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ENVIRONMENTAL LABORATORY PUBLIC MEETING

Proposed Cleanup Plans for Naval Reactors Facility and Argonne National Laboratory-West

FINAL

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MR. SIMPSON: Welcome to tonight's meeting. I'm Erik Simpson. I am the Community Relations Plan Coordinator for the INEEL Environmental Restoration Program.

We're here tonight to discuss the results of two Comprehensive Remedial Investigation/Feasibility Studies. The first that we are going to be addressing tonight involves the Naval Reactors Facility, which is managed by the DOE Naval Reactors branch. The second involves Argonne National Laboratory-West, which is managed by the DOE-Chicago operation's office because of its ties to the University of Chicago.

As you will see from both presentations tonight, each of these facilities has played an instrumental role in furthering our nations' nuclear reactor technology. And tonight we're going to be discussing the resulting contamination at those facilities and what the Department of Energy, State of Idaho and Environmental Protection Agency are proposing for clean up.

This meeting represents the 16th time

that we've taken a proposed plan out for public comment. The last time we were in Boise was the spring of 1997 when we discussed the comprehensive investigation for the Test Reactor Area. DOE, EPA and the state of Idaho recently signed a Record of Decision on that project, and we have the document at the back of the room here, if anyone would like to review it. And if you would like a copy of that document, see me at a break or after the meeting, and I will take your name and your address.

I should also mention that we have several other documents. We have fact sheets. We have the INEEL Reporter. We have some Citizens' Guides and other documents.

I would like to go through the agenda with you right now. Following the introduction, Rick Nieslanik is going to be giving an overview of the Superfund process and how we conduct risk assessments. And then I'm going to turn it over to Margi English and Keith Rose, who represent the state of Idaho and EPA, respectively, for the Naval Reactors Facility project.

Following that, we will go right into the presentation on the Naval Reactors Facility Comprehensive Investigation where Andy Richardson, Mark Hutchison and Bruce Olenick will talk about the results.

A slight change to the agenda. I think what we're going to do is, if you have questions during the presentation, just feel free to stop the presenter. And after the first presentation, we will have the formal comment period where you can comment on the record. We have a court reporter here tonight who is recording all portions of this meeting. And I will talk a little bit more about that later on.

Also each proposed plan has a comment form on the back page, and you can fill that out and submit it here or you can take it home and just fold it and put it in the mail. It has a return mailer.

After the first public comment period, we will take about a 10-minute break, and then we will repeat the format for Argonne. Daryl Koch and Kieth Rose are the state and EPA counterparts for Argonne National Laboratory West. And then Greg Bass and Scott Lee will be giving the presentation. And, once again, feel free to stop the presenter during that presentation, too, if you have questions. And then we will have the formal comment period after that.

I should mention, also, that we have a brief evaluation form on the back of the agenda, and please take a few moments, either during the meeting or after it, to fill it out and give it to us. We will use your comments to shape some of our future public meetings that we have coming up this spring.

At this point I would like to introduce Rick Nieslanik. He has been with the Environmental Restoration Program since the beginning, and he will talk about the Superfund process and something that is common to both of these projects, which is risk assessment.

MR. NIESLANIK: Thanks, Erik. The first thing I want talk about is to give you an overview of the process that we used in investigating the sites at both the Naval Reactors Facility and at Argonne National Lab West. One of things that you will see as you hear the two presentations tonight are some similarities between the two sites and some difference.

One similarity is the process that was used. That was the same at both sites. The differences are the results of site-specific conditions that they found during the investigation process. The work that we're doing here is governed by the Comprehensive Environmental Response Compensation and Liability Act. It's quite a mouthful, so we use the acronym CERCLA. You will also hear us refer to that sometimes as Superfund. And that is just another name for this regulation.

The three agencies involved out at the INEEL, Idaho Division of Environmental Quality, the U.S. EPA and the Department of Energy, got together and worked out an agreement called the Federal Facility Agreement and Consent Order, which governs how the three agencies work together in doing these investigations and establishes some enforceable deadlines and penalties, listed the sites that needed to be investigated, and, in general, to establish the process to use, the procedures to use and the overall effort to investigate these sites.

In this Federal Facility Agreement, it identifies Track 1 and Track 2 processes. This process is a scoping effort. When you look at all the different sites affiliated with these individual facilities, you have to get your arms around the scope of these: How much do we know about them? What do we need to know? And where do we go once we figure out where the sites are?

In the Track 1 process, we took all of the existing data that we had on a particular site, we reviewed that data and decided whether or not we needed more data, whether we had enough data to decide no additional work needed to be done or possibly that some removal action was necessary.

If we determined that more data was needed, then we moved to a Track 2 scoping process. In a Track 2 we did a limited amount of sampling. We would take just enough samples to determine what additional information was needed. Again, if during either one of these scoping processes we found that there was contamination in the soil, that we had enough data to go deal with that contamination, then, in fact, we did a removal action or an interim action.

The difference between a removal action and interim action is just size. A removal action is a small job that could be done quickly. Interim action was a bigger job that required more planning, more investigation and more input on what to do.

If during these scoping efforts, we

found, we did a Track 1, we did a Track 2, and we still didn't feel that we had enough information to make a decision, then we moved to what was called a Remedial Investigation and Feasibility Study. This process is outlined in the guidance from the regulations. And it includes a detailed sampling evolution that allowed you to fully characterize a particular site.

Each of the sites also did what is called a Comprehensive Remedial Investigation Feasibility Study. Now, the difference between this one and this one is that this was geared for a particular area. The Comprehensive Remedial Investigation and Feasibility Study brought back into play all of these scoping efforts that we did early on, all the removal actions, all the interim actions so we have one single Record of Decision that ties all that together.

In every one of these different processes, the scoping, the Remedial Investigation Feasibility Study, the Comprehensive, there is an element of risk assessment involved in all of those. The risk assessment process is outlined in the regulations. It gives us a framework to gather the information that we need in order to make decisions on what to clean up. And that process, we identify the contaminants that are present and what levels they are, where they are and what they are, then we assess the toxicity of each one of those contaminants. We assess the exposure that a person would receive from each one of those contaminants, then we combine these two steps to give a risk characterization: How do we characterize that risk to help us in our decision?

The first part of that, or the exposure assessment part of that, looks at the different pathways. If you have some contaminated soil here, what are the pathways that would get this contamination to an individual for exposure. We also looked at how it would affect ecological receptors: antelopes, rodents, birds, plants, all the different ecological receptors that are in the area.

Those pathways that we looked at, first of all, was groundwater. If there is contamination here and there is rain water that falls on it, it could be pushed down into the groundwater. It could then be pumped to the surface. A person could then ingest that; they could drink it. They could shower in it and inhale the water vapors and get the water on their skin. So groundwater pathway was one of the exposure pathways that we looked at. Dermal exposure, if we are digging in the soil, and we get that soil on your hand and have contaminants, those contaminants can soak through your skin and give you an exposure.

For radioactive constituents, we also have direct radiation. The energy coming off of that radioactive material, a person can be exposed to the energy coming off that radioactive material. There is also an inhalation pathway. These contaminants could become airborne either in vapor or dust, and a person could inhale that and get an exposure.

There is also soil ingestion. There is a certain amount of soil that we all ingest through our daily life, and we looked at ingesting some that contaminated soil.

And, finally, we looked at crop ingestion. If we grew crops in this contaminated soil, and we irrigated those crops with contaminated groundwater, what would the exposure be to an individual who ate those crops?

After you go off and look at the exposure to an individual, now we have to assess the toxicity of each of those contaminants. There are two things that we look at. One is carcinogenic contaminants and the other is noncarcinogenic contaminants. So the carcinogenic contaminants, those things that cause cancer, we use what's called a slope factor. A slope factor is a published value that the EPA puts out. They look at all the different contaminants, all the different research that has been done on those different contaminants, and they come up with a dose response curve. So for some given dose, you have some risk. So the greater the dose, the greater the risk. We then used this value, this risk value to compare to a standard value.

We all have a different perception of risk, of what is an acceptable risk. Some people feel it's certainly an acceptable risk to fly in an airplane. Other people may feel that flying in an airplane is an unacceptable risk. When you drive, you make a risk decision. Is it an acceptable risk to drive 75 miles an hour or is that an unacceptable risk? We all make personal risk assessments, personal risks evaluations in everything that we do.

But when these agencies go to make a

risk decision, they have to have something to refer to that is a standard on what is an acceptable risk. In the guidance documents for the CERCLA regulations, they define what an acceptable risk is. They say that the acceptable risk range is an increase in cancer of one in one million to one in 10,000.

So when we go through our exposure assessment, that I talked about earlier, and take into account our slope factor, we come up with a number that fits somewhere on this chart. The risk is somewhere between one in one million and one in 10,000, that is acceptable. If it's above this one in 10,000, now we need to evaluate that and say: What cleanup actions need to be done based on that risk value?

There are cases where the risk in this range may be deemed to be unacceptable, and we need to take an action. But that is usually based on some uncertainty that was found in the calculations, and there is some additional information rather than just to a risk value.

For noncarcinogenic toxicity, we use a value called a reference dose. Again, this is published value. It's a value that we get from the

EPA, from their reference document. And it's based upon what they call a no observable adverse effect level.

Again, this is based on a lot of different research efforts, evaluation of all those, and then they apply what they call modifying factors to this value to come up with this reference dose. We use the reference dose to compare it back to the calculation that we did on the exposure, and we ratio those. If our exposure is equal to the reference dose, then we have what we call a hazard quotient equal to one. They are the same. If the hazard quotient is greater than one that means our calculated exposure is greater than this reference dose. The other side of that, of course, is if it's less than one, then our calculated exposure is somewhere down here in this range.

It's important to note that down in here, we would not expect for see any adverse effect on human health because it's below this observable adverse effect range. It's below the reference dose. The guidance, the CERCLA guidance, again, defines what this hazard quotient of one is equal to. That does not mean that if you have a hazard quotient slightly greater than one, that that is not acceptable. What it means is, you have to go back to your calculations to look at your uncertainty in those calculations. You have to go back to your reference value and say, Is this higher hazard quotient acceptable? Are we in a range where there is still no observable adverse effect?

Now, as you listen to the presentations later tonight on the different projects, they are going to talk about these values. They are going to talk about hazard quotients, and they are going to talk about acceptable risk values and calculated risk based on the investigations that they did.

I want you to keep in mind when you're doing that to remember what the process is. These are prescribed calculations that are in the guidance from the regulations, and they are used for risk-management decisions. They are decision-making tools. They are not trying to predict the number of cancers that might result. They are strictly a method of calculating risk so you can compare it to a standard to make a decision on what clean-up actions are appropriate.

Does anybody have any questions on any

of that?

AUDIENCE MEMBER: Would you go back to the previous slide for just a moment? I apologize for being late. What was the baseline, then, for the two risk levels?

MR. NIESLANIK: One in one million and one in 10,000. In the National Contingency Plan, which is one of the documents that came out of the CERCLA regulations, that is the Comprehensive Environmental Response and Compensation Act, and it defines an acceptable risk range. It says that the point of departure for risk is one in one million, and that acceptable risk is up to one in 10,000. That means anything down here really is "De Minimis." It is so small that we don't need to consider it. But this is the range that we need to then consider as acceptable risk. Anything above that, we need to look at for clean-up action. Does that answer your question?

AUDIENCE MEMBER: Almost. The range was based on what baseline factors?

MR. NIESLANIK: Based on what baseline factors?

AUDIENCE MEMBER: The numbers of incidence of cancer prior to a certain date or --

MR. NIESLANIK: No, again, this is the decision-making tool. It's a range that they set up, or that they established based upon the calculations that we do.

In other words, we have a method of calculating exposure, and we have to have something to compare it to. If you wanted to use as an example or standard, the average individual has a one in five chance of getting cancer. We're talking about one in one million chance. So if you added that one additional cancer above your standard, so I have a one in five chance of getting cancer. If I take that into account, one in 10,000, I now have a chance one in 5.0001, a very small increase above what you normally would expect a cancer risk.

AUDIENCE MEMBER: Baseline is normal?

MR. NIESLANIK: Right, above normal.

AUDIENCE MEMBER: I guess the best way to say it is chronic lifetime exposure. What we're talking about is the additional chronic lifetime exposure.

MR. SIMPSON: At this time I would like to introduce the agency counterparts for the Naval Reactors Facility project. We have Margi English with the state of Idaho, Department of Health and Welfare Division of Environmental Quality; and Keith Rose with the EPA's Regional office in Seattle. They are both going to make a few statements.

MS. ENGLISH: Thank you, Erik. I've worked with the other agencies addressing potential past contaminations problems at the NRF for the past five and a half years. During that time that I've been working on this project, we have fully evaluated certain sites and have successfully completed a couple of removal actions as well as a remedial action at the NRF.

These past cleanups were completed on schedule and within budget. So at this point in time what we have decided, where we are focusing out attention are the remaining potential past release sites on the Naval Reactors Facility.

The state has been involved during this process in developing the investigation and the risk assessment for these sites, which you see identified in your proposed plan.

We have also participated with our NRF and our EPA counterparts in developing and screening the potential remedial alternatives to address these sites.

I do want to emphasize at this point in time that we are seeking public participation in the remedy selection process. And what I want to emphasize is that although you'll see in the proposed plans, Preferred Alternative or a clean-up recommendation, the agencies at this time have not selected a clean-up remedy to implement.

So I really want to encourage you to participate in the process and to offer your opinions and recommendations on not only the Preferred Alternative, but also all the other alternatives that are in the proposed plans as well as any others that you think the agency should have considered. And we will use your opinions and your recommendations to help us select a remedy, a final remedy for these sites, which will then be documented in a Record of Decision, which will be finalized later this year.

Also if, during this evening or later on, you have any questions about the sites or the remedy selection process, please don't hesitate to ask those questions. And we, members of the agencies, will try to answer your questions, or if we can't answer them now, we will get answers and get back to you. So, with that, I will turn it over to Keith.

MR. ROSE: The Environmental Protection Agency has been involved in the development of the Remedial Investigation and Feasibility Study for the Naval Reactors Facility and has commented on, reviewed and commented concurred, or given approval to these documents and has also been involved in the development of the proposed plan, which evaluates a whole range of feasible alternatives for addressing the contamination at the site.

We have given our concurrence to that proposed plans. It represents a range of alternatives which satisfy the requirements of a CERCLA or Superfund clean up, and now we're into the public comment period. We received comments from the public. We will take those comments along with using the nine evaluation criteria that are specified under Superfund to work with the state and with the Department of Energy to select a final alternative, which will be in the form of Record of Decision to be issued later on this year.

Just to summarize the nine criteria that we use. There are two, what we call threshold criteria. They are overall protection of human health and the environment, how well the alternative meets the regulatory requirements, is the second one, and then there are balancing criteria, which include short-term effectiveness, long-term effectiveness, implementability, reduction of mobility, volume or toxicity through treatment, and then there is cost and State approval and, finally, community approval input.

We will weigh all those criteria in the process of determining what the final alternative will be. So we look forward to receiving comments from the public. If you have any questions of me, you can catch me after this meeting. Thank you.

MR. SIMPSON: At this time I would like to turn it over to Andy Richardson, who is with the DOE Naval Reactors. He will give a brief summary of the history of the Naval Reactors and then also a brief summary of the Comprehensive Investigation.

MR. RICHARDSON: Thanks, Erik. Good evening. As Erik said, I'm Andy Richardson. I'm with the Naval Reactors Idaho branch office, Naval Reactors Facility.

I want to give you a little bit of background why we're here, why we have some areas that we think that we need to clean up, because that is what this all is really about, how we got to this point. Back in the late -- actually, the late 1940s, the word came down from Congress and the President to then Captain Rickover, go build a nuclear submarine, let us know when you're done and do it right. So that is what Captain Rickover went off to do.

In the course of developing that program in 1951, we established the Naval Reactors Facility what was then called the National Reactor Testing Station. Since -- as you may have noticed, things happened a whole lot faster in the '50s than they happen in the '90s. By March of 1953 this project, which was the first reactor plant that we built called the S1W prototype, was completed and operating at power.

But, again, this being the '50s and utilizing the technology at hand at that time, part of the construction of that plant resulted in using a discharge system for radioactive liquids that, essentially, sent some of the liquids out into what is called a tile drain field, which is, essentially, a pipe that is buried about 10 feet below the ground and has a bunch of holes in it.

You take the radioactive liquid, put it out, the water leached out into the soil, hopefully, and as our studies have shown rather effectively, those contaminants got entrained in the soil about 10 feet below the surface.

So that worked fine for a couple years. And around 1955 they decided to expand this system and build what is called the SW1 leaching pit. So then we sent some of those radioactive discharges out to the leaching pit. Shortly -- or about the same time or a year or two later Congress had come back and said, "Oh, by the way, while you're at it, we would like you to build us a nuclear aircraft carrier." So, once again, out here at the Naval Reactors Facility, we built a prototype plant for what was to become the USS Enterprise, the first nuclear-powered aircraft carrier, which, interestingly enough, is still in operation, and they are making a lot of commercials with it.

We built the A1W prototype. It was operating in 1957. It had a similar system. Down here to the west side of the Naval Reactors Facility, we had a leaching system. The radioactive missiles were sent out to bed, entrained the containments in the soil, and we operated on it.

Still in the late '50s we had some experience with nuclear-powered ships. We had taken some of the spent cores out of the ships. And the program decided it would be a very good idea, and still think it's a very good idea, to go off and study those spent cores: Did those reactor cores operate the way we expected them to? It allowed us to confirm all the theoretical design work; and two, to build upon that experience so we could build even better and better cores.

To do that we constructed the expending core facility here on the north end of the Naval Reactors Facility. It started out as a building only about this big and has numerous expansions over the years. As part of that building, we built water pools that we use to store that spent fuel while we do the examinations. Again, that water has some residual radioactive contamination in it. A very small levels, but it's there. And some of that water, in fact, was piped over to this S1W at this point what I call the drain field complex.

So we're marching along. We're inspecting our fuel. We're doing research and development on our reactor plants. We're training sailors on how to run those plants so they can take them out in the fleet and let them run in the ocean.

And in the mid-'60s we built a third prototype plant called the S5G prototype. There was some change in some of the technology. The two main benefits to using that plant were the fact that it used what is called natural circulation. The difference in the temperature of the water, to actually move that cooling water through the reactor. That did a couple very important things for us. It made our submarines much more quiet. You don't have these big pumps pushing that water through. The submarines can be more quite and much more effective. Also, it's a very safe design because even if you lost power, that cooling water would continue to circulate through the reactor. So it was a pretty major step.

At about the same time that we were building and placing the S5G plant in operation in the mid-'60s, mid to late-'60s, most everybody decided that maybe putting this water out and letting it soak into the ground to entrain this containment wasn't the best way to handle that material. We could probably do a better job.

By the early '70s, we already started doing some development work on how can we recycle this radioactive water so we don't have to put it out in the ground anymore. By 1979 we finished discharging any of this radioactive water out to these leaching beds.

So that is how we got to the point where we've identified these nine sites that in this entire comprehensive look that we have taken at the Naval Reactors Facility, we found these nine sites that we really think that we need to go off and do something. We think that there is going to be some clean up required. In fact, we know in some cases we will find something that we will have to do.

Again, that is taken in conjunction with all the other 71 sites or so that we've looked at in doing this comprehensive study of what we have to do. That is sort of the background how we got to where we're at. Are there any questions on that?

Okay. If not, I would like to turn it over to Mark Hutchison. He is the senior engineer who works at Westinghouse at the Naval Reactors Facility and did an awful lot, if not all of putting this information together in a form that we can use as decision makers to figure out what we have to go clean up. So, Mark.

MR. HUTCHISON: Good evening, everybody. I'm going to ask you to bear with me. I'm having some sinus problems and with my medication I'm taking for it, I'm floating around the room right now. I'll make sure that I push the right buttons here.

To begin with, I would like to give a brief overview of the CERCLA process at the Naval Reactors Facility. We have 71 sites identified at the Naval Reactors Facility that required us to go off and do an evaluation, do an assessment on them.

Of those 71, 10 of those sites were included in a previous Record of Decision. Of those 10 sites, three of them included landfill covers that we put over some landfill areas. We had 43 other sites that we looked at and did Track 1, Track 2 type investigations that Rick had discussed earlier on. Those 43 sites, it was determined that no further investigation was required for those sites. That left us with 18 individual sites that we still had to assess.

That brings us to our Comprehensive Remedial Investigation and Feasibility Study, which we sometimes call RI/FS, but I will try to call it the comprehensive study. That involved these 18 sites. It involved what we called a cumulative assessment, which I will discuss a little bit later, and that led to our conclusion that we had nine sites of concern that Andy has already discussed that are on that board.

That brings us up to where we're at right now, which is the public comment where we're getting input from the public. We want your comments. We want to know what your concerns are. We will look at those comments and come up with a Record of Decision. The Record of Decision will have a Responsiveness Summary, which we will take all the comments that we receive, evaluate them and provide responses to them and possibly changes to our plans. And beyond that, we will go into a remedial action/remedial design phase, which includes some monitoring. And even further down the road, we do five-year reviews where we look at the effectiveness of the actions that we're proposing to take.

The comprehensive study involved five

primary tasks. The first task was an individual assessment of these 18 potentially radiological sites. It included a cumulative assessment of all 71 of the sites that we have identified at the Naval Reactors Facility.

The third task, which will be discussed a little later, is the development of remedial action objectives. We also developed and evaluated various remedial action alternatives, and, finally, a selection of a Preferred Alternative.

The individual site assessments, like I said, were 18 potentially radiological areas. We went off and gathered up as much historical information as we could including past records, interviewing past employees, as much historical information on these sites as we could. Then we went off and took some surface, some subsurface soil samples and groundwater samples, and we used all that information as input into our human health risk assessment that we performed for each of the sites.

After doing the human health risk assessments, we came up with the nine sites of concern that are shown on the board on the far right. The cumulative assessment involved three primary tasks. The first task was a cumulative assessment of all 71 of the sites identified at the Naval Reactors Facility. And the cumulative idea is to evaluate the possible additive effects of more than one site being close to each other.

The conclusion of our cumulative assessment was that we did not identify any additional sites of concern that we hadn't identified for our individual site assessment. We also performed an ecological risk assessment to evaluate the potential impact to environmental receptors.

Our ecological risk assessment concluded that the actions that we take for protection of human health are also going to be protective of the ecological receptors, and therefore, no additional action was required from environmental ecological perspective.

Finally, we did a hydrogeological study that assesses the potential impact to groundwater. The hydro study provided input into our risk assessment as far as the groundwater pathways were concerned.

Our human health risk assessment involved a couple different scenarios. We had a residential scenario, an occupational scenario. The residential scenario included a 30-year future resident and 100-year future resident. The occupational scenario included a current worker and a 30-year future worker. You will notice we highlighted the 100-future year resident scenario because that was our scenario that we were primarily concerned about. The reason being is that there is an assumption made that the next 100 years, there will be an institutional government, possibly in control of the site, and therefore, there would not be a resident within the next 100 years living out there. As far as the occupational scenario goes, we currently have controls and practices and various ways of doing work out there that prevent a worker from being exposed to contaminants at these sites.

The human health risk assessment came up with nine contaminants of concern. Eight of them are radiological and one inorganic, lead. Cesium-137, strontium-90 and lead were the primary contaminants of concern. The risk drivers were cesium-137 and strontium-90. Lead was found in one place to be above the EPA recommended screening level for lead clean up.

And that leads us to a bar graph here that shows the sites and the risks that were posed by each of the sites. You will see here, this is the one in 10,000, I call it a threshold, that was discussed earlier. Seven of the nine sites are above that threshold. You will notice two other sites, the A1W/S1W radioactive line is below this threshold or range. It is included as a site of concern because there is some uncertainty associated with this particular line. It's an underground pipe. We have done some sampling around it. However, there is a possibility that there is some contamination there that we did not detect while sampling that may require some clean-up action.

Another one is the S1W retention basin. These basins are concrete structures that held liquid at one time. There is a potential that we have some contamination under these basins if they had leaked in the past, which we think there is a possibility of that happening. Because of the expense that would have been required to sample one of these basins, we made a decision up front that we were going to go ahead and take care of the retention basins and do the clean up that is necessary after we come up with our risk assessment results.

With that, I'm going to turn it over to Bruce Olenick, and he's going to continue on. He's the Westinghouse program manager Waste Area Group 8, WAG 8.

MR. OLENICK: Thanks, Mark. Okay. A real quick summary. We've already learned a little bit about the Naval Reactors Facility and the type of discharges that we have had in the past. We've also discussed a little bit about the risk for those nine sites of concern that Mark pointed out on the block diagram over here.

Next, after we identified the sites of concern, what we need to do now is establish what next. What do we do? We need to clean up these individual sites.

The way we do that is by setting out what we call remedial action objectives. All that is, is just the goals that we set in order to clean up these individual sites. What do we do? What criteria do we use in order to make sure that we make the right decisions and perform the right actions?

The first goal that we set for cleaning

up these nine sites of concern is to prevent direct exposure and ingestion of soil and food crops containing radionuclides of concern in excess of that range that we previously discussed for the future 100-year resident.

AUDIENCE MEMBER: How did you decide, based on the list that was on the previous slide, for all contaminants? How did you pick those three contaminants as the contaminants of concern?

MR. OLENICK: These three right here? The risk for those three -- there is a nice table of the proposed plan. I don't know if you have a copy of that in front of you. The risk for those three were above what we would call the acceptable range, the levels that would be required for you to do action above the one in 10,000. I think that is Table 4, if I'm not mistaken.

AUDIENCE MEMBER: So for the same amount of a contaminant of each of those nine, those three would be the more dangerous?

MR. OLENICK: That is right. That is exactly right. Those would be the ones that would be deemed unacceptable that we would have to perform an action on to bring them down to a level that would be acceptable to that future resident that were to live there. Did that answer your question?

AUDIENCE MEMBER: The same kind of question. It seems to me like plutonium would be hazardous.

MR. OLENICK: It is. It is very hazardous, especially for us.

AUDIENCE MEMBER: They are not as dangerous as the other three highlighted?

MR. OLENICK: Fortunately for us, the levels of plutonium at our facility were below those ranges. They weren't very large at all.

AUDIENCE MEMBER: You don't have to ingest very much.

MR. OLENICK: No, you don't. That is exactly right.

AUDIENCE MEMBER: I found Table 2. Can you go back to this one. And I have a couple of questions also. Is this a good time to do that?

MR. OLENICK: Sure.

AUDIENCE MEMBER: I'm not noticing anything here on the list of exposure that would indicate -- and this is in reference to plutonium, airborne. Are there no concerns?

MR. OLENICK: There isn't. The

contamination, again, if you remember the leaching beds here, the piping for that, all the contamination was issued underground about 10 feet below ground, so the vast majority of the contamination is located underground, under 10 feet of soil, so there is no airborne concern, at least at our facility.

AUDIENCE MEMBER: None in the process of remediation?

MR. OLENICK: We do look at airborne. The applicable regulations apply when we actually clean this up, and that is a consideration for the remedial alternative that we will get to here in just a minute and discuss. Anything else at all? These questions will come up, but they will be, hopefully, answered for you as we move forward here.

Okay. So once again, we create these goals, the types of goals that we want to go meet in order to clean up these individual sites. Another goal that we wanted to ensure that we meet was prevent exposures to soils that were contaminated to that screening level for lead cleanup at 400 PPM.

If you notice here, these are the levels that we calculated, at least for radionuclides, that a hundred years into the future, if cleaned up above this level, would pose an unacceptable risk. If cleaned up below that level, they would be acceptable a hundred years in the future, say, to someone living at the facility. And then, again, once again, the screening level for lead, the recommended screening level published by the EPA, is 400 PPM that we would also like to meet as well.

Not only do we have remedial action objectives for human health, but we also created them for environmental protection. The first one being that whatever action that we did, was going to be protective of the environment by preventing erosion or intrusion by plant or animal species into those nine sites of concern. Also, one of key goals, is to prevent exposure to those contaminants of concern to any ecological receptor.

That brings us to the proposed response actions. We evaluated a whole sieve of different response actions and narrowed it down to these four. The four can be basically summarized as, number one, no action, don't do anything. We would not invoke additional controls or provide any additional monitoring than what the facility currently does.

The second proposed action or the action evaluated was limited action. What that would invoke would be long-term monitoring using our groundwater monitoring wells around the facility and then instituting institutional controls. What that means is building fences, placing barriers to keep people out of these areas.

The third one, if you notice, is simply building on the second one, performing long-term monitoring, institutional controls, but also to consolidate the soil from six sites into the S1W leaching bed complex and build a cap over the top of it. And then the A1W leaching bed on the west side of the facility would also have a separate individual cap built on that as well.

The fourth alternative considered was a complete excavation and removal of all nine sites and the soil matter within them, for disposal off the NRF facility proper. Included with that one, obviously, there is no long-term monitoring necessary since all the contamination was moved off the facility.

AUDIENCE MEMBER: On that previous

slide, is that referring to table 4, on page 17, on No. 8 and the costs associated; is that correct?

MR. OLENICK: That is correct. We will get up to a slide that will summarize that, perhaps, a little better.

Okay. Those four criteria, those four proposed actions, evaluated actions, must be evaluated against something, and we've talked about that already. Keith Rose did a good job of explaining what those evaluation criteria are.

Protection of human health and the environment and complying with laws are two key compliance or evaluation criteria that we use to evaluate those against one another.

Long-term, short-term effectiveness: How well or what type of permanence do we have with the proposed action and whether or not it's protective of workers actually performing the action while they are doing that.

Treatment is also another evaluation criteria that we considered, although none of those four actions actually use treatment in the alternative, so that one we did not evaluate or use as an evaluation criteria.

Ease of implementation and cost are key, particularly, since we spend taxpayers' dollars in order to go do this, we want to be as cost effective as we can.

Finally, the last two, state acceptance and public acceptance. State acceptance, being part of the meeting here and being represented here, speaking what they feel is necessary for us to accomplish our actions as well as seeking public comment, seeking your opinions on what we are planning.

AUDIENCE MEMBER: Are those criteria, are they priority, one through nine?

MR. OLENICK: Yes, in a sense they are. The first two are essentially baseline criteria that we use to screen out the alternatives themselves and then they kind of fall into line.

Actually, the center portion kind of works in a set. These two you look at first, this group, then the last two there.

MR. ROSE: The first two are usually called threshold criteria, and all of the alternatives are screened against those. If the alternative method fulfills those two, then it's carried further in the evaluation. But if it passes the threshold, then it goes on to the other criteria.

MR. OLENICK: Right. There is really not a number associated. If you're looking for hard values for each one of those, though, they are all relative to one another, and they must be played off one another to see which is the best alternative.

Here is a chart that might answer your question and, hopefully, put it in a little bit of a visual format for you to see.

If you notice the first alternative, doing no action wasn't very protective of the environment or human health and so that was automatically screened out as a considered alternative.

The next three, 2, 3 and 4. Notice we kind of coin terms so it can come to mind relatively quickly, such that Alternative 2 is kind of a fence and monitor; Alternative 3 is consolidate and monitor; and number four is complete removal from the facility of the contaminated soils.

The evaluation of these -- note that Alternative 3 and 4 for the protection of human health, in compliance with all applicable laws, did the best job of addressing that criteria. For long-term effectiveness, obviously, removing all the contamination from the facility is the best solution. After removing it completely forever, then the other two fall in line. Actually, doing nothing, it's still there, and it will be there for long periods of time with just fencing and monitoring in place.

Short-term effectiveness, the ability for workers to go in there and be protected while they perform the action. Obviously, not doing much of anything other than fencing is the least detrimental to those workers whereas handling the soil and excavating at all nine sites is the worst as far as that evaluation criteria goes.

Implementability, some of the same reasons. It's easier to do very little and most complex to do a lot. Then, finally, the cost involved, and that is kind of self-explanatory.

AUDIENCE MEMBER: So these associated problem sites in a leave-alone mode, would that be compatible with human use and work of the area? In other words, people working in the area in the future, that idea wouldn't be coming in contact. It can be fenced off, and it wouldn't impede any of the work effort. They won't have to be walking around to do something.

MR. OLENICK: Certainly, that could add to that. You're saying impeding just normal work efforts at the facility?

AUDIENCE MEMBER: Yeah. I mean, by just leaving it alone and fencing it off, that would impede working efforts. You have to redesign to some extent to be able to accommodate that fence?

MR. OLENICK: Not typically, no. The fencing that can be done can preclude workers from coming into contact with those areas without greatly impacting the area in general. Is that what you're saying?

AUDIENCE MEMBER: Or impacting the work progress on the facility because of the fact that there are barriers.

MR. OLENICK: There would be minor impact, but it wouldn't be significant where we would have to pick up the building or move it, I guess, is what you're insinuating.

MS. ENGLISH: It could potentially restrict activity to certain parts of the facility.

MR. OLENICK: Yes, it would prevent,

obviously, that type.

AUDIENCE MEMBER: Where it also kind of comes from unknown factors, too, if there is any future investigating of discoveries that could be made, why, then, the whole picture could change. In that respect, if the facility had to be changed to accommodate that research and discovery.

MR. OLENICK: Yeah, I think the impacts would be small. I think in general they would be small. Most of these areas are relatively small in size. In fact, quite a few of them occur outside this facility fence.

AUDIENCE MEMBER: I have a question. On Alternative No. 2, the fencing and monitoring, do you have an estimate of the period of time it would take for natural decomposition of these half-lives and so on?

MR. OLENICK: That would work for the two radioactive components there, the strontium and cesium, both relatively low half-life, thirty years or so. That is what you play off of. Remember those risk levels and cleanup levels? We're projecting that if someone living there a hundred years in the future, if we get our levels down below those levels, that risk would be acceptable, anything above that would be unacceptable.

Lead works a little differently, though. Lead is there forever, so you have to preclude that activity from human beings getting in contact with that, hence, the cap and that nature. Good point.

AUDIENCE MEMBER: So about 30 years?

MR. OLENICK: That is one-half life, correct. Our scenario that we looked at, we assume institutional controls up to a hundred years, the government will be there for a hundred years.

AUDIENCE MEMBER: Sort of a pea soup grade, it's just a mix of all --

MR. OLENICK: The contamination, you mean? Yeah, it's within the soil, bound up underneath the leaching beds or the individual sites.

MS. ENGLISH: Maybe you can explain half-life a little more fully, what exactly that means. It doesn't mean that in 30 years --

MR. OLENICK: That's right. Radioactive half-life works that in 30 years, say, if you had a half-life of 30 years, half that material would be there. In another 30 years, half again, so you'd be down to a quarter.

AUDIENCE MEMBER: I'm wondering what period of time would it get down to acceptable.

MR. OLENICK: Well, again, remember those criteria that we set, if we cleaned them up to 16.7, cesium, in a hundred years it would be below that risk threshold level and be acceptable. It never goes away completely, but gets down infinitesimally.

AUDIENCE MEMBER: So that is the one that has the longest period of natural decomposition?

MR. OLENICK: Of the contaminants concerned, yeah, the cesium. I forget what the actual half-life is.

AUDIENCE MEMBER: It's not the longest half-life. Cesium is the highest risk driver. There are some others that have a longer half-life, but the quantity and the radioactivity of those others are so small that cesium and strontium are the risk drivers.

MR. OLENICK: I guess I was comparing strontium and cesium together. They are about equal.

Anything else?

MR. ROSE: As a point of clarification,

are you saying that the levels of strontium and cesium that interact would be below acceptable or within the acceptable risk range within a hundred years?

MR. OLENICK: For the future 100 year residential scenario, based on the location in the soil and the scenario that we painted for that hundred-year residential person living there.

MR. ROSE: So are the highest levels of those constituents in the subsurface so there is not a pathway of exposure?

MR. OLENICK: That is correct.

MR. ROSE: The levels at the surface would come to a point where they are no longer of concern after a hundred years?

MR. OLENICK: That is correct.

AUDIENCE MEMBER: What would be an estimated time for completion for Alternative 4? It's probably in here somewhere.

MR. OLENICK: This one right here, the complete excavation and removal. Our plan goes out depending on what alternative is selected. Obviously, some will take longer than others. With complete excavation -- and correct me if I'm wrong, Rick and Margi and Keith -- would be somewhere around 2002, 2003, for complete removal of that from the facility.

AUDIENCE MEMBER: Are you saying three years?

MR. OLENICK: Three to four.

MS. ENGLISH: The Record of Decision will establish the commitment to do this cleanup and then very shortly after the Record of Decision, we will put together something called a Scope of Work, which will outline deadlines for getting various pieces of remediation done.

We have not put that document together yet, so it's not saying exactly what date the remediation will be completed. Right now we don't really have that date. We will be developing that schedule over the next couple months.

MR. OLENICK: She brings up a good point that it is really difficult to go off and pick a date until you decide the alternative, get a feel for it.

AUDIENCE MEMBER: Speaking in a construction way, what period of time, given some parameters that you're talking about, would it take for the construction period to happen to achieve that goal?

MR. OLENICK: The process after the Record of Decision this summer is called the Remedial Design, Remedial Action Phase where we create another work document, a plan to go off and implement this. That takes, roughly, about a year or so.

MR. OLENICK: Given that evaluation criteria and looking at those three alternatives that we have evaluated, the preferred action recommended by the agencies is the Remedial Action Alternative No. 3. Essentially, that is consolidate and monitor. Looking at that a little more specifically, it's taking six sites from within the facility here and combining the soil from those sites into the depression known as the S1W leaching bed. That leaching bed holds -- we calculated about -- let's see, about 90,000 cubic feet of soil. The maximum volume of those six sites, soil-wise, that we've calculated is about 60,000 cubic feet of soil.

In other words, we fill that area up about two-thirds. We still have another third of that leaching bed complex open for any contingency to happen.

So, again, consolidating those six sites into that S1W leaching bed, note also the S1W leaching pit is right near by here. Both those sites, an engineered cap will be built over the top of that to protect them from -- again, remember meeting our remedial action goals, prevent intrusion by plant and animal species.

Then the A1W leaching bed on the west side of the facility would have its own cap built over the top of that for this alternative. And then, also, institutional controls and long-term monitoring in place to ensure that that remedy is protective of the human health and the environment.

That is a hypothetical example of one of the caps that we would consider during that remedial design phase.

Okay. In summary, we've already belabored the point of these nine sites of concern that are up on the reader board here. Those nine sites represent an unacceptable human risk that require some type of remedial action. Cumulative risk assessment did not identify any additional risk that we didn't see in the individual sites.

We've identified four remedial action alternatives for clean up. We've evaluated those four remedial action alternatives according to the criteria that we listed earlier.

The selection of the third alternative as a proposed action, seeking your comment, is the excavation of six sites and consolidating that into a one-site -- or actually, a two-site area and building a cap over the top of it. Also building a second cap over another leaching bed, and instituting long-term monitoring.

In addition to that, there are 52 identified sites that require no additional action. Eleven of those are no further action. They have some source present but would be reviewed in that five-year review process we talked about a little earlier, and the remaining 41 sites be recommended as no action whatsoever.

This is the point where, again, I think several of us have already noted that we must understand the public's concerns. We want public feedback on this, and we want to answer your questions. We encourage you to write written or oral comments based on tonight's meeting or submit those in the back of the proposed plan that you're currently reading.

Our public comment period ends

February 10th, coming up shortly. The Record of Decision compiles all your concerns. These are placed in a Responsiveness Summary into that Record of Decision in the summer of '98.

And, finally, the remedial action that Keith mentioned a little bit earlier, that detailed design will begin in the fall of 1998.

So with that, we will bring up Andy Richardson, the representative of the facility, again, to coordinate any other questions. You guys have good questions, by the way.

MR. RICHARDSON: Any other questions?

AUDIENCE MEMBER: I take it, then, there has been some core samples taken around these facilities; right?

MR. RICHARDSON: Yes.

AUDIENCE MEMBER: I think it's been mentioned, 10 feet; is that the bottom line?

MR. RICHARDSON: The basalt layer, if you remember much about the -- it had some top soil that varies in depth, and you then get down to, essentially, lava rock, hard, solid rock.

AUDIENCE MEMBER: I'm wondering about the contaminated readings.

MR. RICHARDSON: I think I understand. Let me make sure. When we did the core sampling, we would routinely sample all the way down to that basalt layer, and we would take samples depending on what we were looking for, sometimes every two feet, sometimes every four feet, depending on the contaminants that we were looking for.

So we would normally do the sampling. It gets a profile of as you go down through the soil column what your contamination will look like. Is that the sort of question that you're getting to?

AUDIENCE MEMBER: You're heading in the right direction.

MR. RICHARDSON: I'm going down. Essentially, what we found -- and, again, where we said that in most of the cases with these discharge points, the discharge piping was already buried. As you would expect, up near the surface you hardly had any contamination. As you got down closer and closer to the level where that discharge pipe was at, you would find the majority of your contamination, and then as you got closer down to the basalt level, again, you found, in most cases hardly any, which tells us that that contamination, in fact, has not migrated down very far.

AUDIENCE MEMBER: It probably varies some places. Can you calculate an educated guess about eight foot, ten foot in depth?

MR. RICHARDSON: Most of the discharge points were actually down at about the ten-foot level, and we found most of the contamination starting about that level and going down another three feet or so and then fairly rapidly.

AUDIENCE MEMBER: Does this include pits as well as the pipe lines area?

MR. RICHARDSON: Yes.

AUDIENCE MEMBER: And that is pretty much uniform on all the findings for those tests?

MR. RICHARDSON: For the most part. Every site had its own unique characteristics. Sometimes you find what you might call a particular hot spot. We made some rather conservative assumptions when we did the risk assessment. If we found high levels to be concerned with, we made the assumption, okay, that entire soil column is contaminated to that level even though the sampling shows that isn't necessarily the case. But it gave us a very good conservative as far as how far do we think we need to clean this up.

AUDIENCE MEMBER: I don't know if this is stretching it a bit here. I'm kind of drawing from Hanford. I'm familiar with that somewhat and what the big flow problem that they have underneath those and the contamination there. How does this compare to Hanford?

MR. RICHARDSON: The question was: How does this compare with the spread underneath?

AUDIENCE MEMBER: The large areas that they saw at Hanford.

MR. RICHARDSON: The large areas that they saw at Hanford. Most all of our contamination from our sampling is pretty much restricted to the areas directly underneath these leaching beds.

AUDIENCE MEMBER: I'm talking about the intensity. In other words, the intensity of the radiological emissions, equal volume compared to Hanford.

MR. RICHARDSON: Hopefully, this will address that. Going back and looking at the historical records, how much do we think that we discharged at NRF in these liquids, the total discharge of radioactivity from the liquids, we estimate to be about 300 curies. About half of that has already decayed away. So we think, between all these sites -- and these are some relatively ballpark numbers, we probably had down here in the soils, primarily in these specific areas, about 150 curies that is in the soil that we're going to have. Does that --

AUDIENCE MEMBER: I was kind of worrying about the intensity of likely this problem compared to Hanford.

MR. OLENICK: If I could jump in, are you talking about the tank farms at Hanford?

AUDIENCE MEMBER: I was kind of thinking, like, if we were to go over to Hanford and go down, what is the average depth problem, is what, 200 feet, and they go in, say, at 50 feet and take out one square foot of soil and then analyze that. If we were to go here and go down five feet and take out one square foot and analyze that, how would we be looking at that, as far as intensity in each square foot of soil?

MR. RICHARDSON: I'm not really in the position to say because I don't know that much about Hanford. And anything I would be telling you would be speculation. I could tell you rumors I've heard, but I really don't know the answer to that. I'm not that familiar with Hanford.

Keith, do you have any thoughts on that?

MR. ROSE: No, I can't say anything about Hanford. But maybe, Andy, you can tell the audience the range of activities found in the soil to give us a feel for what kind of levels of activity and maybe compare that to the levels, the target levels that are trying to be achieved. In other words, we have clean-up goals for strontium and cesium. Maybe if you give us a range of concentrations at certain depths.

MS. ENGLISH: I think you could look at page 14, you can get a feel for it. We can walk through that.

MR. HUTCHISON: We have a table and proposed plan that outlines the maximum contamination that we found at the Naval Reactors Facility. And it compares to what we are calling our recommended clean-up levels. Like with the cesium, the maximum we found anywhere out there was 7,300, approximately, picocuries per gram. I'm not going to describe picocuries per gram, but that is an activity energy level in a gram of soil.

The clean-up level for cesium is 16.7. Now, again, I don't know a lot about Hanford, but I have heard there is a lot higher levels out there than what we have. We're talking 150 curies that are in the soil, and compared to some of the other DOE facilities, there is quite a bit more curies than that in the soils.

So as far as trying to gauge how much we got there compared to someone else, it's kind of hard to do. Again, we looked at our strontium concentrations, and the maximum that we found was, in this A1W leaching bed, right next to the pipe at 750 picocuries per gram. Our suggested clean-up level is about 45.

Again, our proposed action isn't to clean up this area or these areas, it's to clean up these other areas. This area here, the leaching beds and leaching pit probably received at least 99 percent of our total discharges. The areas that we're looking at, as far as proposing some kind of action, are these other areas which did not typically receive near the quantity of fluid that these other areas did.

MR. OLENICK: I was going to add, my familiarity with Hanford, I have been there several times to the laboratory to talk and visit a little bit, but relative perspective of some of their tank farm areas, they are talking about hundreds of thousands of curies that have been discharged into the soil in some specific areas. Certainly, it varies by site, but quite a significant difference between this facility and Hanford.

AUDIENCE MEMBER: Thank you. I don't know if I'm getting off on this, but we're correcting a problem here, so I would like to ask as a follow-up is, how are we going to address this situation in the future, as far as handling these the materials before the leaching and so forth? Am I getting too far off here?

MR. RICHARDSON: No, if I understand, is it how are we going to keep from having to go do this again?

AUDIENCE MEMBER: Right.

MR. RICHARDSON: As I said earlier, we made the decision -- started working on it in the late '60s, and by 1979 --

AUDIENCE MEMBER: Is this dealing with job analysis now?

MR. RICHARDSON: No, this is just a matter of working real hard to make sure that you keep the water exactly where you want the water, which is inside the pipes and inside tanks and inside process equipment and don't let it out into the rest of the environment. And we worked real hard at that. I won't claim that we are perfect at it, but I will say we are pretty darn good at it.

You do rehearse about your work, and you make sure to the best of your ability that you don't let the stuff spill out, like changing the oil in your car.

AUDIENCE MEMBER: So, then, when you say it can go into some kind of container that evaporates and collect it and send it off to a disposition site?

MR. RICHARDSON: We, essentially, recycle it, reuse it.

AUDIENCE MEMBER: What about the evaporated materials that are left over?

MR. RICHARDSON: Eventually, what you can do as you lose some, say, due to evaporation, we do things, also running the water through filters. We will run it through an ion exchanger, similar to a water softener, that can take out some of those contaminants. Then you can, essentially, concentrate the radionuclides enough to go through that ion exchange or processor, and you can solidify that and put it in a condition so it can't leach out and take it to an approved disposal facility. Any other questions?

AUDIENCE MEMBER: I have a question about the evacuation of the soil. What sort of protocol and procedure, how do you do that?

MR. RICHARDSON: The question, if you didn't hear it is, how do you go about if you want to excavate all this soil, how do you go about doing that? That is, particularly in some of these leaching beds, if you went off to do that, that is a -- it's not necessarily an easy process. It's doable, but there are certainly a lot of engineering hurdles that one would have to get over to do that safely.

Again, it primarily becomes a question of worker safety. If you have to have people down there -- eventually -- essentially, you have to dig it up. How you go about digging it up is where the engineering expertise has to get involved. You build tents. You have extensive metal filter ventilation systems. You have to have wetting systems to make sure that things don't go airborne.

Those are the sorts of things that get addressed when you're doing your remedial design effort, for example, or you sit down and you try to put forth some really good, well-thought out engineered solutions to those problems. But it's not necessarily easy.

MS. ENGLISH: I think, Andy, you can emphasize, too, that is what is factored into the evaluation criteria under implementability. You had asked earlier how does worker -- risk to worker during digging up, how does that factor in. It's really factored in the decision process, into that criteria implementability because, like Andy said, it's doable but some alternatives, it's more difficult than others.

MR. OLENICK: It's the increased cost.

AUDIENCE MEMBER: In Alternative 3, which is one that is being carefully considered, there is some soil evacuations. Is there the technology existing? Is there a plan for how that would be done?

MR. RICHARDSON: Yes. Again, as Mark had said earlier, most of that excavation will, in fact, be in these areas where we expect comparatively very low levels of contamination. From the sampling, 99 percent of the contamination is here in this S1W leaching bed. And we don't want to go off and disturb that soil. We will take these relatively low contaminated soils, consolidate them here so we don't have -- so we can focus what we want to watch and what we want to monitor, then build the caps over these. So it minimizes the amount and the type of soil that we do have to disturb for that remedy.

Any other questions? Okay. I guess at this point, if anybody has any specific comments on this proposed plan that they would like to get on the record at this point, I guess is the time to do that, if I heard you right.

MR. SIMPSON: Thanks, Andy. Your comments will be responded to, I think it's been mentioned, in the Responsiveness Summary section of the Record of Decision, so if you do comment, clearly speak your name and also give your mailing address so we can mail you the Record of Decision once it's signed. Who would like to go first?

No comments.

MR. RICHARDSON: Obviously, this isn't the only time.

MR. SIMPSON: Each proposed plan has a comment form on the back page and you can write your comments down and fold it and put it in the mail.

AUDIENCE MEMBER: You're doing this tomorrow night, I believe, in Idaho Falls.

MR. SIMPSON: Moscow. Thursday is Idaho Falls.

AUDIENCE MEMBER: We will make our comments that night.

MR. SIMPSON: At this time I would like to take about a five-minute break, and we will come back, and we will talk about Argonne's comprehensive investigation.

(Break).

MR. SIMPSON: Do you folks want to take your seats, please. At this point I would like to introduce the agency representatives for the Argonne National Laboratory-West Comprehensive Investigation. We have Daryl Koch from the Division of Environmental Quality and Keith Rose, once again, from the Environmental Protection Agency, and they are both going to say a few things on the Argonne National Laboratory-West Proposed Plan.

MR. KOCH: I took over this project just a few months ago from my predecessor Sean Rosenberg from the state. He did an excellent job in keeping track of documents and everything. So I had a relatively easily task. I got the draft RI/FS and went from there, so I don't see any problems from the state's perspective.

This schedule -- I think we're on schedule almost a year ahead. That is unusual at the facility. So I would like to applaud my counterparts for keeping on schedule. We're only a few weeks behind right now, not only the proposed plan or Record of Decision but this feasibility study and all that kind of stuff, but well ahead of schedule, so I want to applaud my staff.

I want you, if you can, as they go through their presentation, they will be talking about various sites of contamination. I want you to visualize what you see here. You see water. You see water. Okay. Not there naturally, pumped up from groundwater used in the facility processes, some of those processes in the past have contaminated certain sites at the ANL-West.

By the addition of water, ANL-West has created a mini ecosystem. If you take a tour of the site you will walk down these contaminated ditches and realize it's a wet land. There is cattails, there is reeds, there is birds. There is all sorts of microbule matter in the ditches. There is all sorts of animal and plant life.

So I want you to visualize that when we talk about the risks that have occurred to these ditches and ponds. You will hear about radiological contamination, those heavy metal contaminations from various processes. That was all in the past. The thing now is to go through risk assessment process, which I will explain to you and what the levels of contamination are and what we want to do about that.

I want you to visualize this water has been what the site has needed. Water has created this wetland, which you will see in the preferred remedy, is what we're trying to protect. It's kind of an unusual system here. The preferred remedy, we don't really want to mess with the ecosystem even though we created it artificially by pumping up groundwater.

In the future, when the facility essentially goes away in about 35 years, that ecosystem will likely go away as well because there won't be any water pumped up into the surface unless they want to keep the pumps running. But in the meantime, you will see the preferred remedy, we call it a holistic approach to let Mother Nature, essentially, take care of the contaminants that would be a concern to the plants and animals that are already living there. That is why they are going to take a clean-up action.

It's sort of a circuitous procutuous route that we are trying to do here. We kind of messed it up a little, yet using plant species, we hope to clean it up a little and not go into these ditches and ponds right now and, essentially, haul it away to some other place, more or less let Mother Nature take over. So we will see how you like that proposed remedy.

MR. ROSE: The Environmental Protection Agency has also reviewed the Remedial Investigation, the Feasibility Study and the Proposed Plan for the Argonne Lab-West. We have reviewed and commented on documents and we concur with these documents.

Once again, we're going to use the nine evaluation criteria to determine which of the alternatives is the best alternatives for this facility with input from the public, the community and from the state. We work with the state to determine what the best alternative is in the

Record of Decision coming up later on this year.

The Preferred Alternative for Argonne, which you will hear about in the up-coming presentation, involves an innovative treatment technology, which we find very interesting, and we believe has a lot of potential. It's called phyto remediation in which plants are used to uptake the contaminants of concern, in this case radionuclides including strontium and cesium, and once taken up into the plants, the plant is harvested and taken off site for consideration, then the ashes then disposed of. It essentially is the ultimate volume reduction technology. So we find it very interesting. We believe it has great potential.

If anyone has any questions of me, you can either ask them now or later after the presentation. Thank you.

MR. SIMPSON: Thanks, Keith. At this time I would like to introduce Greg Bass. He is the Waste Area Group 9 manager for Argonne National Laboratory West representing DOE-Chicago. Greg.

AUDIENCE MEMBER: Can I ask a question? How do we come about the name "Argonne"?

MR. BASS: There is neighborhood on outskirts of Chicago, Illinois called Argonne. And it's just a -- well, it's a little town. It was named after the Argonne Forest in France. And the first Argonne National Lab was built there near that town, Argonne, Illinois. It became known as Argonne National Laboratory, and they built Argonne National Laboratory-West in Idaho, it's sort of a test station for research being done back in Illinois.

Briefly, as advertised, I'm Greg Bass. I work for the Department of Energy, Chicago operations office. My office is at Argonne National Laboratory-West, which is located on the INEEL, which is in southeastern Idaho. We're in the southeastern corner of the INEEL here, and it's about 30 miles to Idaho Falls from Argonne National Laboratory-West.

This looks like an UFO convention, however, this is a national laboratory. This is the Transient Reactor Test Facility. This is a small research reactor of which we have five. This is Zero Power Physics Reactor. Inside this mound is the Advanced Fast Source Reactor, another small research reactor. This is the Experimental Breeder Reactor 2. A reactor that we operated until 1994. The only reactor that still has fuel in it and is still operating is our neutron radiography reactor, which is in the basement of this rectangular building.

Over the years, Argonne has had several missions with national and international sponsors. And since 1958, we've done nuclear reactor fuel research. Mainly developing a reactor that can recycle its own spent nuclear fuel within the same facility. Also we developed a reactor that can shut itself down, should it lose all of its coolant capabilities.

Our modern missions, starting with 1990 have been characterizing radioactive waste that is destined for the WIPP Facility down in Carlsbad. We can't ship the thousands of drums of transuranic waste stored at the INEEL to WIPP unless it's characterized first to some extent. I mean, we do that at Argonne and are continuing to do that.

Our core mission these days is spent fuel stabilization research and development. We take spent fuel that has a constituent such as sodium that render it unsuitable for geologic disposal in a national repository, and we turn it into waste forms that are thought to be acceptable for geologic disposal. So that is a very important mission. And we are applying a lot of our fuel cycle technology to making this spent fuel stable in the environment.

I'm going to go over, briefly, what we believe the problem is and where some of this contamination that got in our ditches and ponds came from. Briefly, throughout our mission in the '60s, we had an analytical laboratory right here which did radiochemistry, dissolving spent fuel samples. And the radioactive liquids from that analytical chemistry were disposed of in a combined sanitary industrial radioactive nuclear waste piping system which ran along here and then discharged to a leach pit, which is essentially a rock-bottomed septic tank about 40 by 15 by 15 feet deep. That was used in the '60s to dispose of all our liquid waste, be it sewage or industrial waste or radioactive waste.

This leach pit is no more. We cleaned it and the pipe leading to it up in 1993. By that, I mean, that we broke apart the concrete lid and the walls to the leach pit. We cleaned sludge out of the bottom and we backfilled the pit with clean fill. We also took out several hundred linear feet of pipe that fed the leach pit.

At sometime during its operation, the leach pit inadvertently discharged some radioactive liquid into this interceptor canal. This interceptor canal was built to channel storm water away from the Argonne-West site and into this low spot, which is our industrial waste pond. The inadvertent discharge of radioactive liquid contaminated the shallow sediment in this interceptor canal and also contaminated sediments that are in the bottom of our industrial waste pond with cesium-137. These three locations --

AUDIENCE MEMBER: When was that? What was the date of the inadvertent?

MR. BASS: We believe it was in 1972 that happened. As a response action back in 1976, they did excavate the contaminated soil to the standards at the time, that time being 1976. But we're finding out now that with our risk assessment process, that definition of clean is no longer clean enough. And we're going to have to take some action with both the interceptor canal and the mound of soil and plant matter that was excavated from the canal.

These three sites: industrial waste pond, the mound and the interceptor canal are the only sites at Argonne-West that pose an unacceptable risk to human health. That is important to remember. All these other sites, such as these ditches, show unacceptable risk to ecological receptors, those being plants and animals that could burrow or grow in the vicinity of these ditches.

A little bit about those ditches. The ditches are contaminated with heavy metal such as arsenic, chrome, mercury, selenium, et cetera, and in the case of industrial waste lift station discharge ditch, our photo lab routinely in the '60s discharged liquids that were contaminated with these heavy metals to that ditch. These other ditches, the main cooling tower blow-down ditch were contaminated with metals that were used to control algae growth and scaling in industrial waters that we used in our steam plant.

Once again, the heavy metal contamination, as well as the extensive cesium contamination, is very shallow. We found it to be a problem from one to three feet down. So unlike NRF, our contaminants are very shallow and easy to get at. The sewage lagoons currently do not pose a threat to ecological receptors for the reason that the sediments on the bottom are covered by water and no burrowing animals can get to the contaminants at this time. Should we ever abandon the sewage lagoons and they dry up, it would then be a problem for the animals and some action would need to be taken.

AUDIENCE MEMBER: Do you know when the sewage lagoons were established?

MR. BASS: They were built in phases. The first one was built in the late 1960s, and the newest one was but the in '76 -- where is Scott?

MR. LEE: It sounds correct.

MR. BASS: Yeah, 1976. The large one was built in 1976.

MR. LEE: '74 or '76.

MR. BASS: But I've gone over a little bit of our problem, and I'm going to let Scott talk about the process by which we define these problems and our alternatives for cleaning up these sites, which include a rather unique alternative that Daryl went over briefly, that being the use of plants to take some of these shallow contaminants out of our ditches and pond bottoms.

So I would like to let Scott come up here. Scott works for the University of Chicago who operates the Argonne National Laboratory Facility for the Department of Energy.

MR. LEE: Just informally, does everybody have a copy of the proposed plan? You may or may not have a copy. These are for your information.

As Greg mentioned, I work for the University of Chicago, which operates the Argonne National Laboratory. This is a brief summary of the overall project. These two binders, double-sided paper contains about 2,600 pages is the Comprehensive RI/FS. The proposed plan in your hand is a 28-page summary of it. And we will try to give you a little more detail to fill in the gaps today.

Argonne National Lab is identified as WAG 9 on the INEEL. We have 37 identified waste sites in the Federal Facility Agreement Consent Order that Rick had talked about earlier. We have divided those 37 sites up to 43 sites. We have a couple of ditches that were subdivided because of physical dimensions. This interceptor canal ditch had an associated mound. There are different exposure pathways to different receptors in the future. So to make it easier and a better risk assessment, we divided the mound from the interceptor canal. In a similar fashion, we divided the industrial waste pond, which has standing water and has completely different exposure pathways from the drainage ditches that collect intermittent surface runoff that flows out there. So we have taken 37 sites, and now we're talking about 47 distinct units.

We have -- 43, I'm sorry. In this comprehensive RI/FS of the Argonne facility, we're looking at the comprehensive risk associated from the Interceptor Canal mound and ditch together with industrial waste pond and all these other units. That is how the comprehensive risk different from the individual risk. So we've evaluated all waste sites and Argonne National Laboratory-West in the comprehensive risk assessment, and we've included two waste sites from WAG 10. WAG 10 is the INEEL, the overall INEEL.

One of those WAG-10 waste sites is a wind-blown contamination and another site is a stockpile, soil that was approximately a half mile down the access road. How did those sites affect the risks from our sites? To accomplish this we've collected over 9,400 contaminants, specific samples at the Argonne National Laboratory-West.

We've completed the Track 1, Track 2 process. All of our Track 1, Track 2s have no further action determination. One site, EBR-II leach pit was used to dispose of our radioactive liquid up until 1975. We had what we determined to be an unacceptable risk by leaving that in place, so we went off and cleaned that up in 1993.

The liquid waste from 1975 through 1993 were treated at our analytical lab in an evaporator, and the contaminants sent off for disposal. Once we stopped that process, our contaminated radioactive liquids are sent up to a system that is called a shade's system. It's a newer type of a self-contained evaporator, so we are not discharging anymore radioactive liquids at the Argonne National Laboratory.

All of these sites were, again, reassessed in the Comprehensive RI/FS to make sure that we haven't overlooked any contaminants, any pathways, or maybe we have new information that showed a new contaminant or a new site. So we have taken that and put it into the Comprehensive RI/FS. We are currently at the public comment period. The next step is the ROD, and then based on the comments we will determine our next steps.

Similarly to NRF, we have similar pathways. We have an occupational receptor, which is someone currently working on the site for the next 25 years, for 250 days a year. And we have a future resident scenario who are there 350 days a year. That is a person living at the Argonne site 100 years in the future. They will start living there at year 100 from now (2097), and they will continue living there for 30 years, 350 days a year.

For all receptor pathways, we've looked at soil ingestion and industrial inhalation, inhalation of volatiles, direct radiation exposure and dermal contact. And specific to the future residents, we have looked at ingestion of groundwater and inhalation of the contaminants in the groundwater in a hundred years through the inhalation pathway. Have also looked at the ingestion of homegrown produce. If they used this groundwater, what effect does that have on what they are going to take in?

Based on that evaluation and going through the risk assessment calculations, we have determined that cesium-137 is the only contaminant that poses unacceptable risks to the human health exposure pathway. As Rick pointed out, we only have this in three sites: industrial waste pond, the interceptor canal and the interceptor canal mound. The concentrations with cesium-137 are in parenthesis underneath. Twenty-nine picocuries per gram in the industrial waste pond. The interceptor canal has 18 picocuries per gram. And the interceptor mound, that dredge pile, has 30 picocuries per gram. This one-in-10,000 risk levels from CERCLA. The current concentration of cesium that would be acceptable is 23 picocuries per gram for a receptor living there right now. Not the occupational but the receptor. So you can see, we're over it, and for the occupational receptor, we're slightly over.

We have taken the residential exposure scenario 100 years from now (2097), what are the effects if we leave the contamination in there and it decays through its natural decay process.

AUDIENCE MEMBER: I'm probably just tired now, but mine doesn't match yours in terms where the bars are going -- I am tired. Here we go.

MR. LEE: We're on the residential

exposure. Through natural decay of the cesium, which has a half-life of approximately 30 years, if we left those contaminants there, this is the concentration or the curies of the contaminants that we have. What was 29.2 picocuries per gram would reduce down to 2.3 picocuries per gram through natural decay after 100 years.

We can see that this interceptor canal, based on the future residential scenario, is now within the acceptable range through natural decay. And, again, the mound would be right at that threshold.

Again, these three sites, the spill occurred right down here, contaminated that ditch all the way up to the pond. This canal was dredged and those soils are on this mound right now, and the contaminant, again, is cesium-137.

You will not have this slide in your overhead. We combined it with the human health one. We separated it to make it a little easier. In addition to evaluating the risk to human health and the environment, we have to look at the risks to the population of animals on the INEEL. We have created, as Keith said -- by having our water out there on the desert, we created this ecosystem.

I'm not going to call it a wetland because it has other implications with the U.S. Corps of Army Engineers, and we won't get into that.

But we have identified 12 inorganics that potentially pose unacceptable risks to individual ecological receptors. And if you could go to the next slide. These are shown in the next table. We have the interceptor canal again, which also has human health risks. We have the industrial waste pond, which has the human health risks. We have ditches A, B and C, and we have main cooling tower blow-down ditch, sewage lagoons and the industrial, waste lift station discharge ditch. Those are all shown on the next overhead. Greg has talked about those. And we will go to the next one.

Now, we have identified our contaminants. We have identified the sites that pose unacceptable risk. Now we're going to identify the cleanup or action levels. And we have a remedial action objectives for human health and the environment to clean up to any risk that is greater than one in 10,000. And for the protection of the environment, we're going to clean up any site that has a hazard quotient greater than ten.

We have evaluated 28 different treatment technologies. We have reduced some of those technologies, and we ended up with five alternatives. The first alternative, no action, we have to include as our baseline. And it's used to assess what is the effect of doing nothing on the sites.

Our limited action is what happens if we put a fence around and possibly monitor what are the future effects. We have containment with institutional controls, which is basically capping in place. I will talk about that later. And we have evaluated excavation disposal, which is capping off site or off the INEEL. And we have phytoremediation.

The EPA stipulates under CERCLA, the Comprehensive Environmental Response -- Liability -- whatever, Act, that we had the nine evaluation criteria for assessing these alternatives.

The first two are the threshold criteria, and if we do not comply with protection of human health and the environment or we do not comply with the ARARs, or Applicable Relevant and Appropriate Requirements, we have to screen our remedial alternatives. In our case we have screened off no further action, or no action because it does not meet the threshold criteria. And we screened off Alternative 2, limited action because it does not meet the threshold criteria. In addition, we have screened off one alternative, The native soil cover, cover evaluation, Alternative 3A. The other modifying criteria, we will show a table evaluating each alternative against each other based on that criteria later.

The next slide. As mentioned before, the Alternative 3, the containment, basically, means that. We scoop up the contaminated soil. We put them under a protective cap, and we continue monitoring that for a hundred years. We haven't treated the soils. We haven't done anything. We moved it from one location and put it in another. The type of cap that we're looking at is similar to the one that has been used at the SL1 project NRF is possibly looking at using that type of cap also.

Alternative 4 is excavation and disposal. This is where we would remove the contamination similarly to Alternative 3, but we would dispose of it in an on-site, that means on the INEEL location, possibly at RWMC. This is Alternative 4A. We have the possibility of putting that soil on the site on the INEEL at a proposed INEEL soil repository.

Alternative 5 is phytoremediation. Phytoremediation is actually using of plants, phyto, to remove the contaminants from the soil. We have, as Greg mentioned, contaminants in the upper foot or foot and a half of soil, very susceptible to the root zone of the plants. We have identified an off-site use or off-site disposal area for these plants. We would remove the plants, root and all, dry the plants, bale the plants and then send it off to an incinerator. We have one incinerator on the INEEL at the WERF incinerator, which is currently operating. We're not sure it will be operating in the future, but that is one possible treatment facility to further reduce the contaminants.

The advantages of using phyto over Alternatives 4 or 3 are that we're dealing with less than one percent by weight of the material, and we're actually treating versus just removing the soil from one place to the next.

AUDIENCE MEMBER: On that, would that

involve more than one crop?

MR. LEE: Exactly. For the cesium contaminants, I have three overheads, which are kind of hard to put up on the screen, but we have assumed one has a 5 percent uptake by plants. One has 4 percent uptake by the plants and one has a 3 percent uptake each year by the plants. If we look at the 5 percent uptake, which is not that unrealistic for some of these contaminants, we would meet acceptable levels in four years. If we look at 3 percent, we can obtain acceptable levels after six years. These are kind of hard to see, but I can show you those afterwards.

AUDIENCE MEMBER: I have a zillion questions.

MR. LEE: Save those for about three more slides. The evaluation criteria, as I stated above, stated prior to this, we have evaluated each of the retained alternatives with the evaluation criteria and have ranked those as to how well they meet these requirements. It's not a ranking: this is the best, this is the worst, but they have to be either -- they are ranked as far as being the best, are they good at meeting it or are they the worst at meeting it?

AUDIENCE MEMBER: Do we have a focus problem there?

MR. LEE: We had a scan problem on that one. It's a scanned image. The one in your proposed plan is much better. It's table 3 on page 17.

To retain an alternative, we are had to meet the first two threshold criteria. And Alternatives 3a, 4a, 4b and 5 all meet that criteria. Some meet it a little better than others, but they all fill the requirements.

For long-term effectiveness and permanence, we have ranked Alternative 5 at being the best at meeting that because it does provide some permanence versus just removal of the contaminants off site. If the contaminants stay on site, we rank that the worse as far as Argonne is concerned.

The same goes for a short-term effectiveness. We're going to have some exposures to people. We can deal with those with safety and health issues, and they are easy to deal with.

Production of toxicity and mobility and volume through treatment, Alternative 5 is the only alternative that treats the soil, so it obviously ranked the best.

Implementability, Alternative 3a, and 4b are easily implemented. They are currently being used at other facilities, and so we had to rank Alternative 5, phytoremediation, as being a little harder to implement because there are some unknowns associated with using phyto, and we're not going to hide that.

The costs are shown in the bottom. We have $7.6 million for Alternative 3a. That is Table 4. I think it's on page 20, if you're looking at a proposed plan -- I'm sorry, it's on page 18.

The costs of using Alternative 4b, which is removing the soil and sending it to another INEEL facility, those costs are 5.9 million. And we look at Alternative 4b, take in the soil, bring it over to Central Facilities Area, put it on a rail car and sending it down to Utah, those costs are approximately $13.1 million.

The cost for phytoremediation using seven field seasons, which gives us a safety factor, is anticipated at $2.8 million. So obviously phyto ranked the best.

AUDIENCE MEMBER: Is there a yearly fee

or a one-time fee or how does that work when you send it to Enviro-Care?

MR. LEE: Enviro-Care has what they call a tipping fee. It's a per volume fee. That is currently about $400 per cubic yard.

AUDIENCE MEMBER: Does that vary, based on the type of materials?

MR. LEE: Yes. These soils are considered low level radionuclides. It's $400 per cubic yard. The INEEL facilities that were evaluated in Alternative 4a, potentially RWMC or the INEEL soil repository, the dollar value that their tipping fee is approximately $10 to $14 per cubic yard. So in addition to having costs associated with using a train to truck your soil down to Utah, you have $386 per cubic yard, and we have 19,600 cubic yards, so you can see that is starting to escalate.

In summary, we have identified 34 -- I should phrase this differently. In summary, we have identified 39 units we have evaluated at Argonne. Thirty-four of those have risks that are currently acceptable and will be acceptable in the future. Those are will require no additional action. Those are shown up here.

We have five sites that are broken out into nine distinct areas that have unacceptable risks. Three of those have unacceptable risk to human health and eight of those have unacceptable risk to the ecological receptors.

We evaluated the remedial alternatives that could work for the Argonne National Laboratory. We based it on the evaluation criteria. It looks like Alternative 5 is the best choice or Preferred Alternative for cleanup. All these areas at the Argonne National Lab have involved using the plants to remove the contaminants, and then sending those plant matter off to be incinerated and then the ash would be consolidated and sent to a facility in Utah.

We are at the public comment period right now because we are soliciting your input. We want your questions. We want your concerns. And we want to record those. We encourage you to ask questions and ask for clarifications on anything that we have presented here tonight.

Again, our public comment period started January 12th and will be completed on February 10th, similar to Argonne or NRF. And Record of Decision follows in a timely fashion, and our

Record of Decision is due this summer, which will document our Preferred Alternative, will document your questions and comments, and it will have our responses to those comments included in the Record of Decision. And we are currently scheduled to start implementing our alternative in the summer of 1998, this summer.

So with that, you probably have a ton of questions, so I'll have Greg Bass come up here.

AUDIENCE MEMBER: I wanted to go back to talking about plants. I had a chance to read what it said and got some of my questions answered.

So at this point plants, specifically, haven't been determined as to which plants would be used; is that correct?

MR. BASS: As we speak, we're setting up an experiment in a greenhouse, a climate-controlled greenhouse at Argonne National Laboratory-East in Illinois. We sent them several bucket loads of our soil from our ditches at contaminated sites. They are going to experiment with different types of plant species on our actual contaminants, even our soil to see what kind of removal efficiency they get using different species. We prefer that they use native species, things like willow and poplar family plants such as the Lombardy poplar for this type of remediation.

AUDIENCE MEMBER: Fast growing.

MR. BASS: Fast growing. They take up a lot of water, and they tend to sequester the heavy metals and radionuclides that are of a concern to us in their root system rather in their stems and leaves where other animals could browse on them.

MR. LEE: The people that are doing this test back East are Ph.D.s from the University of Chicago. They are experts in phytoremediation. We're utilizing their expertise in helping us along.

AUDIENCE MEMBER: This is going to be exciting. Moving on, the incinerator at INEEL that could be used for these -- there is an existing incinerator -- are you also consider using a advanced mix waste treatment facility as a possible option?

MR. BASS: I couldn't quite hear that. What is that? Do we propose to use an advanced mixed waste treatment facility as an incinerator for our plant matter? The timely, unfortunately, is not right. The advanced mixed waste treatment facility would not come on line soon enough for us to use it.

AUDIENCE MEMBER: All right. And you answered my question. The plants will uptake other mixes of materials depending on what the plant gets?

MR. BASS: That's right.

AUDIENCE MEMBER: The last question, then, is the off-site disposal facility. Why off site and where off site for the ash?

MR. LEE: Why would we send the ash off site? At WERF specifically, they accept all kinds of waste from all the INEEL facilities. They do not treat their ash as an individual component, and you can deal with that. They do so many burns and then take ash from all these different areas to be tested, analyzed, solidified and then sent off site. Typically, I believe it's still in a mixed hazardous dried form, and we do not have the facility on the INEEL to accept that.

AUDIENCE MEMBER: I have a question. In this Alternative 5, is that going to require some irrigation?

MR. LEE: Yes.

AUDIENCE MEMBER: Is that going to have an effect on the contaminants that we're trying to remove as far as them moving deeper into the substrata.

MR. BASS: The fact that they have not moved very deep over 35 years of them being in there means that they are not readily mobile. One particular contaminant, cesium, we are looking into adding soil amendments, things like ammonium fertilizers, which plants like anyway, that would enter the soil and free up the cesium, which would enter the soil water in solution and then be taken up by these plants.

AUDIENCE MEMBER: What about plants as monocotyledons like cattails and brushes and some of these brush grasses? Is there any consideration? Some of those would require more water. Would that have an adverse effect.

MR. LEE: We actually have cattail reeds and blue/green type algae growing in some of these ditches right now. We were too late in the field season to go out and select samples of living plants, living tissue, to see if they already have already uptaken the contaminants.

We believe the contaminates are in the upper soil in the ditches I can show you some graphics afterwards. We believe they are because in the ditches where we have this real heavy septic anaerobic soil, real dark soil, our contamination is right around a foot and that is this whole active root zone. So this coming summer, we are hoping to go out there and see if these plants have actually been extracting contaminants.

MR. BASS: Scott, speak to the geology depth at Argonne.

MR. LEE: Argonne has, just like NRF, we have a thin layer of soil over this volcanic lava-flow type geography. That layer of soil that has been deposited by wind over the years, varies from just about zero feet to 14 or 15 feet in some areas. Typically at the bottom of our ditches, there is not that much soil, less than 4 feet of soil. So that means our contaminants are reachable by these root systems, especially looking at the plants that we're looking at using. So we don't think any of our contaminants of concern will be able to escape these root systems by being too deep or otherwise or other factors.

MR. KOCH: I was going to add that at other sites across United States, especially, treatment sewage plant used quite often to remove the contaminants from the water, especially metals. It's not a new technology. It's just new to us.

MR. BASS: That is true. Phytoremediation is in use at other DOE sites. The Ashtabula site in Ohio is using plants to remove uranium, for instance, from their soils. Army installations are using plants to extract explosive chemicals from their soils. Phytoremediation is being used at Chernobyl for their problems over there.

Phytoremediation research at Argonne East has been going on since 1990. So they have seven years under their belt, and they know what to look for, and they know when a plant is doing what we want it to and when it isn't. We're lucky to have that expertise at our disposal.

AUDIENCE MEMBER: I have to say this because I just amuse myself with it, but I hope that we don't have the Society for the Prevention of Cruelty to Plants.

MR. BASS: That is true. I will have to give the plants we select a pep talk before we plant them.

AUDIENCE MEMBER: You might mention what the local Indian tribe thought of phytoremediation.

MR. BASS: The Shoshone/Bannock are our neighbors in eastern Idaho. They actually have used plants to consume nutrients in their waste waters that are discharged to the Snake River. They are at Fort Hall. They are very receptive to the use of living things to extract these contaminants, to do something that really we don't have the manmade technology to do right now.

So as far as the response that we got from giving a similar briefing like this to the Shoshone/Bannock tribe, they are proponents of phytoremediation.

They, like others, have a concern that we not introduce any exotic species to the INEEL that could reproduce or cause some sort of ecological harm, and we've heard their comments and we are going to take those comments very seriously in our selection of species.

MR. SIMPSON: Thanks, guys. Would anyone like to comment for the record on this project at this time?

I will just mention that the comment period remains open until February 10th. And like I said earlier, there are comment forms on the back of each proposed plan.

I also wanted to mention that we will be back out conducting public meetings next month on the Test Area North Comprehensive Investigation, that will be later in the month of February. And then in late March or April we will be back to talk about the Waste Area Group 3 comprehensive investigation, which is the Idaho Chemical Processing Plant. So we have a real busy spring ahead of us.

Anyhow, thanks for coming tonight. We'll hang around after the meeting if you have anymore questions you would like to ask.

AUDIENCE MEMBER: Have you set the dates for the February waste area?

MR. SIMPSON: They are tentatively set. Okay. Thank you.

(Meeting concluded at 9:30 p.m.).

STATE OF IDAHO)
) ss.
County of Ada)

I, N A N C Y S C H W A R T Z, a Notary Public in and for the State of Idaho, do hereby certify:

That said hearing was taken down by me in shorthand at the time and place therein named and thereafter reduced to computer type, and that the foregoing transcript contains a true and correct record of the said hearing, all done to the best of my skill and ability.

I further certify that I have no interest in the event of the action.

WITNESS my hand and seal this 23rd day of February, 1998.

Nancy Schwartz
Nancy Schwartz, Notary
Public in and for the
State of Idaho

My commission expires:
September 28, 1998