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FLUOR DANIEL FERNALD

PUBLIC HEARING

PROPOSED PLAN FOR REMEDIAL ACTIONS AT
SILOS 1 AND 2

APRIL 25, 2000
6:30 P.M.

Alpha Building
10967 Hamilton-Cleves Highway
Harrison, Ohio

000001

MR. STEGNER: Good evening everyone and thanks for coming. My name is Gary Stegner, I work in Public Affairs for the Department of Energy at Fernald.

The purpose of the meeting tonight is to conduct a formal public hearing on the revised proposed plan for Fernald's Operable Unit 4, which includes Silos 1 and 2, also known as K-65 silos. I want to emphasize that the scope of tonight's meeting is exclusively OU-4, and that is the subject we will be discussing for the duration of the meeting.

With me tonight are Nina Akgunduz. She's the Department of Energy's Project Manager for the silos project, and Terry Hagen, who is the Fluor Fernald Vice President for Site Closure.

I try to remind everybody to please sign the attendance roster, and if you have, I appreciate that. Also hope you've indicated whether or not you want to speak this evening during the formal public hearing portion of tonight. I want to emphasize that you do not have to speak tonight in order for your comments or questions to become part of the public record.

Written comments can be submitted this evening, they can be submitted anytime before the end of the comment period, which is May 18th. You can send those to me at the site or you can fax them to me at the site. My fax number is 648-3073.

We have scheduled two hours tonight to allow maximum time for questions and comments. We'll take more time if necessary. Before we begin the formal public hearing, we will present a brief overview of the project, followed by a short informal question and answer session.

Also with us tonight we have Don Payne and Dennis Nixon, who will be able to answer questions during the informal question and answer period.

Prior to going into the formal public hearing, we will have a break. We will do that a little bit differently. Because this is a formal hearing, we do have a court reporter present. A copy of the transcript should be available in the Public Environmental Information Center within the next two weeks, more or less, and we will let you know when it's in there through one of our mailings.

When we do receive your formal comments, they will be addressed in a formal responsiveness summary. That will be a part of, also part of the Record of Decision document.

You can't hear me? We're turning it up. I'll hold it closer. Is it okay now, Carol?

Is it okay now, folks? Better? Thanks, Carol. Sorry.

With that, let's now go into the overview portion of it. This will take probably -- We'll begin with the video, approximately 12 to 15 minutes. That will be followed by a presentation by Terry, and then an informal question and answer session, and following that we will take a break and proceed to the formal public hearing. So with that, Terry.

(Playing of video.)

MR. STEGNER: This video was produced at the request of stakeholders from Nevada to really present a very succinct overview of the project for their stakeholders.

Following Terry's presentation, we will go into an informal question and answer session. Once we go into the formal public comment slot this evening, we will not be responding at that time. We will simply be in a listening and recording mode then. So if you have questions, please raise them during the informal question and comment period.

We would ask that, in the interest of time, hold your questions until Terry's presentation is completed, and we will respond to all during the informal question and comment period. Terry.

MR. HAGEN: What I'd like to do is summarize the information that was presented in the video and in some instances supplement it with some additional detail against the evaluation criteria that CERCLA requires us to use when we evaluate and select remedies. For those of you who have been with us through this long process, this is going to in essence be a repeat of what we talked about the last time we were together.

The CERCLA decision-making criteria are called the nine criteria, and you see them here. They're broken up into three categories. The first two are called threshold criteria, and what that means is by EPA promulgated regulation you cannot select a remedy that does not meet adequately these two threshold criteria, the first two on the overhead, overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements. If a potential alternative is demonstrated to meet those threshold criteria, then it's eligible for further evaluation against what are called the balancing criteria. That's the next five.

What you are looking for is a qualitative assessment of the trade-offs among those. There's nothing in the guidance that says among these next five balancing criteria one is more important than the other, nor does the guidance tell you how to develop a site specific weighting. It's really dependent upon very site specific circumstances, and it's the job of the responsible party, the stakeholders, and EPA to make those qualitative judgments as to what's the best balance of trade-offs among these five.

Finally, the last two, state acceptance and community acceptance, are called modifying criteria, and where those come in formally, although we have done our best to consider those things to date in developing and presenting the preferred alternative, where those come in formally is as a result of this process where there's a formal public comment period, stakeholders have the opportunity to have their say on what DOE and the regulators have proposed as the remedy, and DOE, as the responsible party, is obligated to consider those comments, make a change in the remedy, if warranted, based on those comments, or at a minimum respond in a responsiveness summary, which becomes part of the Record of Decision to each and every one of those. Since this process isn't done, obviously we don't have any kind of presentation tonight on those.

Let me talk briefly about the two threshold criteria, which you'll see are neutral, which means that it was our assessment that both of the technology families, vitrification and chemical stabilization, did indeed meet the threshold criteria, are eligible for selection under CERCLA, and hence went forward for a more detailed review of how the balancing criteria played out.

What's the basis for saying both

alternatives meet the threshold criteria starting with overall protection of human health and the environment? First, from a Fernald perspective, all of the materials that are contaminated with metals and radiological contaminants above health based levels are taken up, taken out of the silos, treated and sent in a safe configuration to the Nevada Test Site for disposal. So from the Fernald perspective, we're taking the contamination up and getting it out of here.

From the perspective of transportation, which we talk about again later, we did calculations as to what risks would be associated with incident-free transportation, in other words, everything went great, no problems. We also did evaluations of what risk would be presented in an accident scenario, what if something went wrong, and both alternatives, although there are differences which we'll come to here in a little bit, both were well within the CERCLA range of acceptable risk.

And then, finally, disposal at the Nevada Test Site, long-term protection is provided there by, number one, the treatment, which immobilizes the lead, the primary contaminant of concern for the purpose of treatment; the combination of the treatment containerization and disposal at depth mitigates radon attenuation, which is the other significant contaminant of concern, and that combined with the isolated location and access controls that go along with the Nevada Test Site provide for the protection there. And here in a minute when we get into the balancing criteria, the first one is long-term effectiveness and permanence, and as you saw on the slide that I just had, we rated those neutral, both performing approximately the same. The arguments that I just presented apply there as well. That's also the basis under that criterion for rating them as providing equal and adequate long-term protection.

Compliance with ARARs, which are applicable or relevant and appropriate requirements, another threshold, again our assessment has concluded that both alternatives adequately satisfy all ARARs. Most notably is the NESHAP Subpart Q radon flux limit, which is met adequately for both alternatives, and we'll talk about radon attenuation here again in a few moments. The treatment under vitrification adequately provides radon attenuation, a combination of packaging and disposal. The whole alternative provides compliance with that ARAR for stabilization.

As far as all transportation requirements, Department of Transportation requirements, those will be met. Our analysis indicates that they can be met. And as far as siting requirements, engineering, other action specific requirements, again the consensus was that both alternatives could meet all identified ARARs, which means that both alternative families, both technology families, vitrification and chemical stabilization, are acceptable for further evaluation against the balancing criteria. I just talked about this.

And again the same argument that both alternatives adequately protect human health and the environment also apply in our evaluation of long-term effectiveness and permanence. We get it out of here, treat the materials such that the lead is immobilized, and get it into the ground in a stable disposal configuration in an arid, remote environment with access controls to minimize any kind of long-term environmental impact.

Now, of the five balancing criteria, it was our assessment, and let me define who "our," when I say "our," who I'm talking about. Certainly DOE, working with both US and Ohio EPA, as well as receiving input from the Department of Energy Independent Review Team and the Critical Analysis Team, basically felt that there were three primary discriminators, and subsequent interface with the stakeholders, especially with FRESH and the CAB, I think tended to validate that, that, as we just talked about, long-term effectiveness and permanence was neutral.

We'll get to cost, which is important but not substantially different among the alternatives, so there was really nothing there that said there's a basis for selecting one over another.

We did see what we felt were meaningful differences between the two technologies in the next three balancing criteria that I'm going to talk about. The first one is reduction of toxicity, mobility, or volume through treatment.

The overall conclusion of the groups that I referenced earlier is that there is a clear advantage in this criteria for vitrification, and it's primarily related to the treated waste volume, and I'll reference where the arrows fall here in a little bit.

But to move on, roughly because of the nature of the process, the treated volume and then the packaged volume and the amount of material on the road and going into the ground in Nevada is roughly three times greater for the chemical stabilization technologies than the two representative vitrification technologies. And that's primarily because as part of chemical stabilization you add things, additives, chemical additives that achieve the chemical immobilization process, coming along with it a fairly significant volume increase.

Vitrification, by the nature of that technology, actually reduces the volume. So this right here is the bottom line for why we felt there was a clear advantage to the vitrification technology family on the overall criterion of reduction of toxicity, mobility, and volume through treatment.

A couple of other things were evaluated, the first one being secondary waste generation. We're showing an advantage to chemical stabilization for that. However, it's not significant, not a discriminator, not something that undoes or overrides or even erodes the significant advantage of vitrification relative to the treated volume. You can see they're about the same.

Our assessment is that the actual secondary waste produced by vitrification are going to be a little harder to deal with, we'll probably have some mixed waste associated with the refractory brick, and because of the high temperature aspect of the operation, some of the off-gases are expected to be a little bit more difficult to deal with. For instance, we're going to fully liberate the radon that is contained in these wastes, whereas that won't be the case with chemical stabilization, but not a significant discriminator.

Reduction in mobility of COCs, let me just say quickly we rated that as neutral, the reason being is that testing data that came back from our proof of principle testing for both technology families with all four representative technologies adequately treated the lead, the RCRA metals, which is the primary treatment objective.

The second contaminant of concern that we're looking at in evaluating what treatment does in relationship to is radon. There is a significant advantage for the vitrification technology for reduction of radon emanation. If you look at the results of our proof of principle testing, basically what that showed is, I referenced earlier the NESHAP, Subpart Q ARAR for radon flux, the treatment through vitrification alone achieves that ARAR. For chemical stabilization, while there is a reduction of radon attenuation through treatment, to achieve that ARAR, we got to do it through a combination of treatment and packaging. So there was an advantage there for vitrification, which again promoted the overall conclusion of reduction of toxicity, mobility, and volume through treatment in favor of vitrification.

The second discriminating balancing

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criteria is called short-term effectiveness, in which we have judged there to be an advantage to chemical stabilization, broken up in several parts. The first one is worker risk, and to summarize some things you heard on the video, the radiological dose that we calculated for on-site workers is about the same. That's not the differentiator here. A little later in the package on implementability I'm going to show a graphic that shows number of hours worked, and what you're going to see is roughly it takes, our current estimate is about 16,000 work hours to implement vitrification, whereas, depending on which representative technology of chemical stabilization, there's going to be anywhere from 7,000 to 10,000. So there's a reduced number of operating hours, which statistically translates to a lower probability of some kind of accident during operation.

The second thing has to do with worker risk in an upset mode, in which something goes wrong and we've got to go in under let's say nonroutine circumstances and do something about it. As you recall, these are going to be remote

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technologies. Maintenance, however, is direct contact. Because of the high temperature, high voltage operation, we think there are greater risks for workers associated with maintenance and upset conditions for the vitrification technology. So that's the worker risk aspect of this.

The second aspect of short-term effectiveness is transportation risk, where we judge there to be an advantage for vitrification, and it links back to the exact same piece of data that I gave for reduction of toxicity, mobility, and volume. There's about a third less volume of material for vitrification that has to be shipped over the highways. That directly results in about a third of the statistical chance of some kind of accident happening. So, therefore, we judge there to be an advantage in this for vitrification.

A couple of others notes, neither of which undoes the conclusion that I just said, is that the calculated transportation risk for both technologies, including in an accident scenario, were within the CERCLA guidelines, I mentioned that up front, for overall protection of human health and the environment. And, second, one of the

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things that was of interest to our stakeholders in Nevada is that because with vitrification you are essentially consolidating that waste -- consolidation isn't the right word -- concentrating that waste, I'm sorry, the radioactivity associated with the treated material isn't going away, it actually becomes more concentrated. So the dose associated with the treated material is actually higher in chemical stabilization because in effect you're diluting it by adding those additives. So in the event, which we think is the unlikely event, of some kind of an accident scenario where it would come out of the container, out of the packaging, it would be -- it would represent a higher risk to response workers because of that higher dose radon contact.

Off-site environmental impacts were judged to be neutral. And we do recognize that there's a higher volume for the chemical stabilization materials, but the basis of that statement is that it's going into a highly impacted area that has been designated for disposal of this type of material. Hence, approximately neutral. There's no meaningful difference in the long-term impact between the two at the Nevada Test Site.

Finally, time to achieve protectiveness, based on the data that came back from the proof of principle testing, there was roughly, I think it was about ten months, as I recall, an advantage to chemical stabilization on the up front design, construction, and start-up that allowed that technology to finish sooner. That's a fairly slight difference, but there was a perceived advantage for chemical stabilization there.

The third discriminating criteria of the balancing criteria is implementability, where we have judged there to be an advantage to chemical stabilization. Let me go back and repeat something that the video said. Implementing any of these technologies is going to be a challenge. They've all got their unique aspects that are not going to be easy. Chemical stabilization, for instance, done in a remote environment is not going to be easy. That's the input that we received from our independent reviewers, to a lesser extent our vendors, and that we recognized ourselves. So I don't want anybody to leave with the impression that we're suggesting that it's a slam dunk for chemical stabilization because we're suggesting there's an advantage. Just that when compared against vitrification, it does appear to be more implementable.

What's the basis of that, scaleup neutral? Why are we declaring that neutral? Because for the vitrification technologies, there are instances where there have been applied commercially, not in a radioactive environment, but where there have been applied commercially at a scale actually greater than what we think we need here to get the job done in a timely fashion and numerous instances where chemical stabilization has been applied at a scale that we require here. But since we did find in the real world applications of vitrification where it had been done at the scale, it was rated as neutral.

Commercial demonstration, and we have judged there to be an advantage for chemical stabilization there. As we've talked about in past meetings, what we did was is did a survey of the DOE complex, actually extended that to radioactive waste treatment worldwide, and then also looked

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across the range of SuperFund Records of Decisions, corrective actions under RCRA, and to a lesser extent remedial actions overseen by the Nuclear Regulatory Commission. There were a dramatically larger number of instances to where chemical stabilization had been applied. And a relatively small, and in some instances no applications of the vitrification technologies at the scale that we need in a radioactive environment.

Now, let me go back and repeat what I said at the outset. There are a couple of famous failures of chemical stabilization at the DOE complex that people know about. This is not suggesting that it's a slam dunk. It's simply saying that when reviewed by literature, going through the DOE complex, et cetera, there are a lot more instances to where chemical stabilization has been applied, applied in similar circumstances successfully, which is something that the EPA guidance does ask us to look at and does judge to be a meaningful decision-making input.

Operability is again a subcomponent of implementability that we judged there to be an advantage for chemical stabilization. Put simply, if you look at the unit operations associated with chemical stabilization versus vitrification, there are fewer of them, and that it is our judgment, again looking with DOE, the regulators, with input from our vendors and independent review teams, that they are generally more easy to control. And in addition, there being fewer of them, that in a nutshell is really the quantifiable basis for saying that we think that chemical stabilization technologies will be more readily implementable based on the operability criteria.

Something that we also mentioned earlier is that while implementing these technologies will be remote for standard operations, in an upset condition or for routine maintenance, that's going to be direct contact where actually we have to send workers in there, and we think because of the high temperature, high voltage aspects of vitrification, it's going to be more difficult to do in a safe, timely fashion whatever we need to do to recover from an upset or the routine maintenance on these things.

To kind of back that up, so to speak, I had mentioned earlier that there's a

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significantly larger number of operating hours required to implement remediation if we use vitrification versus stabilization, and I quoted a couple of numbers. To bring that back to this particular evaluation technology, the message here is that the more these things run with more unit operations, the more hours, the more time that these things have to go, it's our experience and we believe the experience of the DOE complex and industry in general of these technologies that more things happen. That's kind of common sense based on any operation that we work with, the longer the operation takes, the more likelihood that you will encounter some kind of maintenance issues, some kind of operability issue.

The last balancing criteria is cost. I mentioned at the outset that we did not view this as discriminating, costs. That's not to say that cost effectiveness is not important. In fact, it's a statutory requirement that DOE only select, the EPA only select remedies that are cost effective. We're not saying that it's unimportant. What we're saying is that when we did the cost estimating based on the data that we had from industry, the

DOE complex, and our proof of principle testing, there was only about a 15, 16 percent difference. Within the range of accuracy of this stage of the CERCLA process, which is plus 50 percent minus 30, it was judged that that's just not a meaningful difference. So it wasn't a discriminator in this decision-making process. It is generally -- in fact, it is statutorily required that the remedy be demonstrated to be cost effective.

This is a brief summary of what you saw on the video with a little bit of information. The reason we did it is because these are the criteria that we're obligated to use under CERCLA guidance, under EPA guidance to make decisions. Hopefully it's nothing really new. I believe it matches directly what we've talked about in the past.

That does conclude the presentation that I've got. I think we're ready for Q&A, Gary.

MR. STEGNER: I want to emphasize that if you have questions that you want responded to, now is the time to ask those questions. If you've not received an answer to your question so far tonight or in a previous meeting and you want clarification on a matter, please raise those questions now. Again, we will not be responding to questions during the formal comment period. JoAnne.

MS. WILSON: My name is JoAnne Wilson, and I live in Fairfield, Ohio. Can you tell us how long it is going to take to develop, build the containment buildings that will surround the silos that you'll use for either one of the passages? What time frame are we looking at, and is the money already funded for this part?

MR. STEGNER: Yes, we can answer that, JoAnne.

MR. HAGEN: We're pulling out a slide right now to try to answer that question. I'm not sure if this is what she asked, by the way.

For the alternatives that are being considered in the FS, this is a breakdown of how long we have estimated at this point in time, using the data that's come back from the proof of principle testing and also our review of application of these technologies from around the complex, you see roughly about 120 months.

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What this breaks down, the first -- just to take these in order -- the first block of time is how long we estimate that it will take to design the treatment technology fully, incorporating public involvement and regulatory review and approval. Then we move on to construction. That roughly takes a little over a year and a half for that design process. Moving on to construction, a similar amount of time, about a year and a half. The next stage is once the system is constructed, we don't go to operation until we fully shake down, is my term, until we've demonstrated that we know exactly how to operate this thing right, safely, and efficiently. And then the next stage is actual operations. Right now we're showing that as three years. Our input from vendors from both families is that if we've got adequate funding, we can do it faster, either by upping the capacity of the unit operations as we've assumed in the FS or by adding additional processing capability. The last parts of the process are a little bit of contingency for uncertainty, you know, everything doesn't always go great, so we've added some contingencies with scheduling. And, finally, safe shutdown of the facilities and disposal goes in a safe manner.

Where the difference is, you know, it's a few months here and there, but primarily there was about five or six months advantage to the chemical stabilization technologies in the start-up phase and then a few months here and there, adding up to about a year of estimated schedule advantage for the chemical stabilization alternatives.

Now, that's the answer relative to the alternatives that are under consideration for treatment. I had interpreted your question to be related to our advanced waste retrieval project in taking it out of the existing silos and putting it into a safe, homogenized configuration which facilitates treatment and also improves upon the stability of the storage configuration over what's in the silos. So in case I interpreted that right, Dennis, do you want to give a brief update on where we're at on that.

MR. NIXON: Yes. The state of the art project is currently in design. The operations are scheduled to begin March of 2001, and that would complete in June of '02. So there would be,

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that project would be completed by June of '02.

MS. WILSON: Of '02?

MR. NIXON: Yes.

MS. WILSON: That personally answers my question, but I guess what I'm really trying to get at from you is, there is going to be a containment building of some nature built over the silos sites; is that not correct?

MR. NIXON: No, that's not.

MS. WILSON: Well, the last time when we had our meeting in November there was a concern over when you opened up the silos, and I believe you stated at that time that there would be some type of, and I call it a containment building, you perhaps have another word for it, which would go over the site so that when the silos are opened and the escaping gases, et cetera, would be collected, and I believe you showed several slides showing how the air would be sucked up and treated. So those buildings that -- First of all, what do you -- I'm assuming they would be the same for either project since you would have to open the silos for either.

MS. AKGUNDUZ: I'll take that,

JoAnne. What you are referring to is the auxiliary waste retrieval project we have. The structure that you saw from the past meeting is probably the gantry type of thing that's built over the silos to facilitate the deploying the retrieval equipment through the hole top of the silo. Now, in order to retrieve the material, we do have to have a radon control system in operations. The radon control system building is not on top of the silo. It's adjacent to the tanks that we're going to be building that the material is going to be transferred into.

MS. WILSON: So there will be actually nothing over either of the silos?

MS. AKGUNDUZ: Only the equipment room and the structure that is going to support the equipment room.

MR. SCHNEIDER: There's a containment structure around the breach -- I think your question, the answer to your question is, yes, there is a containment structure over the breach in the silos.

MS. WILSON: That's what I thought from the last meeting that there was going to be that, and that is already scheduled, you said it's already being worked on?

MR. NIXON: Right, it's being done right now.

MS. AKGUNDUZ: March 2001 is when the radon control system will be starting to operate. It won't be the time -- when we actually start retrieving the waste out of the silos will be in the year 2002.

MS. WILSON: But you have plans for some type of -- I still say a building, whether it's here or there -- and then along with that process, then, you have also scheduled or are designing or have designed the specialized storage barrels, containers --

MR. SCHNEIDER: Tanks.

MS. WILSON: -- that the material from the silos will go into as a precautionary measure and will wait there until the other material process is chosen to process that; is that correct?

MS. AKGUNDUZ: That's correct.

MS. WILSON: And these are already funded?

MS. AKGUNDUZ: We are -- The way the funds, the funding works is that we are annually funded. Now, these are budgeted; all the scope is budgeted.

MS. WILSON: They're in the budget?

MS. AKGUNDUZ: Yes, they're in the budget.

MS. WILSON: That's probably the word then. And you anticipate the containment affair and the containers would be available then or would be ready to go by 2002, is that your --

MS. AKGUNDUZ: Yes. Material will be, yes, it will be starting, we will be starting to retrieve the material out of the silos in 2002.

MS. WILSON: Is there any difference in these things for either of the methods that are going to be used?

MS. AKGUNDUZ: No.

MS. WILSON: Thank you.

MR. STEGNER: Pam and then Edwa.

MS. DUNN: I just have a couple of quick questions. On your cost comparison, Gary, is transportation part of the waste disposal cost or is transportation cost not reflected in this?

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MR. HAGEN: It's part of the transportation disposal costs, right?

UNIDENTIFIED SPEAKER: Yes.

MR. HAGEN: The answer is yes, it is incorporated into the total cost, and it's reflected into the disposal cost estimate.

MS. DUNN: Is also the cost to dispose it that you have to pay the test site part of that number too, or is that mostly transportation?

UNIDENTIFIED SPEAKER: Most of that is transportation, most of the disposal cost is transportation.

MR. HAGEN: It does include the tip entry at the site as well.

MS. DUNN: On the alternatives or your implementability where you talk about your commercial, did you look at commercial uses outside of the US as well as within?

MR. HAGEN: Yes.

MS. DUNN: There is some success for it outside the US?

MR. HAGEN: Yes, we did. And that's also within -- As an appendix to the FS, we present the results of that survey, and it does specifically mention which international applications we found -- well, we focused on it internationally, but we do include every instance to where we applied it internationally, and that's an attachment, an appendix to the FS.

MS. YOCUM: I just need some clarification. On chemical stabilization CHEM1, is there a wastewater treatment included in that also? I see it mentioned only in CHEM2.

MR. NIXON: Yes, they both have treatment prior to transfer.

MS. YOCUM: Okay, then why isn't one mentioned in CHEM1? I mean, it would be easier than me having to ask the question over and over.

MR. NIXON: Right. The vendor in the proof of principle testing felt that they could treat -- the wastewater at the pump filter press would be clean enough to meet the advance wastewater treatment facility acceptance criteria. But if it doesn't -- that's in the text of the document -- it's stated if they can't meet that, then a wastewater treatment plant would be provided. It was not required for this, for that treatment technology because they were able to demonstrate that in their testing.

MR. HAGEN: One of the things that we will do during the design phase is require additional testing to document conclusively that they meet it or they can't.

MS. YOCUM: That was going to be my next question, how are you going to make sure you can meet that?

MR. NIXON: We're going to give them the future contract, and they will have a very strict waste acceptance criteria for a wastewater treatment facility that they will have to meet. As I said, in this case the vendor was able to meet the criteria without further treatment, but if that's not the case, then they would have to comply with that.

MS. CRAWFORD: Do the costs over and above that, are those reflected in your cost estimates if they have to go forward and use the wastewater treatment facility?

MR. HAGEN: No.

MS. CRAWFORD: I think you should go back and add that number in because if that's the

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case, if you're using wastewater in CHEM2 and probably 1, if they can't meet the WAC, then common sense would tell us the cost estimates are not correct if you've not factored in the extra costs for the wastewater treatment facility. Which is going to probably bring them neck and neck.

MR. NIXON: Well, I can't -- it's difficult to address that. We have what we call operational risk dollars in the cost estimates that is for things of that nature. In the event that the vendor proposal would include wastewater treatment because of the process they are providing, then that would be covered under operational risk at that time. There was about a 16 percent difference between CHEM and VIT, which is a fairly significant number in a wastewater treatment plan of this kind. It would be relatively inexpensive.

MR. HAGEN: These guys always love it when I make these commitments for them, but one thing we can do in the responsiveness summary is do a specific evaluation and document how many dollars would go along with adding a treatment facility, number one, and then make a conclusion as to whether it changes the fundamental evaluation, which is that it's an important but not a discriminating decision-making factor. So we can do that.

MS. CRAWFORD: We ask for those things because too many times, as you all well know, we get down the pike and all of a sudden it's like, oh, well, we forgot this and we need to add that, and it's a little more money here and a little more money there, and then in the long run you haven't saved a whole hell of a lot of money. So I would encourage you to do that.

MR. HAGEN: Okay.

MR. STEGNER: Sir.

MR. DAVIS: I'm Doug Davis from Toledo Engineering. When these materials, treated materials arrive at NTS, what is the time period which you estimate they will require the attention and the maintenance of this test site?

MR. HAGEN: Let me answer it this way: One of the things that we've got to do to be able to get these materials into the ground for permanent disposal at the test site is pass a performance assessment. The life assumed, the life of disposal assumed in that assessment is 10,000 years. So we've got to have a quantitative demonstration that this will remain -- this alternative, if implemented, with either waste form going into the ground at Nevada will remain its protectiveness for at least 10,000 years, and that really, I think it starts to drive some of the -- What that means is that direct intrusion scenarios tend to drive that risk assessment, but we have been working with the Nevada Test Site and have information from them based on specific evaluation of the untreated waste form for starters, and then secondly what our current estimates of what the characteristics of the treated waste form would be, and both would meet the performance assessment requirements based on a 10,000 year life evaluation.

MS. WILSON: What I was asking before, how long do you estimate that the materials, the silo materials will remain in the special containers before either one of the treatments begin?

MR. NIXON: Treatment is scheduled to begin in June of '06 for this process. That's our current based on schedule.

MS. WILSON: For either one?

MR. NIXON: That's correct, for either technology.

MS. WILSON: The building will be in place and it will already be operational by '06?

MR. NIXON: Right.

MS. WILSON: And these containers are -- will be especially built to hold the residue as it now is?

MR. NIXON: They're actually tanks. They're steel tanks, and there's shielding, there's a containment around those tanks of concrete.

MS. WILSON: A concrete protection?

MR. NIXON: Right.

MR. STEGNER: Edwa.

MS. YOCUM: I have one more. This is always a concern to me, is if NTS closes the gates, what happens to this waste, the silo waste, where will it be disposed?

MR. HAGEN: That's not an easy question to answer. The one thing, though, that is clear if you look across the Records of Decision for Fernald, it can't go here. It's not even close to meeting the waste acceptance criteria for an on-site disposal facility. So while I don't have a good answer for you, there's nothing that we've agreed to together that says it can go to Fernald.

MR. STEGNER: Okay. Let's take a short break.

MR. HAGEN: There's another question.

MR. STEGNER: I'm sorry, go ahead.

MR. DAVIS: This will be a very short one. With the materials going to NTS, when the consideration was being made for high level radioactive waste, and I know the materials are significantly different, but the part of the scenario was always the "what if" game played out formally which said, let us assume that the infrastructure to maintain this is gone, and for 10,000 years that may be a reasonable assumption, and so for these materials it was always driven very strongly toward the most durable treatment, you know, not depending on the container. So I was curious if this kind of consideration came up in your discussion?

MR. BECKMAN: As part of the PA

process, we look at inadvertent scenarios, what happens if somebody built a form on top of a waste cell and sinks its well through the disposal. The container brings the stuff up to the surface and eats it.

MR. HAGEN: And they also considered the untreated waste form, right, Steve?

MR. BECKMAN: Right. They don't take credit for the waste form.

MR. STEGNER: Jerry.

MR. GELS: I had a question about the comparative analysis summary. Is the analysis of the treatment technology or the combination of the treatment technology and the burial or ultimate disposal together?

MR. BECKMAN: It's together.

MR. HAGEN: It's together, right.

MR. GELS: It's together, that's what I assumed. So if you wanted to increase your number, you just bury it deeper or in a drier location? That may be -- we're looking at the NTS.

MR. HAGEN: Yes. Particularly as it relates to the radon flux. The depth of burial is an issue there and, yes, it's one of the ways to address that issue. But it does include the entire combination of treatment and disposal.

MR. GELS: Okay. One question I had then was with your long-term evaluation for effectiveness and permanence. The neutral decision goes against everything I've heard before about vitrification versus a cement kind of a product, especially as you point out that 10,000 year scenario, we're talking about -- I don't know of any -- I mean, we found glass materials near volcanoes that have lasted that long, yes, but I've never seen anything that has shown that a cement or concrete product can last 10,000 years.

MR. HAGEN: A couple of things. One is that for chemical stabilization, the immobilization of the lead is not through a physical form like you see in concrete blocks in the building down the road. It's actually the chemical reaction that takes place between the pozzolan type additive and the lead itself. In fact, the test that EPA requires to demonstrate, called TCLP, I forget what the letters stand for, actually grinds the material up, the vitrified material, the stabilized material, chemically stabilized material. So the physical form of the waste is not really what drives the protectiveness, particularly for chemical stabilization, that chemical reaction. So that's the first thing. If there is degradation of the physical consolidated waste form, it doesn't mean that you're losing the immobilization contamination.

Secondly, and, you know, this is a statement that we always say respectfully and carefully in Nevada, but given where it is, it is going in fact into a hole created by an explosion of a nuclear weapon, and with the background and other contamination that is in place, the meaningful difference between what we're putting there compared to what is already there and the degree of impact to the environment is just not, in our mind, this is our conclusion, not forcing it on anybody else, especially the citizens of Nevada, but it's just not a meaningful difference. And, by the way, we haven't gotten, you know, that's generally been accepted by the people in Nevada. So that's why we say it's neutral.

Is there some basis for saying they're different? Yes. Is it a meaningful

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difference in our mind considering that they both achieve the remedial action objective and that the protection for that achievement of the remedial action objective isn't dependent on the physical form of the waste, it's the chemical processes that take place. We don't think there's enough of a difference to say there's an advantage in one direction or another. That's the basis of us calling it neutral.

MR. GELS: I don't necessarily disagree with you on the basis of lead and radon, but you've not mentioned radium in this. Was that evaluated, radium 226 as part of the leachate, leachability?

MR. HAGEN: Yeah, it was evaluated. It was not judged to be -- It is a contaminant of concern, yes, requiring, you know, us to do something from a risk assessment perspective. If you look at what drove the requirement for treatment, that was not a contaminant that required treatment. It was actually just the lead. The second -- and I'm talking from a regulatory perspective. Different stakeholders can have different perceptions, and we respect that, but from a regulatory perspective, the only thing that drove the treatment was the lead and the fact that it is present at leachable concentrations above the RCRA thresholds. That's why we focused on lead and radon, because they both have ARARs that tend to drive the acceptability of disposal as opposed to radium.

MR. BECKMAN: But that's looked at in the PA.

MR. STEGNER: Sir, you had a question?

UNIDENTIFIED SPEAKER: I'm trying to determine which is better, is CHEM1 better than CHEM2 or vice versa?

MR. HAGEN: Well, what we're going to do if ultimately chemical stabilization is selected is not specify any one iteration of chemical stabilization. What we're going to do is require that the successful offeror provide a technology that uses chemical stabilization, but then let the competitive market give us the best version as it applies for these specific wastes. We're not really trying to say that we know enough that one iteration is better.

The reason is because we selected two representative technologies. There are 20 or 30 other different ways to do it out there, and we don't want to make the conclusion that one is better than B because it might produce a false path forward. Okay. We want the best application of chemical stabilization possible out there, the most timely and to a lesser extent cost effective application to come out of a competitive process. That's why we've stayed away from conclusions like which of the two representative technologies are better.

UNIDENTIFIED SPEAKER: Well, it looks like vitrification is dead from everything that I've read, and we just ought to forget about that and concentrate now on the chemical stabilization.

MR. HAGEN: Well, we propose chemical.

UNIDENTIFIED SPEAKER: We still don't know which chemical stabilization is better. So it sounds like you really haven't done your job at this point.

MR. HAGEN: Let me go back and say

what I've just said again, and that is that, well, first, we are proposing chemical stabilization as the technology family. It doesn't mean vitrification is dead, that's why we're here tonight, to get public input. Let's just suppose hypothetically that we do go forward with chemical stabilization. What we're saying is that there are a lot of different ways to implement chemical stabilization that are consistent with the way we define the technology and what a successful vendor would have to offer. We don't want to get into the situation to where we artificially limit the best way to do it by only comparing two or three or four vendors. We want to let the competitive market with people that have demonstrated success with their particular version of the technology come and give us the best application. So we want to stay away from that.

UNIDENTIFIED SPEAKER: Okay. We're still in the very early process then of selecting the best method?

MR. HAGEN: The final vendor.

UNIDENTIFIED SPEAKER: Okay. Reading this material here it looks like you've done the survey, you know, and you've decided on CHEM1 or CHEM2 and you know exactly what goes into that, one has fly ash and the other one doesn't, and so forth and so on, but you may go to something completely different from what you've got here?

MR. HAGEN: Not completely different. It still has to fundamentally be a chemical stabilization technology where you've got to immobilize the lead to RCRA standards using a chemical process that achieves that reduction in mobility through that chemical reaction. So it's not just anything; it's got to be within that technology family, and again, I know I'm repeating myself, what we want is the best application that's available out there in the competitive market from vendors that have demonstrated the ability to do it right.

UNIDENTIFIED SPEAKER: Okay. So in this comment period what are the citizens supposed to do? You haven't really decided the best method yet. What are the citizens supposed to say, vitrification, we don't want that, we want CHEM1 and CHEM2, but of the CHEM1 and CHEM2, we don't know what the best solution is?

MR. HAGEN: We're not attempting, I apologize, I know I'm not being clear, we're not attempting to make a decision or ask you to decide between CHEM1 and CHEM2. We're asking you to give whatever input you want to give, including if you think we have more work to do, tell us that, but what we are specifically asking right now is based on the comparative analysis, that the family of vitrification compared to the family of chemical stabilization, we are proposing chemical stabilization. We want to know what you think of that. I'm not going to tell you how to comment. If you think that there needs to be more public involvement, which there will be, in how we get to the final answer, if you've got particular thoughts on how that public involvement should be structured, what decision points based on what data you want, please comment. But first and foremost, we're asking people to react to our proposal to select some application of chemical stabilization family.

UNIDENTIFIED SPEAKER: I see, okay, as opposed to vitrification.

MR. HAGEN: Yes.

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MR. STEGNER: We'll take two more, you and you.

UNIDENTIFIED SPEAKER: I was going to point out for Jerry, he talked about a city in which the volcanic glass being nationally available and have had long age, cementatious rocks are the same. There's all kind of cementatious rocks, including limestone and sandstones, that have been around for millions of years. So I think you can make that same comparison that way.

The other thing, Terry, you guys have also looked at the radioactive decay of this material. I know lead was the driving factor, but in terms of where it's going into the Nevada Test Site, I think from a radioactive standpoint, due to the decay, you don't need 10,000 years to protect this material, do you?

UNIDENTIFIED SPEAKER: Sure do. It's there for the term.

MR. SCHNEIDER: It's not going to get any less radioactive.

UNIDENTIFIED SPEAKER: In 10,000 years you'll have six half lives of radium 226, so it should decrease, total activity of the radium should decrease by 1/60th.

MR. GELS: More than that.

MR. STEGNER: JoAnne.

MS. WILSON: This brings up a point that the gentleman brought up here, when you were preparing the plans for either method, I believe you said that you consulted with various companies that were both familiar with and competent, appeared to be competent in handling this. Was it from these people -- Was it from these people that you got the general plan for each one of these?

MR. HAGEN: The answer is generically, yes. We mentioned that we conducted proof of principle tests using two representative applications of each technology family. We went out competitively and procured the services of four different companies to go do 72-hour test run for each of the technologies. That is the primary basis of the data that we used to develop the alternatives in the FS. That was not the exclusive basis.

We also went to other places where it's been done in the DOE complex, talked to them. Did literature reviews, and also used some of our

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own experience at Fernald because we have successfully implemented chemical stabilization, on a smaller scale, and we've also gotten experience through the melter, for better or for worse, with vitrification. But having said that, we didn't bias anything with our experience. The primary basis of information was the data from the proof of principles testing.

MS. WILSON: Would these same companies then be considered as possible vendors?

MR. HAGEN: The answer is that any vendor, let's suppose hypothetically it's chemical stabilization, any vendor that can demonstrate qualifications with that particular technology will have an opportunity to bid on the final job. Conversely, if for some reason it changes to vitrification, the same thing applies. Any company that can demonstrate capabilities with that technology will have the opportunity to propose.

MS. WILSON: But I think you also then said that when you chose a vendor, it could quite possibly be up to that vendor to decide how they were going to process material, and it could be a third, fourth or fifth version of say the chemical stabilization.

MR. HAGEN: All within the general, all within the general family, which, a dramatic oversimplification, means you take the material, you add some kind of pozzolanic agent, sometimes it's as simple as a cement derivative, sometimes there are companies that have their own proprietary twist, but in all instances it is the addition of some chemical agent that causes a chemical reaction with your constituents of concern to achieve the remedial action objective. So any offeror has got to be bringing something to the party that works within those constraints.

Where are the opportunities for differences? It's slight differences in the additive. As I said, different companies have their own version of the pozzolanic additive that may work better or worse for certain applications that would have to be demonstrated. They also might have what are fairly minor differences in the way it's mixed, for instance, off-loaded -- I'm sorry, taken out of the mixing agent. In other words, process modifications but the same basic technology.

MS. WILSON: But at the same time you couldn't be sure that the results would be the same as what you were saying in these two alternative chemical stabilization methods?

MR. HAGEN: No, that's right. I think there's a strong basis of confidence that we would achieve the remedial action objectives. Would there be differences in the treated waste form? There might be slight differences in the leachability rate. In all instances they have to meet the lead leachability standard. And there might be slight differences in the radon attenuation reduction because of a particular chemical or additive that they use. It also might result in differences in the volume; rather than, you know, three times, it might be two and a half times more, or it could be three and a half times more. I don't see it getting much out of that envelope. But, yeah, there are going to be differences, but the bottom line won't change, and that is it's going to be a chemical reduction process that has to meet certain specified performance requirements as designated in the ROD, most notably around this reduction of leachability of the RCRA constituents. Those are going to be absolutes.

MS. WILSON: Okay, thank you.

MR. STEGNER: Let's take a break, and we will set up for the formal public comments.

MS. CRAWFORD: Can we take like a really short one because some of us need to leave?

MR. STEGNER: Yeah, we're going to take five minutes, Lisa.

(Brief recess.)

MR. STEGNER: All right, this will begin the formal public comment portion of the evening, the public hearing. I want to restate that we will be doing this in Nevada next week for the stakeholders at the Nevada Test Site.

What we ask you to do is either raise your hand, step up to the microphone, otherwise ask to be recognized this evening. When you begin speaking, we ask that you state your name clearly, simply because this is being taken down for the record.

If you have any written materials that you want to submit this evening, you can also give those to me at that time. If not, those can be sent in separately. As I say, this is being transcribed, so what you say will be on the record anyhow.

The comments, questions that we have here tonight will be compiled into a responsiveness summary, and that will be provided to everyone who has signed in here tonight. We will also put a copy of that in the Public Environmental Information Center as soon as it is ready, and that will probably be within two to three weeks after the end of the public comment period, which again ends on May 18th. With that, we would ask that whoever wants to speak -- I think, Lisa, you had asked to speak early, so please proceed.

MS. CRAWFORD: I need to leave right away.

MR. STEGNER: I understand.

MS. CRAWFORD: Quickly, you've all heard my comments on many other occasions, but to kind of put them in a nutshell tonight is I just want to say that we live in a society of less is better, as we all know, and reduce, reuse, recycle are terms that are stressed at every turn these days. So with that, three times the waste load is

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a little bit mind boggling for me, and it's a little hard for me to comprehend, and the fact that we are sending three times the amount of waste to somebody else's backyard seems a little bit unfair, and it really seems technologically wrong to me. Three times the amount of waste also equals three times the amount of shipments in trucks and, again, those shipments will be traveling on highways and byways across this country.

The waste form in a cement waste form, and I call it solidification, it's cement, sorry, but that's what it is, is not near as protective, in my opinion, as vitrification is. I've not seen a tremendous difference in the cost values. They pretty much look the same to me. I think when we add in some of the possible advance wastewater treatment facility activities, that could possibly bring them in line together.

Some of us have seen and heard the horror stories from around the DOE complexes on the cement issues, and they're not pretty. They can tell me some work, and that's fine, but I've also seen some that don't work, so that's a little scary for us.

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The last thing I want to add is if chemical stabilization is chosen, which it pretty much seems like that's what it's going to be, that I want to encourage everybody involved here that you look very, very hard for ways to lower the waste volumes and to possibly lower those truck shipments. There's new technologies at every turn; every time you turn around there's a new technology out there and old technologies are made better and better, and we would just encourage you to be very watchful of the new technologies as they come down the pike. And that's it.

MR. STEGNER: Thank you. JoAnne.

MS. WILSON: My name is JoAnne Wilson. I'm from Fairfield, Ohio, and I would like to make the following comments.

Some of this will go back to 1995, because I think there are many people in this room who were at meetings at that time, and I think it's very, very important that you realize some of the advances that have been made since that time. In 1995, when it was announced that there was all this radium in the silos, and many scientists and doctors came to see collectively what might be done to preserve this for medical research. However, at that time this was just a -- it was just talk as to what was possible.

I would like to be able to report today in 2000 that Dr. David Scheinberg, who was here at that time and announced a new method of treatment and possible cure, it will take time to see whether it's an absolute cure, of using one of the isotopes that would come from radium, namely bismuth 213, married or connected with an antibody which will target a specific type of leukemia or non-Hodgkin's lymphoma and will carry this tiny Alpha-admitting particle to the cancer cell and will kill it wherever it is in the body. If it has traveled from the site, it will get it. They're called smart bullets, and they have a seek and destroy ability.

The reason I bring this up is that the Sloan Kettering Memorial Institute, Cancer Institute, has been conducting since 1995 various trials, I believe they're at least in phase two, they may be going into phase three. The bismuth 213 has proved to be an excellent cancer killer. It has mated with a number of these antibodies, and it is treating people who are desperately ill with this. Dr. Scheinberg, whom I have spoken with, has chosen the sickest of the patients to treat. Both of these diseases are hard to treat, and he has figured if he can treat and possibly cure these people, then people who are lesser sick can also benefit.

This is not the only type of cancer that is being treated. The only reason I bring this up so strongly is Dr. Scheinberg was here. There's been nothing in the paper as to how successful this has been. There are other people who are working with medical isotopes in the same manner using specific isotopes, and they are working on treatment of ovarian cancer, prostate cancer, lung cancer, brain cancer, and some other noncancerous things such as heart and even the possibility of AIDS treatment. This is a new type of thing. Instead of irradiating the body with radioactive material, you send bits and pieces in. The body is subjected to less, much less trauma, there's no hair loss, there's no nausea, it can even be treated on an outpatient basis.

The reason that I bring this up, too,

is because contained in the radium which is in the two silos are two very important isotopes, medical isotopes which are in short supply and of which the radium which we have here is the largest known supply all over the world. Bismuth 213 and actinium 225 are both very, very valuable, and I would like to speak on the alternative of trying to preserve this radium. Both of these methods, the vitrification and the chemical stabilization, will put this 10 pounds of radium out of use of the medical community. It will be gone, it cannot be used. Some people say that you can take the glass capsules, crush them down and treat them. The cost, from what I've been able to gather, would be extremely prohibitive. The same way, I think the chemical stabilization is even worse in possible retrieval later on, if at all.

I think that the radium here is extremely valuable. I think your presentations tonight have been very, very good and they certainly have been honest ones in that there is no real easy way to treat this material. We wish that there was. Each one of them has a, its own problems, complications, uncertainties I think you were careful to point out, and I think that honesty is good to see.

I have, and I've come to this meeting with an alternative, which I have discussed with other people in the DOE, with scientists out in Hanford, as a method of removing this material completely from the neighborhood in a much less complicated manner, and I would like the DOE and the EPA and all the other involved agencies to consider this. The biggest problem we have is getting it out and my proposal is this: That the contents of the silos be removed as they are with no treatment here, and that in the process or before this, of course, that some agency, some site, some commercial company be either given or sold this, however to take it out of our hands.

There are many companies in this country and in Canada that are very competent in processing radioactive material. They do it all the time. They separate different things out. It's no big deal to them. If this material could be disposed of to such an entity, and I'm not saying that they would be easy to find, I am suggesting that we would, for example, try an entity in Canada. A number of years ago there was a company called, I believe it was Rioalto -- Rioalgum, that's correct, who was interested in the material, and as I understand it, they did -- the problem with them is that they didn't have any method of final disposal of the waste product after they had taken the radium out. I think someone said that they were just going to dump it somewhere, if I remember. If we were able to give, sell, dispose of the material in Canada, for example, and I use Canada because there's a lot of uranium mining being done there, and they know how to care for and process radioactive material, it's no big deal, it's their living. They could decide on the method of separating out the radium from the barium sulfate which is contained in this. If you have to process it, barium sulfate is taken out and then that has to be processed in order to get the radium salts. But once this is done, the material, the residue, the radium can go to a reactor and can be changed into many, many valuable isotopes, medical isotopes, and I stress that. This whole area is just beginning, and I think we would be proud, extremely proud if we could be the source of saving lives of people with various types of cancer.

It may seem like an odd proposal, and I realize that, but our biggest problem here is to get rid of the material in the silos. And I know that there are places that could take it. It's just a question of working with -- finding them and working with them. Perhaps it sounds too simple. What we've heard has been very complicated, very interesting, but very complicated.

So I offer this proposal. I am at this time talking with different people, different mining companies to find their interest, see if there is any. However, I do not believe and, Gary, correct me if you have any different information, I do not believe at this time that the DOE has put out any type of requests for comments or proposals to, for this type of treatment or disposal of the material.

I would also like to end this by saying that the Department of Energy as well as its -- what is it called here -- its Isotope Production and Distribution Division has funded a great deal of money into Dr. Scheinberg's clinical trials and in his work, and so the DOE must have some confidence in what he's doing that is being a great contribution to cancer treatments. I would offer the alternative, and I would also think that we should keep in mind what a valuable amount of radium that we had. If we send it to Nevada, it's gone forever, and people with lymphomas, leukemias, non-Hodgkin's disease, for example, and if you remember, this is what King Hussein, Jacqueline Kennedy, and Tom Landry of the Dallas Cowboys all died of, and I think that we should use this radium, find a way to use it and keep it and not dump it. Thank you very much.

MR. STEGNER: Thank you, JoAnne.

MS. SCHROER: My name is Carol Schroer, and if what I'm going to read makes no sense to everybody, it's because I haven't been able to hear very well tonight.

We knew the silos would be a big part of the Fernald cleanup, and we knew they would be a real challenge. And when vitrification was suggested, it seemed to be our answer to the low volume storage plus the transportation. But when the VIT pilot plant ran into major problems, like square fittings into round holes, I knew we were in trouble. I still know in my heart that to vitrify is really the best way to go, but we must move on and we must get to the silos and get them taken care of, and my one prayer is that it be done with every precaution and that it be done correctly. We live here, and we want to be sure that we're still here when the silos aren't.

MR. STEGNER: Thank you, Carol.

MS. YOCUM: I'm Edwa Yocum, and as a resident living one and a half miles south of the Fernald site, which is also a disposal and storage site, and it contaminated the environment, I really prefer the vitrification process for its reduction of the toxicity, the mobility, and the low volume of treated waste and less volume for shipping. But when I think about the workers and their safety, I have to select chemical stabilization. Because, yes, it's easier possibly to implement than what vitrification is right at this time, but who knows what can happen to the vitrification technology in another four years. But still we must move on and get this job done. So I will accept chemical stabilization, but also I would like to add too, as treated silos 1 and 2 waste must not remain on the Fernald site or be placed in the on-site disposal facility if NTS's doors close. Thank you.

MR. STEGNER: Anyone else?

MR. DAVIS: Douglas Davis. I want to take an opportunity to be very brief, you've been very gracious to our company in the past in allowing us in discussion, and I'm very impressed with the level of consideration that's come into this whole problem. I think this is amazing. I might like it if it were shifted a bit, but that's not the point.

I did want to say just a couple of things about glass, though, I think it gets into your soul a little bit when you work on glass developments for months. In terms of safety I have to say that I feel better about thinking about a durable glass at a site where, even if our infrastructure is totally gone and even if it's no longer an arid area, the radon, the radioactivity, the lead, is still contained and can't wander off.

The other thing that several times we've talked about, and I think perhaps we haven't given it as much emphasis as we might, is to the large commercial glass industry that operates all around the world, not with our radioactive hazardous waste glasses, but many of these issues. I think it's wonderful that we've gone and considered the opinions of the workers, that's very important. Surprisingly that's not done very much. But a slightly increased inherent risk in a process does not always result in more injury because you can build in, and I think the glass industry is a good example, they have built in the structure to be a very safe industry. Even in parts of the world where they don't even have the infrastructure that we have.

In talking about greater implementability, you know, our company, one of the things we do is build large float glass plants, and one of the demands that's often put on us is, okay, here's an order, we would like to have glass running out in sheet form in two years. That's very common. So, you know, through construction planning and engineering planning you can put together complex projects very quickly, and it's still with good quality control.

And I guess under the question of

operability, again I would just mention some of these plants that are run commercially, we commonly as part of our contracts to a customer, now these are not radioactive waste raw materials, but part of our warranty is that day after day these operate with less than two or three defects per ton of glass. So the commercial industry sits there and runs, it's very operable. Just want to make sure we just think about that, and I appreciate your consideration.

MR. STEGNER: Thank you, sir.

MR. GELS: My name is Jerry Gels. I'm a health physicist. I've been coming to a lot of these meetings and was about to go on the record as saying that I thought that cementation was the better alternative of the two because if those are our choices, I felt that, as Ms. Wilson pointed out, that the retrievability would be better than that, although I think she said that it wouldn't, so I don't know how to feel about that. But I do feel that the radium 226 that we have in those silos is a resource. We've been looking at it as a waste, and it is very true in a lot of short-term viewpoints, it can be considered a waste. If you look at the long term, as she's pointed out, it could be considered a resource, and this is a resource that of all the atoms of radium 226 that there are in this country, most of them are in two silos out by Paddy's Run Creek, and they are, depending on the medical results, which I've been trying to find out about for some years now, how that is doing, but depending on those results, they can be a resource of tremendous value to the world, and I think that should be considered in the long run as what we do on that basis, whether we do something that will put those atoms in a form that cannot be easily retrieved or whether we separate them out. And they can be chemically separated, it is possible to do. Marie Curie did it a hundred years ago. It's possible to do it. I don't know if we've looked at doing that, but I think it's something that we ought to look at. Thank you.

MR. STEGNER: Anyone else? Going once, twice. Thank you all for coming.

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MEETING CONCLUDED AT 8:20 P.M.

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CERTIFICATE

I, LOIS A. ROELL, RMR, the undersigned, a notary public-court reporter, do hereby certify that at the time and place stated herein, I recorded in stenotypy and thereafter had transcribed with computer-aided transcription the within (68) sixty-eight pages, and that the foregoing transcript of proceedings is a complete and accurate report of my said stenotypy notes.

Lois A. Roell

MY COMMISSION EXPIRES: SEPTEMBER 7, 2003.

LOIS A. ROELL, RMR
NOTARY PUBLIC-STATE OF KENTUCKY