ABBY JOHNSON'S

INTERVIEW WITH RUSS DYER

EUREKA COUNTY, NEVADA

YUCCA MOUNTAIN LESSONS LEARNED PROJECT

held in

CARSON CITY, NEVADA

November 23, 2011

(5:06 p.m. - Begin Tape 1.)

MS. CLANCY: Today is November 23rd, 2011. We are in Carson City, conducting an interview for the Yucca Video Project. And we are with Abby Johnson, interviewing.

MS. JOHNSON: My name is Abby Johnson. I'm the Nuclear Waste Advisor for Eureka County, Nevada. This is Yucca Mountain Lessons Learned Video Project, and today we are interviewing Russ Dyer, who is retired and from the Department of Energy.

(5:06 p.m. - End Tape 1.)

(5:06 p.m. - Begin Tape 1-1.)

MS. JOHNSON: Russ, I want to thank you very much for being part of our Lessons Learned Video Project for Eureka County. I really appreciate your time, and I'm hoping that we'll cover everything we need to in the next hour or so. The first question I'd like to ask you is just about your background, your career, how you came to work for the Department of Energy, what your educational background is, and when you first got involved in the Yucca Mountain Project for DOE, and what did you do for them?

MR. DYER: Okay, let's start off--you know me as Russ Dyer. My full name is James Russell Dyer. Born and raised in Oklahoma. I'm a geologist by training. I got my Bachelor's at a little school in Houston called Rice, and I did my Ph.D. at Stanford. After I finished my Ph.D., I was a

university professor, a Geology Professor, at the University of Texas at El Paso for about six years. While I was there I kept getting calls from one of my classmates at Stanford who was trying to hire people for a program that he was involved in at the Department of Energy, and he knew the kinds of things I had worked in, analytical side of geology, and he was interested in trying to get my students involved. And after a while, I said, "Well, my students are not interested but I'll come talk to you." So I did, and I ended up taking a job with the Department of Energy in 1988. August the 1st, 1988 was when I came on board with the Department at the Yucca Mountain Project. At that time we were at 101 Convention Center Drive, down between the Stardust and the Convention Center in Las Vegas.

Earlier there was a closer association with the Weapons Program, Nevada Operations Office, but before I came there was a very distinct split between the Yucca Mountain effort of DOE and the Nevada Test Site, the weapons part of DOE. So I came after that split, but not much after that split. I came on board as a staff geologist and progressed through the ranks as a staff geologist, a branch chief, a division director, I was the Acting Project Manager, I was the Project Manager, I was the Special Assistant to John Arthur when John Arthur came in as a Deputy Director for the program, and then I became the Chief Scientist, and that's

what the role I retired out of in--December 31st, 2009 is when I retired. The vagaries of federal retirement law are kind of interesting. You need to do things by a certain date to get the full benefit.

So that's pretty much the background. Anything particular you want me to go into?

MS. JOHNSON: Well, I wanted to ask you about being a manager because from my limited perspective of observing the project over the years, it seemed like one of the biggest challenges was to be able to manage contractors in Nevada, contractors doing work somewhere else, the national labs and DOE employees. And so my observation was that you had very strong management skills as well as a good scientific background.

MR. DYER: Okay, and actually that's one thing I'll give DOE credit for. It was a highly technical program. Now you have a choice, you can either take a manager and try to make--give them enough technical expertise to understand when to say yes or not, or you can take a technical person and put them in a management position. I had a--well, I had another part of my background I didn't talk about. I spent five years in active duty in the navy, and then was in the Reserves for about thirty years. So I had quite a bit management experience through the navy. I was an officer, I retired as a Navy Captain. So I had both management and

technical experience, so that was something that not everybody--not every Ph.D. has that kind of background.

MS. JOHNSON: Did you spend more of your time managing or involved in science?

MR. DYER: Regrettably, I spent most of it managing. Management is about people, and the technical stuff pretty much takes care of itself. The decisions to make of what to fund and what not to fund, those were legitimate management decisions, but most of the management challenges that I had had to do with people.

MS. JOHNSON: Were there specific challenges about the different--you had so many people working for you, and so many of those people were working for someone else, for a national lab, who then works for DOE, a variety of the--what's it called, M and O, the management and operations contractor, and then all the people they work for. It seems like you're like an orches--you're the leader of the orchestra, kind of.

MR. DYER: Well, yes and no. Yes, we had a management and operations contractor, we had a series of them, that might have 1,500, 1,800 people working for them, but they didn't work for me. There was a contractual relationship between the Department of Energy and that contractor--actually, every contractor--so it's really not allowed for me to give direct--or for any DOE employee,

except the contracting officer, to give directions to a contractor. All of that comes through the contractual vehicle. And that's one of the things that everybody had to become familiar with, is that all of the contractors we had were not an augmentation of DOE staff. They had a job to do. That job was laid out in a contract and their mission was to execute that contract.

MS. JOHNSON: Wow, that's a--I didn't quite realize it worked that way where you, who would understand the technical information and might need the contractor to go further in a particular area, couldn't direct them directly but--

MR. DYER: Well--

MS. JOHNSON: --would need to go through the contracting--

MR. DYER: You--

MS. JOHNSON: --officers.

MR. DYER: You could do it but you had to do it through the contractual vehicle. You had to make a change to the contract, or to the annual operating instructions that the contractor was operating under.

MS. JOHNSON: Were the people who had direct contact with the contractor, were they also people who understood the science and the engineering, or were they pretty much people who understood how to do contracts?

MR. DYER: They were pretty much people who knew how to do contracts. Now there was also--I mean, the contracting officer had to be a qualified contracting officer who has a--who has met a series of qualifications and hold what's called a warrant.

MS. JOHNSON: Oh.

MR. DYER: And there are different levels of warrants, depending on the value of the contract. Many of our contracts were a hundred, $200 million contracts. So they would require that the contracting officer had the highest level of qualifications, of the highest warrant, that was available. But they were contractual specs--specialists. They would have to rely on input from the technical specialist as to what really needed to be done so that we could put modifications in place to steer the contractor and to--if something came up, if the results of a test were not quite what we expected, then we'd have to modify something else in the program, go back and do more tests, or modify something else.

And all that had to do--had to be done through a series of integrated contracts, not just through the one M and O contractor, but you mentioned the national labs, which had various parts of the technical program. And we split the technical program up into areas of specialty, if you will, so Livermore was, for instance, was in charge of the waste

package conceptual development and looking at the, oh, determining the performance of different materials that might go into the waste package; whereas, either Lawrence Berkley Labs or the U.S. Geological Survey were looking at waterflow within the mountain, or the changes in chemistry, and some of the information that they developed about how the water chemistry in a certain area might change what you want Livermore to focus on in the materials. So it all was very interrelated and we had to keep our hands on what was coming out of everywhere and then make tweaks to different parts, and sometimes some fairly major changes too.

MS. JOHNSON: Yes. Let's move on to the next question.

(5:17 p.m. - End Tape 1-1.)

(5:12 p.m. - Begin Tape 1-2 Corrected.)

MR. DYER: --I mean, the largest staff that I think we ever had when I was the project manager, we had 105 DOE employees, and that covered the entire gamut; that was financial, that was contracts, that was outreach, that was quality assurance, that was the health program, that was the technical program, which was dominantly science. Engineering was a separate program, the field management, and so all of those things were covered by about 100 employees. And, obviously, 100 employees could not do all of the work that had to be done.

Helping those 100 employees were the contractors, so the management and operations contractor might have 1,500 to 1,800 employees. The U.S. Geological Survey at times had 100, or maybe 120 employees. The Los Alamos, Livermore, Sandia, Lawrence Berkley Labs, all of those had between forty and maybe 200 individuals who were associated with the program. So they were the ones that were actually doing the work. They had the facilities, they had the laboratories, they had the computer resources, they had the field programs. So the DOE employees were not the actual researchers.

And whenever--I mean, we staffed up. When I came to work for DOE there were about thirty employees, and that grew significantly. And I did a lot of the recruiting and a lot of the interviewing, especially on the technical side, and we were specifically looking for a particular kind of person. And my ideal employee--I had to explain to everybody that I talked to that if you're looking at a career in research, this is not the job for you because you're not going to get to actually do much of the work. There were a few people that were able to juggle their other duties and actually help some of the other researchers and actually do some research, and the co-authors on paper, but that was rather unusual.

What I was looking for, primarily, in my ideal employee, was somebody who had the educational background,

already had the experience, had a technical reputation if they will--if you will, already developed, and could read and understand the work that was being done, as it was being done, and evaluate it, make suggestions of whether we've got enough of this, if we need to do more of that, looking at the commitments that we have made to the Nuclear Regulatory Commission, or to other entities, the Nuclear Waste Technical Review Board, even the affected units of local government. We had commitments to them. Were you fulfilling all of those commitments? Were there some things that we needed to do more of? Or, in some cases, we had done enough. Well, we already knew the answer; we didn't have to do the rest of the program that we had laid out. So, making sure that people understood, before they came to work for DOE, what kinds of jobs they would be doing was very critical to keeping a satisfied employee; otherwise, they're going to be frustrated and we're going to be frustrated.

MS. JOHNSON: That's fair helpful.

MR. DYER: Uh-huh.

MS. JOHNSON: So you've kind of laid out the--the sort of the broad landscape of how this worked, but then there's the political process. DOE is part of the Executive Branch of government, and there was a lot of turnover with Secretaries of Energy who then appoint Directors of the Office of Civilian Radioactive Waste Management. How did

that process of turnover at the highest levels of government affect the program?

MR. DYYER: Huh. Well, there is no getting away from the fact that this was a highly political program. I don't care who was in the White House. If you go back and look at when major pronouncements or decisions were made, they were always made with either elections in mind or major political pronouncements to put whoever was in the White House in the best possible light, and that it did not matter who was in--who was in the White House.

There was--there was a lot of frustration, on my part, with the turnover in the top leadership, the Director of the Office of Civilian Radioactive Waste Management. That was a political appointee, and there were several people in there who really were not qualified to do anything with radioactive waste. They had absolutely no technical experience at all.

Let's go back to what I said, do you want to take a manager and have them--and push them into a technical job, or take a technical person and make a manager out of them? There were a couple that stood out and they were the ones that had both managerial experience and technical experience, and the two that come to mind, Ward Sproat, our last director--well, when I was there Ward had just left--who had gobs of experience in the commercial nuclear power business

on both the technical and the managerial side, and Lake Barrett, who was never the director but he was the acting director for, I think, twice as long as any director that we had. And Lake came from the same background in nuclear power, Nuclear Regulatory Commission and DOE. They were both, I think, highly effective because they could deal with management issues, they could sort out for themselves the technical side of things, and make their own judgment as to what their priorities were in technical issues, and they were familiar with the regulatory environment in which we had to work. This is not just a program where you can go out and do anything you wanted to. It wasn't a wide-open research program, it was done under the very stern eyes of the Nuclear Regulatory Commission and the oversight bodies, such as the Nuclear Waste Technical Review Board.

MS. JOHNSON: Let's move on to the next question. You have talked about when--

(5:21 p.m. - End Tape 1-2 Corrected.)

(5:13 p.m. - Begin Tape 1-3 Corrected.)

MS. JOHNSON: --the Director of the Office of Civilian and Radioactive Waste Management was a strong leader, who had that mix of management and technical ability and an understanding of the regulatory context for the Yucca Mountain Project. When you didn't have that, how did that affect your job and the ability of the program to move

forward?

MR. DYER: In general, what we did was, in a given year we would start planning for the following year and lay out the things that we thought were most important. So the director's primary--or one of his major jobs was to put a blessing on the scope of work that we had identified for the following year, and the budget allocations that we had identified. I can think of one instance where--this is in the early days of what's called "performance assessment."

We were trying to understand how the entire repository system would behave because the repository is a mix of both--it has two components; it's the natural system, the mountain, and it's also the engineered part of the repository, the waste packages, the whatever else that you do that you do to complement the natural system and to improve the performance of the entire system. And at that time we had--we were developing an understanding of the natural system, how things worked in the natural system, what was there, how water moved through the system. But we had very little in the way of information about the engineered system.

And I went to the director at that time and made a strong plea for a much larger waste package program because the key to improving our--the performance assessment, improving the reliability or the believability, was getting a higher confidence that you understood how some of the

engineered components would work. So I asked him to increase the work in the waste package field, and he said he couldn't do that because he had been told not to do anything except, essentially, site characterization, looking at how the natural system worked. So we were developing a lot of information about the natural system but we weren't able to, for quite some time, weren't able to use that to develop what engineered systems needed to be put in place to augment and complement the natural system.

MS. JOHNSON: Well, I think you've just answered most of a question I was going to ask you, which was, as you learned more about the natural system, you seemed to understand more about what additionally needed to be done on the engineering side because of some of the challenges of the natural system. What you just told me is you couldn't always adapt a program as quickly as you wanted to.

MR. DYER: Oh, that's absolutely right, for a couple of reasons. Changing the program is like turning an aircraft carrier. It does not happen quickly. And sometimes--I mean, we had large budgets but they were never as large as what we could have used. The way the--the way that we had idealized the development of the understanding of the system was do site--do a--an amount of site characterization, develop information about what you know is there and how it works, develop a design about some of the

components of the engineered system that would augment and supplement the natural system, evaluate how that whole system performs, evaluate where you need more confidence, where you need more information, where you need to improve performance, go out and develop that information in the natural system, apply it to design updates in the engineered system, re-evaluate that. So there's an iterative cycle that you go through between site characterization, design, performance assessment, site characterization--and site characterization is not necessarily just going out and beating rocks in the field, on rocks in the field, or field observations. It also includes all of the laboratory work, corrosion science, all of the things like that would fall under site characterization, getting information about performance of different elements that you can feed into design and into performance assessment.

So the idea was to go through several iterations of that. We went through; I think, finally, five iterations, five different performance assessments, and the fifth one being the one that supports the license application.

MS. JOHNSON: And is that called the Total System Performance Assessment?

MR. DYER: That was the Total System Performance Assessment. It didn't have that name at the beginning--

MS. JOHNSON: Yes.

MR. DYER: --but, yes.

MS. JOHNSON: And you just described a very smooth process, but what I'm guessing is that with the institute--the, I guess it's institutional issues of the flow of the money and the Congressional appropriations process, it wasn't always quite as smooth as that kind of three-part process. If you need more information and you go do some more study and you pour it into the design, and so it goes.

MR. DYER: Yeah.

MS. JOHNSON: Right?

MR. DYER: Well, unfortunately, every bit of our money had to be appropriated through Congress, and I think Con--as you read the headlines today, Congress has shown themselves as being abysmal caretakers of the nation's finances, and our program showed that. I mean, think of all the years you were involved with Yucca Mountain. How many of those years did the nation provide a budget by 1 October, which was when the physical year started?

MS. JOHNSON: I think never, but maybe not.

MR. DYER: I can think of two years--

MS. JOHNSON: Two years?

MR. DYER: --out of the twenty-two years that I worked for DOE.

MS. JOHNSON: Wow.

MR. DYER: There were two years. So that means

that, for a substantial part of every year, and sometimes there would be a continuing resolution for three months, six months, nine months, sometimes for the entire year, and under those constraints you're constrained to spend no more money than you spent the previous year, irregardless of what your plans were that you had for this year. You--we may have had a prior year budget of $350 million. We had a $425 million program that we had laid out, been approved all through DOE, all through government, through OMB, and it looked good, but if you never get the appropriation for that, you never really have the dollars in hand to execute that program.

So as you're going along, you got this holistic program, but you're going to have to pick and choose things that you can do because you cannot spend more than you spent last year, unless, of course, they finally pass a budget that accommodates that new higher amount, and then you're in a rush and you may have to try to accomplish three or four months of work--I mean, three--a whole year of work in three or four months. The U.S. government, and the way the government funding process works, is poorly suited to do a program like this.

MS. JOHNSON: Well, I know Ward Sproat had made as one of his goals--

MR. DYER: Yes.

MS. JOHNSON: --and one of the few goals he

didn't--he was unsuccessful with, to fix that.

MR. DYER: Right.

MS. JOHNSON: To take the Yucca Mountain program, what they called "cloth budget"--

MR. DYER: Uh-huh.

MS. JOHNSON: --meaning that it wasn't subject to the appropriations process in Congress. It would be separate money that could just be used from the nuclear waste fund to do the work, like a science project would in the private sector. I mean, I--that was sort of my understanding of it.

MR. DYER: That's exactly it. Or, say you're General Motors and you're going to buy a--build a plant. Well, you lay out the resources needed to build that plant. It may take four years to build the plant, but you don't go back every year and say, "Eh, I don't think so. Let's send everybody home for, you know, six months."

And that was one of the things that we were faced with doing was every year there was an unknowable adjustment that had to be made in the workforce. People got laid off, I mean, through no fault of their own. They were doing good work. It needed to be done, but the funds to support it just vaporized, or never showed up.

MS. JOHNSON: Did you, as part of your job, did you have to go to Congress and testify about these budget matters?

MR. DYER: I never testified to Congress. I sat in the front row of hearings behind a number of people to tell them--you know, if they really made a misstatement, I would try to get them to correct it right there on the record, but, no, I never had to--or was never allowed to. One or the other.

MS. JOHNSON: Let's move on to the next question.

MR. DYER: Let me get a drink.

MS. JOHNSON: Russ, I think the primary--

(5:25 p.m. - End Tape 1-3 Corrected.)

(5:15 p.m. - Begin Tape 1-4 Corrected.)

MS. JOHNSON: Russ, I think the primary contact that we have had has been through the affected units of local government. Eureka County is an affected unit of local government under Section 116 of the Nuclear Waste Policy Act, and we, along with nine other counties, have provided, quote, "oversight," unquote, of the Yucca Mountain Project, and have had a lot of interactions and meetings with the Department of Energy to understand the project and that sort of thing. My question to you is, you were involved in a lot of those meetings and a lot of those interactions. Could you talk about the advantages, and also the challenges, of having local governments involved in the Yucca Mountain program.

MR. DYER: The affected units of local government is, as far as I can tell, a fairly unique construct. If

you'll remember when Hazel O'Leary was the Secretary, she tried to establish a--something that was very common in the weapons side of Department of Energy, a Citizens Advisory Board, to get the, essentially, the grassroots citizenry involved in feedback to the program. And that was really shouted down by the political entities of the affected units of local government because they said, "That's our charter. That's what we are legally bound to do, and also paid to do." And I'm--there is a part of me that's a little cynical that the affected units of local government are primarily put together as a revenue source for those counties. One of the organizations that we had, some of the best back-and-forth on the technical side, was Nye County, who put together a independent technical program that didn't duplicate ours but actually provided some meaningful feedback and information to our program.

Now there were other topics that the affected units of local government, I think, were quite effective on. The Transportation Program was one of them, when they were scoping for the rail route. There was a lot of feedback that came from various AULG members about what would be favorable or unfavorable to them. But the view you get is the view of the County Commissioners. It's not necessarily the view of--I mean, I spent a lot of time out in rural Nevada, talking to people, and I think it's fair to say that County

Commissioners don't always provide the same view that their constituency necessarily does.

MS. JOHNSON: I think that's a fair comment. The Blue Ribbon Commission has been taking a lot of input in, also trying to come up with some recommendations for the future. What would your recommendation be in terms of the involvement of local government in the future? Not necessarily the Yucca Mountain Project, but of the next place and the next communities that might be affected. Do you think that's a valuable thing to have?

MR. DYER: Yes, I do, to a point. I hadn't read everything the Blue Ribbon Commission put out, but if I understand right, one of the things they strongly supported was a stronger relationship between the local element of government, not necessarily the state government, but the county or whoever, where a potential facility would be developed, or at least looked at. And I strongly support that.

MS. JOHNSON: I think they haven't really completely addressed the situation, where you have a local government that wants to be a good partner, and the state that doesn't.

MR. DYER: Well, you remember back when we had the nuclear waste negotiator?

MS. JOHNSON: Yeah, I do.

MR. DYER: Whose job was to look for a site and look for an entity--it could either be a county or a tribe--and they actually started--were looking at some places. One of them was in New Mexico, actually, with the Mescalero tribe. But the State of New Mexico overrode that, and say, well, just like Utah, said, "Said, sure, you can--you can build it, but we'll never allow you to transport anything over the state lands" for the facility that they were planning on building outside of Salt Lake City.

MS. JOHNSON: The private fuel storage.

MR. DYER: Yeah.

MS. JOHNSON: Yeah.

MR. DYER: Right. So there is a...there is a absolute challenge there.

MS. JOHNSON: Definitely. Let's move on to the next question. Russ, the Waste Isolation Pilot Project in Carlsbad, New Mexico, is sometimes cited as an example of a success story of how to site a repository. Do you--well, I guess I want to ask you a couple of questions about, what, do you agree that it is a success story? How does it differ from the Yucca Mountain Project? And could you also talk about the--if you could compare the contamination at--the previous contamination at the WIPP site and Yucca Mountain?

MR. DYER: Let's start with the last part first.

MS. JOHNSON: Okay.

MR. DYER: WIPP was developed in salt beds out southeast of Carlsbad, New Mexico. There was one experience that the Carlsbad community had with the Department of Energy, which really didn't impact the WIPP site per se, but it was about the only thing that I know of that happened in the Carlsbad area. Back in the Ploughshare Program, where the Department of Energy was looking at peaceful uses of nuclear devices, Sedan Crater, out at the test site, looking at rapid excavation--really rapid excavation of a lot of material--and they were looking at using devices underground to fracture shale and other things, mostly to enhance oil and gas production, and there was a test, nuclear test, that was done outside of Carlsbad that leaked a little bit.

I don't think it was a terrible thing, like some of the tests at the test site, but it was still--didn't go quite as planned. So there was a little negative experience with the Department of Energy before the Department came in, looking at putting a repository for the defense waste, the mostly plutonium waste.

Now, realize that WIPP was constructed under a very different regulatory environment. There was no involvement by the Nuclear Regulatory Commission. For the first about fifteen years of WIPP, there was no oversight by any agency. It was all done internally by the Department of Energy. At the very end, the Environmental Protection Agency came in and

developed standards that were applied to WIPP that provided criteria that WIPP needed to be able to meet, and EPA was assigned the responsibility as the regulatory agency, an independent regulatory agency. But it was never like the strong regulatory relationship that we had with the Nuclear Regulatory Commission from the very beginning.

One of the--so there were a couple of things that happened during--that I think led to the success of WIPP. One was it was totally internal to DOE. It didn't have to go to anywhere except Congress to get funding to execute the program. There was--in the beginning there was a little resistance, but there became a great support from the community of Carlsbad because Carlsbad looked at this as a very economic benefit for the community. And, actually, the State finally also became a supporter because there were monetary benefits that were made available to the State of New Mexico.

Another thing that WIPP had was a credible oversight agency at the State. I'm trying to remember what the name--it was like EGG--

MS. JOHNSON: E.G.?

MR. DYER: EGK?

MS. JOHNSON: Yes.

MR. DYER: EGK--something. Bob Neal (phonetic) ran that organization, and Bob ran a credible organization. They

provided legitimate criticism of the Department of Energy. When the Department was on the right track, he would say so. When they were not on the right track, he would take them to task and make them change it or fix it, or show why it was okay. So there was truly a legitimate outside oversight organization that was involved in that, I think, and they represented the interests of the State of New Mexico.

And then--I mean, there was still--while WIPP was being built I was a professor in El Paso, so I--in fact, one of my friends, fellow professors, was in mapping the original shafts that went down at WIPP, and I kept very close tabs on what was happening at WIPP. But there was a lot of negative reaction in the State of New Mexico, especially about transportation, and it was the same transportation hysteria that I saw come to Nevada also. And, of course, now we've had, what, ten years of operations of WIPP, about, and I certainly can't think of--I can think of an accident, but I can't think of any accident released any radioactive material, and I would expect we'd have the same kind of experience at Yucca Mountain or any other facility that we put in place.

MS. JOHNSON: Let's move on to the next question.

MR. DYER: Okay.

MS. JOHNSON: Russ, the Nevada Test Site was looked at very closely when the government was trying to find

possible sites for repositories back when there were many sites that were being considered. Do you know how that process went at the Nevada Test Site and how they ended up at Yucca Mountain? Do you have any background on that?

MR. DYER: I do, and, actually, I can back up a little before that. When I went to grad school at Stanford in 1976, one of the first seminars that we had for all of the incoming graduate students, we had the heads of the Geology Department and the Applied Earth Sciences Department. Connie Crosscuff (phonetic), one of the eminent geochemists of all time, and Irwin Rimsun (phonetic), who was an applied engineering geologist, had been involved with the National Academy of Sciences, worked to try to find something--how to deal with high-level nuclear waste. And this had been an issue, really, since the dawn of the nuclear age. It's just that during the Cold War, it was too hard of a problem. We were putting all of our resources into making bombs rather than dealing with the waste, and everybody felt that it--"Yeah, it's a problem, but it's not a big problem, and it's not that hard to solve."

Both Irwin and Connie felt that, you know, the solution was pretty simple, a geologic repository, and salt was a preferred media at that time. Both of them were strong proponents of salt. Later, a little bit later, there were a couple of attempts to try to execute a program, to develop a

geologic repository. You may remember the attempt in Lyons, Kansas, in the--I think it was the mid-fifties, to develop a repository, and what they found was that Lyons, Kansas happened to be in the middle of an oilfield. There were numerous undocumented wells around the area, so you could never be sure that you didn't have penetrations that went into where the potential repository would be. So we started developing ideas of what would really make a good repository, and what would disqualify a potential area for a repository.

Now, from the early 1950's on you had the National Labs and the USGS. You had the U.S. Geological Survey, Sandia National Lab, Los Alamos National Lab, Livermore National Lab--those are the three main weapons laboratories that were involved out at the Nevada Test Site. And they were looking at the geology of the area for a number of reasons. One was to look at--to understand how the geology was put together so that they could detonate the nuclear weapons safely, so that they could put the weapon in place, seal it so there would be no release of radioactive gases from the detonation. But as they were looking, I mean, they looked at a wide range of areas, and began to get some ideas about, well, because this other conversation was playing out in the background as to what makes a--what would make a good repository and what would--what would be on the positive side or the negative side for an area for a repository. So they

were evaluating some of the areas around the test site.

And, in fact, one of the--I think the--one of the first papers that suggested the--not necessarily the Yucca Mountain area, but the desert southwest, was a paper by Ike Wintergrad (phonetic) of the U.S. Geological Survey, who pointed out that, you know, there is a geologic feature in the area of the test site, especially the southwest part of the test site, where you have an incredibly deep water table. It's 2,000 feet below the surface to the water table. And if water is the most important thing to preserve the integrity of nuclear waste, if you don't get any water on it, don't dissolve it, don't transport it anywhere, then it pretty much stays where it is, forever. So Ike said, "Well, if you pick a place that doesn't have much water, then that really is a really positive thing."

At the same time that the national labs and the USGS was looking at various areas, the weapons program was--this is in the mid-eighties, mid-to-late-eighties, were really picking up their activity. There were some years where they detonated a hundred devices a year. I mean, there's almost a thousand devices that were detonated at the Nevada Test Site, 860, something like--per--not--yeah, close to a thousand.

MS. JOHNSON: Close to a thousand.

MR. DYER: And if you've ever driven up through

Frenchman Flats and Yucca Flats, especially in Yucca Flats, driving on that road up to the north where you have subsidence crater after subsidence crater. I mean, hundreds of subsidence craters, each of which marks the place where a nuclear weapon was detonated, or a "device," as they're euphemistically called. They were afraid that if a--if a repository program encroached on where they were doing their active testing, it would--it may in--it may cramp their style, either by taking away territory that they had kind of earmarked for a future test, or by taking some part of the infrastructure, because the--even at that time in the '80s, the infrastructure at the test site was aging.

They had strung the power lines in the--in the '50s, so you had thirty-year-old power lines out there. And it was--it was this that led to a stipulation in the Nuclear Waste Policy Act about, essentially, not interfering with other activities, and what was meant was the weapons program at the Nevada Test Site. So the southwest corner of the Nevada Test Site in Yucca Mountain was an area that was within the area of expertise that had been studied, not exhaustively, but enough to know that it was a good candidate. And it was also adjacent to the Nevada Test Site, which is an area that will never be released to the public. It will never be made into, you know, a green land. There will never be just free and unfettered access allow to the

nuclear--to the Nevada Test Site, which is now called something else--

MS. JOHNSON: Is that an international security site.

MR. DYER: --like the Nevada--Is that it?

MS. JOHNSON: I didn't get that quite right.

MR. DYER: There was--I thought there was--well, it's got a different title now.

MS. JOHNSON: Yes.

MR. DYER: It sounds much more benign. But it's still a dangerous place, and will be a dangerous place forever. The world doesn't have enough money to clean up the Nevada Test Site. I mean, it's a thousand square miles of radioactively contaminated land. So there was one thought that, well, this is an area that will always be dedicated to things nuclear, and adding something else is not going to change very much the legacy that's already here that has nothing to do with nuclear waste. I mean, it's from the nuclear weapons program.

MS. JOHNSON: Although, just to clarify, the actual area of Yucca Mountain that is on the Nevada Test Site is not specifically contaminated.

MR. DYER: Well--

MS. JOHNSON: Is that correct?

MR. DYER: It--remember, there were--in Area 25,

the southwest corner of the Nevada Test Site, there were never any weapons tests at the--in Area 25, but they tested the nuclear rocket there. And they tested the nuclear rocket to points of failure. One of the first things we had to do whenever we came in and started site characterization, was to identify where there were areas of radioactive contamination. And there were some areas that were pretty highly contaminated, that we had to tell people to stay out of, and those are relics from the--from the rocket program.

MS. JOHNSON: Oh, okay. I didn't know that. Let's move on to the next question.

MR. DYER: Okay.

MS. CLANCY: So I'm just going to say end tape one, we're switching tapes now.

MS. JOHNSON: All right. Okay.

(5:39 p.m. - End Tape 1-4 Corrected.)

(5:08 p.m. - Begin Tape 2.)

MS. CLANCY: Tape 2, interview with Russ Dyer.

MS. JOHNSON: Russ, one of the, I'd say, landmarks in the Yucca Mountain Program was when there was a change and the guidelines, which--the site suitability guidelines, I guess, which were sort of a--well, you can explain what the guidelines were better than I, but the guidelines were changed to a different system where there were no qualifying--there were no disqualifying conditions, and that

kind of changed--for a lot of people that changed the rules of the game halfway through the game. Could you explain what happened and what lessons could be learned from that?

MR. DYER: Okay, that's actually probably one of the biggest lessons learned to come out of the program, and it's one of the things that I would hope we don't do in the future, and that is, along with setting a schedule, at the very beginning, before you know what's needed or involved, also setting up requirements as to performance before you understand what the system is, and what's good or bad about the system.

In 1982, the Nuclear Waste Policy Act came out. It told the Department of Energy--well, it told the EPA to develop performance criteria, it told the NRC to adopt those performance criteria, and it told DOE to do a screening of potential sites and to develop criteria for evaluation of those sites. And we called it the Suitability Guidelines. And based on the body of experience that had been developed up to that time we knew that there were some things that were--that contributed to a positive performance of a site and some things that were--contributed to a negative performance of a site. Well, we thought.

But there were a number of things that got built in that are kind of counter-intuitive, and let me give you an example of one. And this didn't become clear until we

developed the techniques and the science, if you will, of looking at the integrated system, the total system performance assessment. How does the entire system behave, from the environment to the natural system to the engineered system that's imbedded in the natural system? How does all of that behave?

One of the criteria that was developed as a disqualifying criteria said you can't put a repository, or a--you would disqualify a site if the repository cannot be at least two hundred meters below the surface of the ground. The idea behind that was that you want to make sure that the repository, wherever it might have been developed, would be deep enough that it would never be exposed by erosion in the foreseeable future, within 10,000 years. Well, it turns out, at Yucca Mountain, the further you are from the water table the better the performance, so the closer you put the repository to the surface, the better the performance of the system, yet it's kind of in violation of that thought that was developed elsewhere because you're not thinking of the specifics of a particular site.

So I think the lesson that I would propose here is that don't rush into developing these mandatory standards and criteria, or even necessarily regulations, until you have a pretty good understanding of what the potential site that you're going to look at is. We rushed in and made these

rules and regulations on the DOE side, the qualifiers and disqualifiers; on EPA's side, the performance of the system. If you'll remember, the original EPA performance criteria, as adopted by the Nuclear Regulatory Commission, put performance requirements on the engineered system and also on releases from the system.

So there had to be an engineered component of the system. It had minimal performance requirements. If you could have found a site, in salt, say, and just stuck the waste in and used the salt as a seal, you couldn't have done it because it would not have met the regulations. The regulations required a waste package that had minimal performance criteria. So into you develop an understanding of what the system is going to be, you don't really want to get too far down the road in putting in place the requirements and regulations. And that's one of the places where it looked like we were changing the rules of the game. Well, yeah, we were, but it's sort of like, Oh, I understand now. These other things really are conflicting, and they don't, by having--checking off everything in the positive column and nothing in the negative column, that doesn't mean you have a repository that worked. It just means it meets these criteria. But you still haven't demonstrated that the whole system has a level of performance that is adequate to ensure public health and safety. And that's what it should

all be about is not geologic criteria, but public health and safety.

So you've got to take these little individual observations and put them in the context of the public health and safety, and that's what the overall criteria became, and I think it was a good change, but not everybody does.

MS. JOHNSON: You were earlier--off-camera you were saying that you'd had some conversations with some folks from Canada about their system, and I was wondering if you could explain a little bit about that?

MR. DYER: Right. The Canadians--well, the Canadians, the Brits, the European countries--had very aggressive repository programs going on until about the early '90s, and almost every one of those programs came to a grinding halt because of some reason. In Canada they just said, we're going to stop the program for--and they stopped it for about ten years. And there was--because they have material they must do something with it, they were reaching out to other programs to understand what are your lessons learned? What are some of the things that went well, didn't go well, with your program?

And I sat down with the lady who was the head of the commission, I think it was, that was trying to develop recommendations for the government, and we talked about lessons learned. This is one of the big things that I tried

to stress to her was that I think one of the--in my opinion--one of the big mistakes that the U.S. program did was rushing to put in place the rules and regulations before we understood what it was that was important. We put in place the original EPA standard, for instance, which had released--had constraints on releases. Carbon dioxide – radioactive carbon dioxide – that would have been released from a repository, would have violated those standards, yet the level that would be released is like 1 percent of what's naturally occurring in the atmosphere now. So there's no health hazard associated with it. So what does it matter?

Well, it's because we didn't think of it originally. So we put in place these things that, yeah, it was a criteria, but we didn't know what was important, and you don't really know what's important until you have a pretty good understanding of what a specific site is. And you're never as confident about a site--you're never more confident about a site than you are before you have ever looked at it. In other words, that's the most confident you will ever be about a site because everything else that you learn, there will be positive and negative things, and you have to balance out. Well, in the aggregate, how does this--how would this system of both what's there and what man can add to it as an engineered component, can that adequately predict--or, protect public health and safety?

MS. JOHNSON: Let's move on to the next question. You were talking earlier about a program that's schedule-driven by a schedule that's set before you even understand what you're dealing with, in terms of studying and characterizing a site. Could you talk a little bit about your experience with that, and explain that some more?

MR. DYER: This is very similar to the argument about putting in place the performance standards and regulations before you understand what's important. Before you understand what's important, how can you dictate a schedule before you know what must be done? I mean, what kind of a facility needs to be built? What kind of studies need to be done? What information needs to be developed? What gaps in information need to be filled? How can you possibly think about putting a schedule--dictating a schedule--before you have an understanding of what that's going to take? And I think that's one of the big faults behind the original Nuclear Waste Policy Act, which put in place this schedule for the contracts for waste acceptance, for operational date for repository before anything had been looked at, in any detail, before any understanding had been developed about what's important at a specific site, mainly Yucca Mountain.

So that certainly, I hope, will be a lesson. But I'll tell you, as long as politicians are involved, you'll

have something like that because they'll demand something like that. And for that reason I do not think any kind of a facility of this nature can be successful as long as it is dictated by politics.

MS. JOHNSON: Well, to follow up on that, there have been a number of discussions with the Blue Ribbon Commission and among people who have been involved for years about what's the best structure, how to manage a repository project in the future. Is it best with a federal agency? Is it best with some sort of public-private partnership? That sort of thing. I'm wondering if you have any opinion on that?

MR. DYER: I think anything that is a federal project is doomed to failure. Private-public, a TVA-like model, has a chance of success. I would say the private--a private approach would probably have the best chance of success, but I don't see any private entity ever willing to bet, you know, twenty, thirty billion dollars on this, or having the resources to do it.

MS. JOHNSON: Then can you--

DYER: That's why--I mean, that's why it devolved to the federal government to start with is that the resources needed to deal with this issue--and, remember, it's not just waste from nuclear power plants, it's also the leftover relics from the weapons program. And if you look at the

metric tons of material that come out of the nuclear power program, it's maybe a fifth, a sixth, of what was reprocessed in the weapons program, like 300,000 tons of material reprocessed from the weapons program. And that's a lot of material sitting around.

MS. JOHNSON: I read that the Blue Ribbon Commission has created a new subcommittee, which actually is going to report back in a couple of weeks, about the history of comingling the commercial spent fuel from nuclear power plants with the defense high-level waste, and looking at whether it should be comingled in the future or split apart. That will be interesting to see what they recommend.

MR. DYER: Yeah, it will, but, I mean, one of the--one of the underpinnings of the development of nuclear power in this country was the federal government's assurance that, eventually, it would deal with the waste, and if that's not going to happen, I don't know how private industry can do it.

MS. JOHNSON: Good point. I want to ask you another Blue Ribbon Commission question. One of the themes that has come up during the Blue Ribbon Commissions, and its report, is the importance of public acceptance of consent-based process and public acceptance, and I'm wondering, what is your view of the need for public acceptance and how it affect a repository program?

MR. DYER: You know, there's many different levels of public acceptance, and I, from what I understand about the Blue Ribbon Panel's recommendation, the level of public acceptance that they stress most strongly is at the local level, and I absolutely agree with that. But if you look at the Yucca Mountain Project, and the level of local acceptance, like in Nye County, Nye County has always been a strong supporter of the Yucca Mountain Project, so what do you mean by "public acceptance?" I mean, the local community was strongly for it. If I look at some of the other experiences we've had, like nuclear waste negotiator negotiating with the Mescalero Apache, certainly the local community was very strongly for it.

If you look at private fuel storage, the Goshute Tribe, at least a majority of them, were strongly for it. Yet there's a different level of the public, there are many more people that are either apathetic or opposed. So this is a nice social construct, but it's a real conundrum because I don't know how you--where you draw the line. Do you just have a referendum within the local county, or whatever entity you have and tell the State it's none of their business, or do you put it--say it's everybody in the State, or what constitutes the public? Is it just the people that come to meetings? In my experience, people that come to meetings are the people that are paid to come to the meetings. It is not

representative of the public.

MS. JOHNSON: I think in Nevada there has been many different versions of public participation--

MR. DYER: Uh-huh.

MS. JOHNSON: --and dealing with the official State position versus State and the Counties. The Counties have been--some, way more supportive than others.

MR. DYER: Right.

MS. JOHNSON: And--but, ultimately, the State is the one who can be much more assertive about its official position.

MR. DYER: Well, and that's because of the--their standing is laid out in the law, in the Nuclear Waste Policy Act. You know, there were all kinds of opportunities written in for opposition, up to and including--the governor had the ability, which he exercised, to veto the site's suitability determination. He did that. It was overridden by a simple majority of two--of both Houses of Congress. I can't think of any other place where a governor gets, you know, that kind of power. So who represents public opinion, the governor or both Houses of Congress?

MS. JOHNSON: That is the crux of the matter.

MR. DYER: Yeah.

MS. JOHNSON: Let's move on to the next question. As we conclude this interview, Russ, I'm wondering what

lessons you have taken away from your experience with the Yucca Mountain Project, and is there anything else you want to add?

MR. DYER: I have a deep, deep cynicism of politics and politicians. What I found is that laws don't mean anything, and I'm waiting to see what law an administration will decide not to enforce next. Will it be segregation? Will it be Roe vs. Wade? Will it be what? And I find that very, very disconcerting. I look for the legal structure to provide some kind of stability and civility, and what I have experienced here is just a blatant abrogation of existing law. So my only question is, What's next?

MS. JOHNSON: Is there anything else you would like to add?

MR. DYER: I don't think so. I am happy in retirement.

MS. JOHNSON: Thank you so much for your time--

MR. DYER: Sure.

MS. JOHNSON: --and your willingness to participate in this project.

MR. DYER: Okay. Okay.

MS. JOHNSON: Thank you. And we just need to ask your permission to use this footage either for researchers in its entirety, or for just short clips on the website.

MR. DYER: As you see fit.

MS. JOHNSON: Thank you. End of interview.

MR. DYER: All right.

(5:17 p.m. - End Tape 2.)

(Whereupon, the interview was concluded.)

TRANSCRIBER'S CERTIFICATE

I hereby certify that the foregoing has been transcribed by me to the best of my ability, and constitutes a true and accurate transcript of the mechanically recorded proceedings in the above matter.

Dated at Aurora, Colorado, this 16th day of December, 2011.

/s/s John Schasny

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