal was opposed by the Administration.

PRESIDENTIAL POLICY STATEMENT

On Feb. 12, 1980, President Carter sent to the Congress a message describing his proposals for a comprehensive radioactive waste program. The primary objective of the program, he said, was to isolate existing and future radioactive waste resulting from military and civilian activities from the biosphere so that they would pose no significant threat to public health and safety. This effort, he said, "must proceed regardless of future developments within the nuclear industry -- its future size, and resolution of specific fuel cycle and reactor design issues."

The President said he was "persuaded that the capability now exists to characterize and evaluate a number of geologic environments for use as repositories built with conventional mining technology."

Components of the President's policy included:

1. Establishment by Executive Order of a State Planning Council to provide a role for State and local governments in developing and implementing the program. Legislation to make the Council permanent will be submitted during the 96th Congress.

2. Focusing attention on research and development and on locating and characterizing a number of potential repository sites in a variety of geological environments with diverse rock types. When four to five sites have been evaluated and found potentially suitable, one or more will be selected for further development as a licensed full-scale repository. The first full-scale repository should be selected by 1985 and be operational in the mid-1990s.

3. Providing a limited amount of government storage capacity for spent fuel to provide flexibility and an alternative for those utilities which are unable to expand their storage capabilities. This includes passage of the Administration's proposed spent nuclear fuel legislation (see LEGISLATION,

below).

4. Development of national plans to establish regional disposal sites for commercial low-level waste.

5. Extending NRC authority to the licensing of spent fuel storage, and disposal of transuranic waste and nondefense low-level waste in any new government facilities.

The policy statement designates the Department of Energy for the management and disposal of radioactive wastes. DOE is preparing a detailed National Plan for Nuclear Waste Management, a draft of which will be released for comment later in 1980.

COSTS

Estimates of the cost of waste management are necessarily imprecise in the absence of a detailed and operating program. After a lengthy series of hearings, the House Committee on Government Operations issued a report on nuclear power costs which dealt extensively with the nuclear waste issue. Estimates of the costs of waste management by a wide variety of witnesses indicated that storage of spent fuel would range from 0.045 to .37 mills per kilowatt hour of electricity produced in 1976 dollars; spent fuel transportation would range from 0.03 to 0.25 mills/kwh, and final disposal of spent fuel -- assuming reprocessing was not adopted -- would cost between 0.15 and 0.88 mills/kwh. The total cost for these three operations was estimated to range from 0.225 to 1.5 mills/kwh. One mill is $.001, or one-tenth of a cent. The basic cost to produce nuclear-powered electricity in 1976 -- including fuel, capital costs, and operation and maintenance -- averaged 14.6 mills/kwh.

LEGISLATION

In the absence of Administration waste management policy, a number of legislative initiatives have been pursued in the 96th Congress, and a number of hearings on some of them have been held.

Several bills deal with the issue of State approval of the location of waste repositories in their jurisdictions. Among them are H.R. 1071 (Moakley) and S. 701 (Cochran), which require DOE announcement of any review of a location within a State for a waste storage facility; and H.R. 1791 (Hanley), H.R. 2762 (Seiberling), S. 594 (McGovern), S. 1360 (Domenici), S. 1443 (Durkin), and H.R. 5923 (Carr), which would give varying amounts of power to State authorities in dealing with the Federal Government on waste facility siting.

Other bills deal with the organization and development of waste management programs, including H.R. 3298 (Jeffords), H.R. 1852 (Goldwater), S. 685 (Jackson), S. 742 (Percy), S. 1521 (Randolph and Hart), and S. 1821 (Mathias).

The Administration's bill to provide for Government possession of spent fuel stored in AFR facilities was introduced by request by Senator Hart (S. 798) and Mr. Udall (H.R. 2611).

Mr. Lundine introduced H.R. 3193 to establish demonstration projects for

disposal of high-level waste at West Valley.

HEARINGS

U.S. Congress. House. Committee on Interior and Insular Affairs. Oversight hearings on nuclear energy---overview of the major issues. Hearings, 94th Congress, 1st session. Washington, U.S. Govt. Print. Off., 1974.
Part I. Hearings held on waste management, Apr. 29, 1975. "Serial No. 94-16."

U.S. Congress. House. Committee on Government Operations. Hearings, 94th Congress, 2d session, on low-level radioactive waste disposal. Feb. 23, Mar. 12, and Apr. 6, 1976. Washington, U.S. Govt. Print. Off., 1976.

——— Radioactive waste disposal problems. Hearing, 94th Congress, 2d session, Sept. 17, 1976. Washington, U.S. Govt. Print. Off., 1976.

----- Nuclear power costs (parts 1 and 2). Hearings, 95th Congress, 1st session, Sept. 20, 21, and 22, 1977. Washington, U.S. Govt. Print. Off., 1978.

U.S. Congress. House. Committee on Science and Technology. Subcommittee on Fossil and Nuclear Energy Research, Development and Demonstration. 1978 ERDA Authorization. Nuclear energy. Hearings, 95th Congress, 1st session, Feb. 23, 24, 25; March 3, 4, 8, 31, 1977. Volume III: 230-282. Washington, U.S. Govt. Print. Off., 1977.

U.S. Congress. Joint Committee on Atomic Energy. Subcommittee on Legislation. ERDA authorizing legislation, fiscal year 1976. Hearings, 94th Congress, 1st session. Washington, U.S. Govt. Print. Off., 1975. Part 2. Hearings on fusion power; biomedical and environmental research; operational safety; waste management and transportation. Feb. 18, 27, 1975.

----- ERDA authorizing legislation, fiscal year 1977. Hearings, 94th Congress, 2d session, on fission power reactor development, space nuclear systems, and nuclear waste management. Feb. 4, 1976. Washington, U.S. Govt. Print. Off., 1976. Part 2.

----- Storage and disposal of radioactive waste. Hearings, 94th Congress, 1st session, on waste management. Washington, U.S. Govt. Print. Off., 1975. Nov. 19, 1975.

----- Radioactive waste management. Hearings, 94th Congress, 2d session, May 10, 11, and 12, 1976. Washington, U.S. Govt. Print. Off., 1976.

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U.S. Congress. House. Committee on Armed Services. Authorizing Appropriations for the Department of Energy for National Security Programs for Fiscal

Year 1979. Report to accompany H.R. 11686. May 3, 1978. Washington, U.S. Govt. Print. Off. (95th Congress, 2d session. House. Report no. 95-1108)

U.S. Congress. House. Committee on Government Operations. Nuclear power costs. Report, together with additional, minority and dissenting views. Apr. 26, 1978. Washington, U.S. Govt. Print. Off. (95th Congress, 2d session. House. Report no. 95-1090)

U.S. Congress. House. Committee on Interstate and Foreign Commerce. Authorizing appropriations for certain civilian programs of the Department of Energy for fiscal year 1979. Report, to accompany H.R. 12163. May 19, 1978. Washington, U.S. Govt. Print. Off. (95th Congress, 2d session. House. Report no. 95-1078, part 3)

U.S. Congress. House. Committee on Science and Technology. Subcommittee on Fossil and Nuclear Energy Research, Development and Demonstration. Authorizing appropriations for the Department of Energy for fiscal year 1979. Report, together with additional views, to accompany H.R. 12163. Apr. 20, 1978. Washington, U.S. Govt. Print. Off. (95th Congress, 2d session. Report no. 95-1078, part I)

CHRONOLOGY OF EVENTS

02/12/80 -- President Carter issued comprehensive nuclear waste policy statement.

12/00/79 -- Beatty low-level waste facility reopened.

11/19/79 -- Hanford, Washington, commercial low-level waste burial ground reopened.

10/25/79 -- Beatty, Nevada, low-level waste burial ground closed.

10/04/79 -- Hanford, Washington, commercial low-level waste burial ground closed.

03/00/79 -- Interagency Review Group on Nuclear Waste Management submitted Final Report.

11/17/78 -- Nuclear Regulatory Commission published proposed policy statement and licensing procedures for high-level radioactive waste repositories.

11/15/78 -- Environmental Protection Agency published proposed Criteria for Radioactive Wastes.

11/08/78 -- President signed Uranium Mill Tailings Control Act of 1978 (P.L. 95-604) to assess and remedy problems with inactive uranium processing sites.

10/00/78 -- Interagency Review Group on Nuclear Waste Management issued draft report recommending licensing and construction of "Intermediate Scale Facilities" for

disposal of nuclear wastes.

02/00/78 -- DOE issued task force report on waste management describing proposed Waste Isolation Pilot Plant (WIPP) near Carlsbad, New Mexico.

10/18/77 -- Carter Administration proposed Government ownership and storage of spent fuel from nuclear reactos as a means of dealing with waste management problem.

09/29/77 -- Council on Environmental Quality member Gus Speth recommended a halt in licensing nuclear reactors if waste management program were not developed and demonstrated.

04/25/77 -- ERDA official announced proposal for surface storage of spent nuclear reactor fuel.

04/07/77 -- President Carter announced policy of "indefinite deferral" of reprocessing spent nuclear fuel.

12/02/76 -- ERDA announced plans to survey 45 states for possible disposal sites, and to construct up to 6 waste repositories.

10/28/76 -- President Ford called for "demonstration" of "all components of waste management technology by 1978," and "a complete repository for commercial high-level nuclear wastes" by 1985.

03/12/76 -- NRC suspended license of low-level burial ground at Beatty, Nev., after discovering that radioactively contaminated equipment had been taken off-site instead of being buried.

01/23/76 -- ERDA budget request for FY77 included six-fold increase in commercial waste management R&D.

01/12/76 -- GAO issued report critical of low-level waste disposal procedures.

04/11/75 -- ERDA announced its intention to prepare an expanded environmental impact statement on management of commercial high-level wastes and transuranium-contaminated waste. Pending completion of this review, ERDA withdrew its FY76 budget request for authorization and partial funding of the retrievable surface storage facility (RSSF).

11/00/74 -- EPA stated that AEC's EIS on radioactive nuclear waste management is inadequate, primarily because of emphasis on interim, rather than permanent, disposal programs.

11/12/74 -- AEC held public hearing on its draft environmental impact statement on management of commercial high-level and transuranic radioactive waste.

10/24/74 -- Natural Resources Defense Council, Inc. (NRDC) and the Sierra Club issued a joint statement critical of the AEC's

draft EIS on waste disposal and requested a new impact statement that will "fully disclose the hazards and costs."

09/12/74 -- AEC issued, for public comment, a draft environmental statement on management of commercial high-level and transuranic radioactive waste. (WASH-1539)

09/11/74 — AEC issued proposed regulations on transuranic waste disposal (39 FR 32921).

12/05/73 -- EPA stated that the 115,000-gallon leak at Hanford did not endanger public health.

11/14/73 -- Another 7,000-gallon leak of high-level radioactive waste occured at Hanford.

07/30/73 -- AEC issued a report on causes of 115,000-gallon leak of high-level liquid wastes from tank at Hanford. Tank corrosion was cited.

ADDITIONAL REFERENCE SOURCES

Battelle Pacific Northwest Laboratories. High-level radioactive waste management alternatives (BNWL-199), Richland, Washington, May, 1974. 4 vol.

----- Alternative processes for managing existing commercial high-level radioactive wastes. Prepared under ERDA contract for the Nuclear Regulatory Commisssion. (NUREG-0043) Richland, WA, April 1976.

Bredehoeft, J.D., et. al. Geologic disposal of high-level radioactive wastes -- earth-science perspectives. U.S. Department of the Interior. Geological Survey circular 779. Washington: 1978.

Hill, Sir John. Nuclear power in the public eye. Atom 257. March 1978: 46-55.

National Research Council, Panel on Land Burial. The shallow land burial of low-level radioactively contaminiated solid waste. Panel on Land Burial, Committee on Radioactive Waste Management, Commission on Natural Resources, National Research Council. Washington, National Academy of Sciences, 1976. 150 p.

----- Panel on waste solidification. Solidification of high-level radioactive wastes. Committee on Radioactive Waste Management. Commission on Natural Resources. The National Research Council. National Academy of Sciences. Prepublication edition.

U.S. Atomic Energy Commission. High Level Radioactive Waste Management Alternatives. (WASH-1297). Washington, May, 1974. 81 p.

----- Management of commercial high-level and transuranium-contaminated radioactive waste (Draft Environmental Statement) (WASH-1539). Washington, September 1974.

U.S. Council on Environmental Quality. News release. ("A member of the Council...urged today...) Sept. 29, 1977.

U.S. Department of Energy. Directorate of Energy Research. Draft report of Task Force for Review of Nuclear Waste Management. (DOE/ER-0004/D). February 1978.

----- Report to the President by the interagency review group on nuclear waste management. Draft. (TID-28817). October 1978.

U.S. General Accounting Office. Improvements needed in the land disposal of radioactive wastes—a problem of centuries. Report to the Congress by the Comptroller General of the United States. Washington, Jan. 12, 1976. (RED-76-54)

----- Nuclear energy's dilemma: disposing of hazardous radioactive waste safely. Report to the Congress by the Comptroller General of the United States. Washington, Sept. 9, 1977. (EMD-77-41)

League of Women Voters of the United States

[redacted]

CRITERIA FOR HAZARDOUS AND NUCLEAR, INCLUDING LOW-LEVEL RADIOACTIVE, WASTE DISPOSAL OR STORAGE SITES

Hazardous and nuclear waste management shall ensure safe disposal or storage with no contamination of groundwater, surface waters, soils or release into the air.

To ensure safe disposal:

- --No disposal or storage sites shall be located in natural hazard areas such as floodplains, areas with high seismic or volcanic activity, areas of unstable geologic, ice or snow formations, or areas subject to extensive damage from hurricanes.

- --There should be an examination of alternative sites, methods of storage and methods of treatment.

- --Both on and off site monitoring for contamination of ground and surface waters and soils are of the utmost importance.

- --Containers should be designed to prevent leakage of the material stored or disposed of.

- --When containers are stored there should be regular inspections for possible leakage.

Siting of waste disposal or storage facilities should not take place in areas of critical concern which include:

- --Drinking water supply sources such as reservoirs and other storage facilities and sole source aquifers and watersheds.

- --Fragile land areas such as shorelines of rivers, lakes and streams; estuaries and bays or wetlands.

- --Where there are rare or valuable ecosystems or geologic formations, significant wildlife habitat or unique scenic or historic areas.

- --Areas with significant renewable resource value, such as prime agricultural lands, aquifer or aquifer recharge areas, significant grazing and forest lands.

The waste siting decision-making process should provide for:

- --Ample and effective public participation, including adequate funding for such participation.

--Economic, social and environmental impacts statements so that both decision makers and the public have information on which to base a decision. Secondary land use demands, in addition to the actual site, should be considered--roads, sewers, water, etc.

--Sites selection in conformance with any adopted comprehensive plan--an example would be an adopted Coastal Zone Management Plan.

--Participation and review by all governmental levels to assure conformance with comprehensive plans at each level of government.

--Procedures for mediation of intergovernmental conflicts.

Pat Bruno

[redacted]

memorandum

This is going on DPM

April 1, 1980

TO: State and Local League Presidents

FROM: Ruth J. Hinerfeld, President; Hester P. McNulty, Natural Resources Coordinator; and Dorothy K. Powers, Energy Chair

RE: Guidance on Nuclear Issues Under Positions of the League of Women Voters of the United States

At its March 1980 meeting, the national board spent much time considering nuclear waste issues and making decisions on how to achieve the goals of national positions as they relate to nuclear waste. The board's decisions supplement those made at its June 1979 meeting on guidelines for action to achieve the energy position goal of not increasing reliance on nuclear fission. This memo summarizes the decisions made to date, the reasons for those decisions, and the actions state and local Leagues may take on the following topics: 1) nuclear power plants, 2) final and interim nuclear waste management, 3) processes for deciding on nuclear waste disposal and storage, and 4) the relationship between nuclear power and nuclear waste. Enclosed with this memo are criteria for specific nuclear and hazardous waste disposal and storage sites.

Delegates to convention may wish to bring this memo with them to convention workshops.

I. Nuclear Power Plants

A) State and local Leagues may oppose licensing for construction of nuclear power plants, and may call for a moratorium on such licensing, on the basis of the national energy position.

--The position states that "reliance on nuclear fission (light water reactors) should not be increased." There are now about 70 commercial reactors with operating licenses and about 90 reactors with construction licenses but without operating licenses. The completion of just those plants which already have construction licenses would substantially increase reliance on nuclear power. Therefore, Leagues may oppose licensing for construction of new plants.

B) State and local Leagues may oppose licensing for operation of those plants now under construction on a case-by-case basis, as outlined in the Guide for State and Local League Action on the National Energy Position, after notifying the national board.

--Because completion and operation of all those plants which already have construction licenses would increase reliance on nuclear power, Leagues may oppose operating licenses for those plants on a case-by-case basis. Opposing operating licenses for all plants under construction could result in decreasing reliance on nuclear fission. Thus Leagues must make a determination based

on the need for power and available alternatives as called for in the Guide for State and Local League Action on National Energy Position. In other words, opposition to operating licenses must come not only from opposition to increased reliance on nuclear fission, but from the broader context of the entire energy position--reduction in the energy consumption growth rate and use of the preferred alternatives of conservation, renewable resources, and the environmentally sound use of coal.

C) State and local Leagues may support licensing for construction or operation of nuclear power plants only in special cases and only with prior permission from the national board.

--Because it is possible to have some new plants without increasing reliance on nuclear power as a percentage of the total energy mix, the option of supporting new construction or operating licenses is open to Leagues. But because of the underlying presumption that our goal is to minimize reliance on nuclear fission, action in support of a nuclear power plant would have to be based on a very strong case and must have prior approval from the national board.

D) State and local Leagues may call for the closing of operating nuclear power plants because of specific non-generic health and safety problems (e.g., siting on a geologic fault without sufficient protections, use of a particularly bad design) but only with prior permission from the national board.

--This is based on our concern with health and safety problems associated with nuclear fission and is consistent with our environmental concerns. Because we recognize the role nuclear power plays in our current energy mix, opposition to an operating plant must be based on non-generic concerns and be on a case-by-case basis.

Leagues contemplating action under the above strategies should keep in mind that any action almost invariably will impact on areas beyond their jurisdiction. Thus, in all cases, a local League should clear its action with the state League. (For further guidance and information, consult LWVUS publication #161, Action, p. 14, and the Guide for State and Local League Action on National Energy Position, p. 2, which spell out ground rules essential to effective action. This Guide was mailed to state and local Leagues and ILOs in late February 1979. Additional copies are available from the Energy Department of the national office.)

II. Final and Interim Nuclear Waste Management

A) The League supports final disposal of nuclear wastes in an environmentally sound manner.

[Even an optimistic timetable does not provide for a technically and environmentally sound final disposal site for high level wastes from commercial nuclear reactors until 1995. Therefore, an interim storage policy is needed. The technically available choices at this time for interim policy are to 1) maximize storage at reactor sites ("swimming pools"), 2) construct one or more away-from-reactor ("AFR") short term storage facilities, or 3) construct

one or more long term surface storage facilities ("vaults" or "mausoleums").]

B) The League believes that storage of high level nuclear wastes from commercial reactors should be maximized at reactor sites. We also believe that an away-from-reactor short term storage facility should only be built if one is needed to prevent commercial reactors from being forced to cease operations because of waste build up.

1) Maximizing on-site interim storage will reduce the need for transportation of nuclear wastes. Transportation increases the likelihood of accidents which could contaminate surface and underground waters and soil, and, in general, endanger public health.

2) On-site storage is most likely to ensure that utilities responsible for the generation of waste remain financially responsible for its storage and, ultimately, disposal. Maintaining such responsibility is called for by our environmental quality positions, which state that polluters should pay for pollution control and that pollution control should be a cost of doing business.

3) AFR storage could reduce pressure to find an acceptable final disposal site and could divert attention and resources from the final disposal effort.

4) It is expected and hoped that maximizing on-site storage will provide sufficient storage capacity until final disposal is available.

5) Maximizing on-site storage does not mean that storage should continue or be increased at a particular site which does not meet the criteria for storage or disposal sites. (See the attached "Criteria for Hazardous and Nuclear Waste Disposal or Storage Sites.")

C) The League believes that no long term surface storage facilities ("vaults" or "mausoleums") should be constructed.

1) Construction of such a facility would not solve waste disposal problems, and it could postpone solving them. Even more than construction of an AFR, construction of a long term surface storage facility would divert attention from solving the problem of final disposal and reduce the pressure to find a disposal site. Support for such a facility would, therefore, be inconsistent with our support for final disposal and for a solution to waste problems.

2) Construction of such a facility could lead to increased reliance on nuclear fission, proliferating increased waste without addressing a final disposal solution.

a) Long-term surface storage, as opposed to final disposal, provides for retrievability. This, in turn, leaves open the possibility of commercial reprocessing, which would close the nuclear fuel cycle and help put nuclear power on a much firmer footing, leading to increased reliance. Reprocessing would, of course, be counter to US non-proliferation policy.

b) Long-term surface storage might appear to provide a long term "solution" to waste problems while not really solving the problems. This perception could lead to changes in the political situation which would lead to reinstitution of utility plans to increase reliance on nuclear.

3) The perception of a "solution" to nuclear waste problems could well lead to reduced efforts for conservation and development of renewable resources.

4) Siting of a long term surface storage facility would be at least as difficult as siting for a final disposal site. Technical questions would be less important while political ones would be more important. This politicalization of waste issues is not what is needed in the current atmosphere surrounding nuclear issues.

III. Processes for Deciding on Nuclear Waste Disposal and Storage

A) The League supports requirements for full public participation at all levels of government in decision making on nuclear waste management.

B) The League supports giving the states a right to consultation and concurrence in decisions on nuclear waste storage (AFR, "vaults" or "mausoleums") and disposal. We believe this right should not consist solely of a simple power to prohibit disposal or storage. Rather, it should be a process which ensures citizen involvement and careful consideration by states and the federal government <u>together</u>. The process should require, on a site specific basis, concurrence by the state that the site is technically and environmentally sound before the site may be used. At this point in the process, the state should be allowed to prevent the use of a particular site. However, if a state opposes a technically and environmentally sound site, then the Congress should override the state determination by joint resolution.

1) The energy position states that all levels of government should have a voice in the development and implementation of energy strategies. Federal law now preempts state and local law, and the federal government thus may force a disposal site on a reluctant state or locality without regard to technical and environmental issues. Giving states a right of concurrence would change this balance of power, while the override authority would ensure that acceptable sites could be approved.

2) The energy position and the environmental quality positions say that states may set more stringent standards than the federal government. Requiring state concurrence on a particular nuclear waste disposal or storage site is consistent with these positions. National policy objectives which might conflict with state concerns would be protected by use of the joint resolution of Congress to override the state decision.

3) Limiting the concurrence process to specific sites will focus the process on specific technical and environmental concerns rather than allowing an overt political decision to ban all nuclear waste disposal or storage.

4) As a process, concurrence will help ensure greater and more meaningful public participation and thus will lead to better decisions.

IV. The Relationship Between Nuclear Power and Nuclear Waste

--State Leagues may support state legislation that prohibits new licensing for construction or operation of nuclear power plants within their state until such time as a technically and environmentally sound disposal site is licensed for wastes generated by commercial nuclear reactors.

1) The national board has determined that state Leagues may oppose new licensing for construction or operation of nuclear plants in their state based on the energy position (no increased reliance on nuclear fission and priority use of preferred alternative sources) if they wish. As a technique to achieve their goal, state Leagues may opt to support state legislation conditioning licensing on a solution to waste problems.

2) There are several conditions or constraints on support for such legislation:

a) While the national board believes the decision is best left to state Leagues, it also believes such support is not wise because this legislation is likely to bring additional, stronger pressures to find a "solution" to waste problems. A "solution" arrived at under such pressure is more likely to be a political, forced decision than a technically and environmentally sound one. In other words, the legislation is likely to force bad solutions.

b) It must be clear to League members, legislators, and the public that the League position does not condition use of nuclear power on a solution for waste problems, and that League support for legislation linking licensing to such a solution is based on our support for preferred alternatives and our opposition to increased reliance on nuclear fission. In other words, it must be clear that concern about waste problems is only one, and not necessarily the most important, reason for being concerned about nuclear power, and that a "solution" for waste problems would not necessarily cause the League to support licensing for new construction or operation of light water reactors.

c) State Leagues must assure themselves of membership understanding and agreement before supporting such legislation.

Cat Xander

memorandum

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April 1, 1980

TO: State and Local League Presidents

FROM: Ruth J. Hinerfeld, President; Hester P. McNulty, Natural Resources Coordinator; and Dorothy K. Powers, Energy Chair

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B) State and local Leagues may oppose licensing for operation of those plants now under construction on a case-by-case basis, as outlined in the Guide for State and Local League Action on the National Energy Position, after notifying the national board.

--Because completion and operation of all those plants which already have construction licenses would increase reliance on nuclear power, Leagues may oppose operating licenses for those plants on a case-by-case basis. Opposing operating licenses for all plants under construction could result in decreasing reliance on nuclear fission. Thus Leagues must make a determination based

on the need for power and available alternatives as called for in the Guide for State and Local League Action on National Energy Position. In other words, opposition to operating licenses must come not only from opposition to increased reliance on nuclear fission, but from the broader context of the entire energy position--reduction in the energy consumption growth rate and use of the preferred alternatives of conservation, renewable resources, and the environmentally sound use of coal.

C) State and local Leagues may support licensing for construction or operation of nuclear power plants only in special cases and only with prior permission from the national board.

--Because it is possible to have some new plants without increasing reliance on nuclear power as a percentage of the total energy mix, the option of supporting new construction or operating licenses is open to Leagues. But because of the underlying presumption that our goal is to minimize reliance on nuclear fission, action in support of a nuclear power plant would have to be based on a very strong case and must have prior approval from the national board.

D) State and local Leagues may call for the closing of operating nuclear power plants because of specific non-generic health and safety problems (e.g., siting on a geologic fault without sufficient protections, use of a particularly bad design) but only with prior permission from the national board.

--This is based on our concern with health and safety problems associated with nuclear fission and is consistent with our environmental concerns. Because we recognize the role nuclear power plays in our current energy mix, opposition to an operating plant must be based on non-generic concerns and be on a case-by-case basis.

Leagues contemplating action under the above strategies should keep in mind that any action almost invariably will impact on areas beyond their jurisdiction. Thus, in all cases, a local League should clear its action with the state League. (For further guidance and information, consult LWVUS publication #161, Action, p. 14, and the Guide for State and Local League Action on National Energy Position, p. 2, which spell out ground rules essential to effective action. This Guide was mailed to state and local Leagues and ILOs in late February 1979. Additional copies are available from the Energy Department of the national office.)

II. Final and Interim Nuclear Waste Management

A) The League supports final disposal of nuclear wastes in an environmentally sound manner.

[Even an optimistic timetable does not provide for a technically and environmentally sound final disposal site for high level wastes from commercial nuclear reactors until 1995. Therefore, an interim storage policy is needed. The technically available choices at this time for interim policy are to 1) maximize storage at reactor sites ("swimming pools"), 2) construct one or more away-from-reactor ("AFR") short term storage facilities, or 3) construct

one or more long term surface storage facilities ("vaults" or "mausoleums").]

B) The League believes that storage of high level nuclear wastes from commercial reactors should be maximized at reactor sites. We also believe that an away-from-reactor short term storage facility should only be built if one is needed to prevent commercial reactors from being forced to cease operations because of waste build up.

1) Maximizing on-site interim storage will reduce the need for transportation of nuclear wastes. Transportation increases the likelihood of accidents which could contaminate surface and underground waters and soil, and, in general, endanger public health.

2) On-site storage is most likely to ensure that utilities responsible for the generation of waste remain financially responsible for its storage and, ultimately, disposal. Maintaining such responsibility is called for by our environmental quality positions, which state that polluters should pay for pollution control and that pollution control should be a cost of doing business.

3) AFR storage could reduce pressure to find an acceptable final disposal site and could divert attention and resources from the final disposal effort.

4) It is expected and hoped that maximizing on-site storage will provide sufficient storage capacity until final disposal is available.

5) Maximizing on-site storage does not mean that storage should continue or be increased at a particular site which does not meet the criteria for storage or disposal sites. (See the attached "Criteria for Hazardous and Nuclear Waste Disposal or Storage Sites.")

C) The League believes that no long term surface storage facilities ("vaults" or "mausoleums") should be constructed.

1) Construction of such a facility would not solve waste disposal problems, and it could postpone solving them. Even more than construction of an AFR, construction of a long term surface storage facility would divert attention from solving the problem of final disposal and reduce the pressure to find a disposal site. Support for such a facility would, therefore, be inconsistent with our support for final disposal and for a solution to waste problems.

2) Construction of such a facility could lead to increased reliance on nuclear fission, proliferating increased waste without addressing a final disposal solution.

a) Long-term surface storage, as opposed to final disposal, provides for retrievability. This, in turn, leaves open the possibility of commercial reprocessing, which would close the nuclear fuel cycle and help put nuclear power on a much firmer footing, leading to increased reliance. Reprocessing would, of course, be counter to US non-proliferation policy.

b) Long-term surface storage might appear to provide a long term "solution" to waste problems while not really solving the problems. This perception could lead to changes in the political situation which would lead to reinstitution of utility plans to increase reliance on nuclear.

3) The perception of a "solution" to nuclear waste problems could well lead to reduced efforts for conservation and development of renewable resources.

4) Siting of a long term surface storage facility would be at least as difficult as siting for a final disposal site. Technical questions would be less important while political ones would be more important. This politicalization of waste issues is not what is needed in the current atmosphere surrounding nuclear issues.

III. Processes for Deciding on Nuclear Waste Disposal and Storage

A) The League supports requirements for full public participation at all levels of government in decision making on nuclear waste management.

B) The League supports giving the states a right to consultation and concurrence in decisions on nuclear waste storage (AFR, "vaults" or "mausoleums") and disposal. We believe this right should not consist solely of a simple power to prohibit disposal or storage. Rather, it should be a process which ensures citizen involvement and careful consideration by states and the federal government together. The process should require, on a site specific basis, concurrence by the state that the site is technically and environmentally sound before the site may be used. At this point in the process, the state should be allowed to prevent the use of a particular site. However, if a state opposes a technically and environmentally sound site, then the Congress should override the state determination by joint resolution.

1) The energy position states that all levels of government should have a voice in the development and implementation of energy strategies. Federal law now preempts state and local law, and the federal government thus may force a disposal site on a reluctant state or locality without regard to technical and environmental issues. Giving states a right of concurrence would change this balance of power, while the override authority would ensure that acceptable sites could be approved.

2) The energy position and the environmental quality positions say that states may set more stringent standards than the federal government. Requiring state concurrence on a particular nuclear waste disposal or storage site is consistent with these positions. National policy objectives which might conflict with state concerns would be protected by use of the joint resolution of Congress to override the state decision.

3) Limiting the concurrence process to specific sites will focus the process on specific technical and environmental concerns rather than allowing an overt political decision to ban all nuclear waste disposal or storage.

4) As a process, concurrence will help ensure greater and more meaningful public participation and thus will lead to better decisions.

IV. The Relationship Between Nuclear Power and Nuclear Waste

--State Leagues may support state legislation that prohibits new licensing for construction or operation of nuclear power plants within their state until such time as a technically and environmentally sound disposal site is licensed for wastes generated by commercial nuclear reactors.

1) The national board has determined that state Leagues may oppose new licensing for construction or operation of nuclear plants in their state based on the energy position (no increased reliance on nuclear fission and priority use of preferred alternative sources) if they wish. As a technique to achieve their goal, state Leagues may opt to support state legislation conditioning licensing on a solution to waste problems.

2) There are several conditions or constraints on support for such legislation:

a) While the national board believes the decision is best left to state Leagues, it also believes such support is not wise because this legislation is likely to bring additional, stronger pressures to find a "solution" to waste problems. A "solution" arrived at under such pressure is more likely to be a political, forced decision than a technically and environmentally sound one. In other words, the legislation is likely to force bad solutions.

b) It must be clear to League members, legislators, and the public that the League position does not condition use of nuclear power on a solution for waste problems, and that League support for legislation linking licensing to such a solution is based on our support for preferred alternatives and our opposition to increased reliance on nuclear fission. In other words, it must be clear that concern about waste problems is only one, and not necessarily the most important, reason for being concerned about nuclear power, and that a "solution" for waste problems would not necessarily cause the League to support licensing for new construction or operation of light water reactors.

c) State Leagues must assure themselves of membership understanding and agreement before supporting such legislation.