

INTERVIEW WITH BOB HALSTEAD

BY JOHN WALKER

EUREKA COUNTY, NEVADA

YUCCA MOUNTAIN LESSONS LEARNED PROJECT

held in

CARSON CITY, NEVADA

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1 MS. CLANCY: My name is Gwen Clancy. I'll be
2 videotaping this interview. It's March 31st. We're in
3 Carson City, Nevada.

4 MR. WALKER: Hi. I'm John Walker. I'm with the
5 Eureka County Oversight Office. We're here doing the Eureka
6 County Lessons Learned video project, and I'm here today with
7 Mr. Bob Halstead, who is a long-time consultant for the State
8 of Nevada, the Nuclear Waste Project Office, or commonly
9 known as the Agency for Nuclear projects.

10 Bob, you're obviously aware of the Fukushima
11 Daiichi problem in Japan, the reactor melt downs, the spent
12 fuel pool problems. What are your impressions of what's
13 happening there now?

14 MR. HALSTEAD: Well, I've been thinking a lot,
15 John, about that nuclear disaster in Japan, and putting aside
16 the immediate implications for the people who live near the
17 site, for the power company, which is going to lose those
18 reactors, the Japanese government, which has lost
19 credibility, I've been thinking about what the implications
20 of the Japanese nuclear crisis are for the way that we do
21 risk assessment, and the way that affects the work that we've
22 done here on transportation and risk assessment for Yucca
23 Mountain.

24 There are three areas in which I think there are
25 important implications. The first is that I'm much less

1 certain now that we have a good handle on our ability to
2 predict severe future events like earthquakes based on the
3 historical record. I think when we do earthquake
4 forecasting, for example, now, we'll have to assume that a
5 future earthquake could easily be greater by a factor of ten
6 than an earthquake that has occurred over the last 1000 or
7 1500 years in any particular area we're concerned about.

8 A second area in which I think there are direct
9 implications has to do with the way that we attempt to
10 estimate the probability of combined events, or multiple
11 sequence events. In this case, for example, you had an
12 earthquake combined with a tsunami combined with a number of
13 human errors, both in the way the facility was configured and
14 the way the emergency response was carried out.

15 Let's just take two of those factors and consider
16 how we would look at a transportation accident. The way that
17 the professional risk assessment community would look, for
18 example, at the combination of a severe accident with a
19 severe human error would be to say well, the probability of
20 the accident is ten to the minus six per year, and the
21 probability of a human error that would cause a considerable
22 exacerbation of an accident is, say, ten to the minus three.
23 We multiply those together, we get ten to the minus nine, or
24 one in a billion probability, and that's way below the limit
25 at which we have a legal obligation under the Council of

1 Environmental Quality Guidelines to actually do an analysis.
2 So, we're not required to analyze an event like that. We
3 probably don't analyze an event like that, and that's
4 precisely the kind of an event that we're concerned about, as
5 we have now found out painfully in Japan.

6 And, a third area in which I think there are some
7 new implications--I'm sorry, you're going to have to edit
8 this part. A third area in which there are some implications
9 that are directly transferable have to do with the way we
10 assess the potential economic impacts of a severe nuclear
11 accident. Now, we've done a lot of work on severe
12 transportation accidents and successful terrorist events, and
13 we know from a range of models that an accident could cost up
14 to \$10 billion in clean-up costs, and a terrorist incident
15 could cost hundreds of billions of dollars.

16 And, now, we're actually seeing unfold in Japan an
17 event where we certainly think already that the combined loss
18 of property, clean-up costs, and compensation costs are going
19 to be in the \$10 to \$20 billion range, and they could well
20 far exceed that, \$50 billion.

21 So, those three areas, our ability to forecast
22 severe events based on the historical record, our ability to
23 accurately assign probabilities for a combination of events,
24 and our ability to accurately assess the maximum economic
25 impact of a nuclear accident, these are all aspects of the

1 Fukushima Daiichi nuclear disaster that I believe are going
2 to be studied by risk analysts for the next ten years. They
3 are going to have a direct impact on the work that we do for
4 the State of Nevada, and the effected counties that are
5 concerned about transportation risks that would result from
6 shipping spent nuclear fuel and high-level waste to Yucca
7 Mountain.

8 MR. WALKER: Thanks, Bob. Let's move on to the
9 next question.

10 Bob, you've been in this business for a long time
11 now. What's the most important thing that you've learned
12 about transportation and nuclear waste?

13 MR. HALSTEAD: John, I think the most important
14 thing that we've learned through the 30 years of studies for
15 the repository program generally, and Yucca Mountain
16 specifically, is that the transportation impacts are going to
17 occur nationally over perhaps as long as half a century.
18 They're going to affect an enormous number of communities and
19 people. Looking at the specific routes that might be used
20 for shipments to Yucca Mountain, we know that more than 40
21 states will be affected, 30 to 50 Indian nations would be
22 affected, 800 to 900 counties would be affected, somewhere in
23 the neighborhood of 160 million people live in those affected
24 counties. 10 to 12 million people actually live within half
25 a mile of one of the shipping routes, and about 330

1 Congressional districts are affected by these routes to Yucca
2 Mountain. The routes to other sites might vary slightly, but
3 probably not by more than about 10 percent.

4 So, the lesson we've learned from Yucca Mountain,
5 which is that transportation will have national impacts for a
6 long time, is not only part of the Yucca Mountain lesson
7 learned, but it's a lesson learned for any future effort at
8 siting a repository anywhere in the country.

9 And, then, what does that mean for the way
10 transportation has to be approached as part of a larger
11 national nuclear waste program? It means transportation has
12 to be given the same level of attention that storage and
13 disposal are, because the transportation component of the
14 waste management program is going to impact so many people
15 and so many political jurisdictions, and it's certainly going
16 to be politically controversial for a number of decades,
17 possibly half a century.

18 Does that seem to be a good point to take a break?

19 MR. WALKER: Bob, you know this transportation
20 issue, you've talked about how important it is, and maybe it
21 hasn't been treated that way in the regulatory process, and
22 I'm not sure exactly what you mean there. I mean, why
23 doesn't it have the stature and importance that, say, the
24 repository itself does and the design of the repository or
25 the examination of a repository site? Why was transportation

1 not part of that process, at least in terms of priority, and
2 will become part of that process in terms of priority in a
3 licensing hearing?

4 MR. HALSTEAD: Well, John, let's break that down
5 into--I need to get my thoughts again here. I'm sorry.
6 Well, John, there are really three aspects of the repository
7 siting, environmental approval, and licensing process where
8 transportation is critically important. In the selection of
9 sites for the first repository, going back to 1982 when the
10 Nuclear Waste Policy Act was passed, certain sites that had
11 already been studied were grandfathered in, and then in 1986,
12 the Department of Energy completed Environmental Assessments
13 for those sites, of which Yucca Mountain was one. And, there
14 were site selection guidelines pertaining to transportation
15 that were very important.

16 And, at that stage in the game, the Department of
17 Energy had done a pretty good job of demonstrating that
18 compared to the other sites for the first repository, Yucca
19 Mountain was the worst of all those sites in terms of rail
20 access, highway access, cost of building access, distance
21 from the load center where the waste was stored, and so
22 forth. That information, of course, was ignored by the
23 Congress in 1987, so Yucca Mountain was selected as the only
24 candidate site for the repository project after 1987,
25 completely ignoring the information that showed it was a poor

1 site from a transportation planning standpoint.

2 Now, in the Environmental Assessment process, the
3 Department of Energy evaluated rail and truck transportation
4 nationally and in Nevada for Yucca Mountain, and they
5 addressed this in a number of documents, planning documents,
6 that were completed before they actually produced their EIS.
7 But, most importantly, these transportation matters are
8 addressed in the 2002 Final Environmental Impact Statement,
9 the 2008 Supplemental Environmental Impact Statement, and
10 then there's also a separate Rail Alignment Environmental
11 Impact Statement. And, in those three Environmental Impact
12 Statements, the Department of Energy devoted about 4600 pages
13 to transportation. So, you would think that they would have
14 gotten it right.

15 Unfortunately, my view is that for a variety of
16 reasons, they allowed themselves to become biased in the
17 process of picking highway routes and rail routes. They
18 convinced themselves that they would go with highway routes
19 that went through Clark County and directly impacted the Las
20 Vegas Valley, and they selected a preferred rail route, so-
21 called Caliente corridor, without really a good NEPA
22 justification.

23 And, so, in this second phase of evaluating
24 transportation, the Department of Energy I believe had a
25 defective process, both in evaluating the highway and rail

1 routes, that they perhaps thought they would get away with in
2 licensing.

3 But, then, in the third area of licensing, I think
4 it's fair to say that the Department's position coming into
5 licensing, filing a license application and a Safety Analysis
6 Report with the NRC, they felt that they had fulfilled their
7 NEPA obligations that the NRC staff, after reviewing their
8 EIS's, would adopt them and decide that the NRC did not have
9 to do its own independent assessment of how they had done
10 transportation.

11 And, of course, this was challenged in contentions
12 filed by the State of Nevada, by the State of California, by
13 the affected counties, and Indian tribes. And, I believe it
14 was quite a surprise to the Department of Energy that the
15 construction authorization boards not only accepted the vast
16 majority of the transportation contentions that were filed,
17 but in fact took a general position that off-site
18 transportation was as much a part of the license application
19 as the repository site itself. That what is called the
20 geologic repository operations area not only is one focus of
21 licensing, but then all of the transportation access that's
22 necessary to get spent fuel and high-level waste to the
23 repository operating area is as much within the purview of
24 the NRC administrative law judges in this case in evaluating
25 the adequacy of the environmental analysis that was done.

1 So, had the Department of Energy had the benefit of
2 knowing how the construction authorization boards would have
3 come down on this issue, (a) transportation is an essential
4 part of the repository, and (b) specific issues that really
5 covered the water front of transportation impact and risk
6 assessment would be specifically admitted into the licensing
7 proceeding. Had the Department of Energy known how that
8 decision would come down from the NRC, perhaps they would
9 have started their consideration of Yucca Mountain
10 differently.

11 But, that said, it really was the Congress that
12 made a fatal error in their failure to consider
13 transportation in 1987 when they decided to go ahead with
14 Yucca Mountain, when DOE's evidence showed that it was going
15 to be very difficult to achieve transportation access, and
16 that there would be both environmental impacts and there
17 would be public health and safety risks that would be
18 peculiar to Yucca Mountain, far beyond the issues that
19 involved the other sites that had been considered for the
20 first repository.

21 MR. WALKER: Excellent, Bob. Let's move onto the
22 next question.

23 Now, Bob, why is it so important to have a railroad
24 access to a repository?

25 MR. HALSTEAD: It's critically important to have

1 rail access because the rail casks, depending on a number of
2 other factors--let's start that over again. I need to give a
3 better answer. It's important to have rail access to the
4 repository, first, because rail casks have a much larger
5 capacity than truck casks, and all other things being equal,
6 it can reduce the number of shipments, the number of cask
7 shipments by perhaps a factor of five or six. And then by
8 putting more than one cask in a train, it can reduce the
9 total number of shipments perhaps by another factor of three
10 or four or five. So, instead of having perhaps 100,000 truck
11 cask shipments, if you move most of the spent fuel by rail,
12 you can get that down to less than 20,000 rail casks and
13 perhaps a few thousand truck shipments.

14 A second reason for having rail access is that now
15 many of the utilities are moving towards dry cask storage
16 systems in which spent fuel is put into welded canisters.
17 Those canisters, if they have to be reloaded into truck
18 casks, would result in a lot of worker exposures at the
19 shipping sites. And, so, while this was not the case when
20 these decisions were made back in the mid 1980's, the major
21 reason then in favor of rail was simply the larger capacity
22 of the rail casks, it's now a combination of the larger
23 capacities and the fact that rail transportation is more
24 compatible. It's able to interface directly with the
25 canisters that are used increasingly in dry storage systems.

1 Now, let me go to the map and show you the way that
2 the Department of Energy began to assess transportation
3 access to Yucca Mountain.

4 In the early 1980's when the Department of Energy
5 began looking at the Yucca Mountain site as one of the nine
6 sites that were originally considered for the first
7 repository, their assumption was that a railroad could be
8 built either from dike siting or valley siting on the north
9 side of Las Vegas, out along the southern edge of the test
10 site, basically along U.S. 95, out to Yucca Mountain.

11 Their backup rail site, and again, we're talking
12 about the 1984, 1985, 1986 period, was to come down from
13 Hawthorne using an existing Southern Pacific line, which was
14 subsequently abandoned and again, largely following U.S. 95.

15 In the early 1990's, after Yucca Mountain became
16 the sole candidate site, for a variety of reasons, some just
17 good planning, to look at what were seen as other technically
18 feasible routes in Nevada, and also, frankly, because some
19 local governments, in particular the City of Caliente and
20 Lincoln County were actually lobbying for routes that would
21 go through the city and through the county, the Department of
22 Energy looked at really all of southern and central Nevada
23 and identified a number of potential corridors. And, these
24 sites were winnowed down in a number of studies that were
25 prepared between about 1990 and 1997. And, then, going into

1 the preparation for the 2002 Environmental Impact Statement,
2 the routes that you see here, although there were some
3 variations, these basically were the routes that DOE decided
4 to do intensive study on between 1997 and 2002.

5 Some of these routes would have directly impacted
6 highly populated areas in Clark County. There were several
7 variations on the Caliente route. Interestingly, the
8 original Caliente route, which would have followed U.S. 93,
9 gone through Hiko Canyon, gone through some difficult
10 mountainous terrain here at Hancock Summit, and then gone
11 through Warm Springs, for reasons that were never clearly
12 explained, that Caliente route was abandoned in favor of one
13 that ran 40 to 100 miles north through largely undisturbed
14 rural areas.

15 And, I think looking back on this, that is
16 certainly an area where I would question DOE's judgment.
17 They actually did a comparative study of the what was the old
18 route and the new route for Caliente, and they had assigned
19 Route A and Route B, and then in the end, they decided to
20 call the B route the base route, and the A route, the
21 alternative route to kind of cover their tracks. And, that
22 was one of the first decisions that they made where I thought
23 they were being overly swayed by political considerations,
24 maybe by input from landowners and were not actually
25 following either engineering criteria or environmental

1 criteria.

2 Similarly, there were a number of different
3 approaches to basically what I would call the central
4 north/south corridor in Nevada, which ended up of course
5 being of great concern to the people in Eureka County as the
6 final versions of the Carlin corridor evolved. Originally,
7 there was consideration of a number of routes, routes that
8 would have come through the Reese River Valley, routes that
9 would have come from the east through Pine Valley, for
10 example. There also were some routes that would have come in
11 from more easterly destinations. One of these was called the
12 Cherry Creek Option.

13 But, by the time that the Draft EIS came out in
14 1999, the central corridor that was still under active
15 consideration are these variations that you see here of
16 Crescent Valley.

17 In general, there were concerns on where this
18 corridor should originate from the Union Pacific. And, you
19 may recall there were earlier, some consideration of
20 locations over closer to Carlin, one at Palisade, and these
21 were from both an engineering and an environmental
22 standpoint, very difficult because they involved steep
23 inclines in order to get out of the Humboldt River Valley.
24 And, so, eventually, they looked at the Beowawe area, I think
25 primarily because there weren't the mountainous terrain

1 issues there, although there were some issues with greater
2 impact on private lands and existing residences, businesses,
3 ranches, and so forth.

4 Then, there were some options that were considered
5 again, Pine Valley and Crescent Valley, but by the time the
6 planning was in place for the Draft EIS, the decision was
7 made to go through Crescent Valley, with a couple of
8 variations, both at the northern end and at the southern end
9 of that corridor. And, primary concerns here were impacts on
10 valleys that really had not had extensive industrial or
11 commercial or even agricultural development.

12 There were some issues with the terrain, the
13 Roberts Creek Mountain here and the Roberts Creek Range poses
14 a real challenge, and you can go to the east of it, you can
15 go to the west of it, but you're not going to go through it.
16 Then, there were questions here whether to go through Monitor
17 Valley or not because of the potential impacts on ranching.
18 And, in the end, the Department of Energy looked very closely
19 at the Caliente route, a Caliente option that involved going
20 through Air Force lands was generally not seriously
21 considered because of the opposition of the Air Force. Then,
22 of course, Crescent Valley was seriously considered, and then
23 there was consideration of the Valley modified and Jean
24 corridors through the southeastern part of the state. But,
25 again, there were serious concerns from the beginning about

1 the impacts on Clark County and populated areas here.

2 I think it's fair to say that by the time that the
3 decisions were being made from the Draft EIS in 1999 to the
4 Final EIS when political factors were considered along with
5 environmental and engineering factors, it really came down to
6 a choice of the Caliente corridor or the Carlin corridor.
7 And, at that point, the Mina corridor, which had been
8 considered early on and was later to be considered, at that
9 point, the Mina corridor was not under consideration.

10 MR. WALKER: So, Bob, continuing on, what's going
11 to happen if licensing is resumed, and what does that mean to
12 the whole transportation question with moving the waste to a
13 place like Yucca Mountain?

14 MR. HALSTEAD: I think it's safe to say that if
15 licensing resumes, there will be major changes in the
16 repository design. There will be major changes in the
17 storage and transportation system that has to serve the
18 repository. And, I think that as that occurs, the entire
19 transportation analysis will be redone. And to put it
20 bluntly, I think the entire Environmental Impact Statement
21 will be redone, and I think it will be redone in two parts.
22 I think there will be a new Environmental Impact Statement
23 for the repository itself, and I think there will be a new
24 Environmental Impact Statement for rail access, given the
25 importance of rail access.

1 Now, it's a little speculative to say exactly what
2 corridors would likely be reconsidered and which new
3 corridors might go into consideration. In terms of my
4 knowledge of the past studies in the State of Nevada, and
5 that includes the DOE studies and the studies that have been
6 done for the State of Nevada and the studies that have been
7 done by the counties, I would certainly expect some
8 reconsideration of the Caliente corridor, but very broadly
9 defined. I think the original Caliente route that goes along
10 U.S. 93 and 375 might be reconsidered. I certainly would
11 expect the central corridor, which is the Caliente corridor
12 more broadly defined, to be reconsidered. In particular, I
13 think an area 50 miles east and 50 miles west, centered on
14 this corridor, would likely be re-examined.

15 It's possible, but unlikely, that corridors coming
16 out of Clark County would be reconsidered. I just think the
17 land use conflicts and the political conflicts are very
18 inhospitable to any rail development there. But, I certainly
19 think the Mina corridor would also be reconsidered. And,
20 again, just as we've said, if Carlin were reconsidered, we
21 would look at something like a 100 mile corridor centered on
22 what was identified in the 2002 EIS. I'd similarly see
23 something like that happening with Mina, looking at options
24 that both go across the Walker River Reservation and options
25 that bypass the reservation.

1 MR. WALKER: Excellent. Let's go down to another
2 question.

3 MR. HALSTEAD: Now, let me return to the Carlin
4 corridor, broadly defined. I think perhaps a 100 mile
5 corridor centered on the corridors that were identified in
6 the Draft and Final EIS between 1999 and 2002, I believe that
7 this corridor would be seriously re-evaluated. Both the
8 corridor options that were actually identified in those DOE
9 documents, but also variations that might come through Pine
10 Valley on the east, variations that might come through the
11 Reese River Valley on the west, coupled with various options
12 for the southern half of that corridor, I think it would
13 receive serious consideration because of the generally
14 favorable topography and because of the generally low
15 population density, even though there are some communities
16 where population density and impacts on existing land uses
17 would be a concern.

18 MR. WALKER: Bob, in December of 1999, there was an
19 EIS hearing in Eureka County, up in Eureka County in Crescent
20 Valley. It's my understanding you attended that meeting.
21 What do you remember from that experience?

22 MR. HALSTEAD: I have very vivid memories of going
23 to that public meeting. I remember getting onto State Route
24 306 and immediately being aware of what a beautiful area it
25 was. Trees, water, you know, we say there's a secret about

1 Nevada, just add water, and this was obviously a water-rich
2 portion of Nevada. And, then, I drove a little further and I
3 saw these peculiar signs that seemed to have some relation to
4 the hearing I was going to. The ones that I remember most
5 were like a cartoon caricature of a two-headed miner, and I
6 thought umm, it would appear that some organizing has been
7 going on in preparation for this public meeting where the
8 Department of Energy is going to take input from the affected
9 local people.

10 And, my strongest recollection of this meeting was
11 the large number of attendees, given that this was a rural
12 area, the fact that there were old people and that there were
13 young people, the fact that there were very well prepared
14 people speaking on virtually every aspect of the railroad and
15 the way that it might affect the valley. Now, there also
16 were comments about Yucca Mountain and comments about nuclear
17 power and comments about alternative energy sources. But,
18 there really was a very good focus on the proposed rail line
19 and the rail line impacts.

20 And, I've been to many, many, many public meetings,
21 not only all over Nevada, but all over the states of
22 Wisconsin and Tennessee and New Mexico and California and
23 Colorado and Utah, and there are a lot of those meetings,
24 frankly, that I don't remember, but I have a very sharp
25 recollection of this meeting, first because of the large

1 turnout and the cross-cutting nature of the turnout,
2 reflecting all the segments of that community.

3 And, then, secondly I have a very specific
4 recollection of the commonality of interest expressed by the
5 Shoshone ranchers and the non-Shoshone ranchers. And, I
6 think it's important to put it in that context of not
7 necessarily being a Native American versus a non-Native
8 American presence, but these were people who were all engaged
9 in ranching. And, so, they had a commonality of interests
10 there, and they expressed that, and yet at the same time,
11 there was an acknowledgement of some long-running historical
12 conflicts and the cultural diversity that existed in that
13 area.

14 And, I particularly remember a long and eloquent,
15 but of course unintelligible to me, since I don't speak or
16 understand the Shoshone language, but there was a beautiful
17 statement made by an older Shoshone woman, and she also made
18 a point of asking the Department of Energy, you know, why
19 they didn't have Shoshone speakers there, and how they would
20 handle her testimony given in her native language.

21 A third thing that I remember about that trip was
22 the way that it enhanced my own knowledge about what planners
23 like to call "unique local conditions," things that planners
24 don't learn about unless they go and actually talk to the
25 people who live on the land that they're talking about

1 developing in one way or another. And, it had never occurred
2 to me that the presence of the rail line, both the right-of-
3 way for the rail line and the construction and operation of
4 the rail line, might adversely affect the development of what
5 is, you know, now rather commonly known as the Carlin Trend
6 Gold Deposits, but I think that at the time in 1999, these
7 were more speculative certainly than they are today.

8 And, at that meeting, there were people who talked
9 about the way in which the right-of-way for the railroad
10 would adversely impact mineral exploration and mineral
11 development, and that indeed the actual existence of an
12 operating rail line there running from north to south would
13 complicate the east/west movement of ores and concentrates
14 from the deposits to mills.

15 So, I left there not only being very much impressed
16 with the way the local residents had organized themselves and
17 prepared themselves to represent their interests in this
18 hearing, I left there not only impressed by the way that,
19 without in any way sugar coating the historical conflicts
20 between the Shoshone and non-Shoshone communities, they had
21 expressed a commonality of interest in ranching and in
22 protecting themselves from the impact of the railroad.

23 And, then, I also left with this specific new
24 knowledge about unique local conditions, and the fact that I
25 had gone into this meeting thinking that the mining community

1 and the mining population would welcome the railroad, that
2 they would see this as either an economic development
3 opportunity in general or that it would be specifically
4 beneficial for mining operations, and I left realizing that I
5 had completely misunderstood what those impacts would be.

6 MR. WALKER: So, Bob, how would this transportation
7 system work getting spent fuel to Yucca Mountain?

8 MR. HALSTEAD: Well, first of all, let's remember
9 that about 90 percent of the waste is currently stored east
10 of the Mississippi River. And, so, the vast majority of
11 shipments would be coming from the east to the west. Yucca
12 Mountain is over here. There is certainly a major Federal
13 site in Washington and another in Idaho that would ship
14 defense high-level waste and some spent fuel.

15 But, in terms of the overall flow, you're talking
16 about a flow from the east to the west, and you're talking,
17 therefore, about a lot of long distance shipments in excess
18 of 2000 miles, whether they come by truck or by rail. In
19 fact, the average shipment overall is about 2100 miles,
20 whether you're talking about rail or by truck.

21 Now, in theory, according to DOE thinking, only
22 about seven reactor sites would have to ship by truck. And,
23 the other 65 sites would ship almost exclusively by rail.
24 But, of those sites, about 24 of them either don't have rail
25 access or don't have the capability to handle large rail

1 casks, generally because of limitations on the crane capacity
2 in their loading facilities, but in other cases, because they
3 have lost their rail spurs, most often through abandonment
4 proceedings. So, there is a gray area here.

5 DOE is confident that they can move 90 percent of
6 the spent fuel and high-level waste by rail. In fact, they
7 would move 100 percent of the high-level waste by rail and 95
8 percent of the spent fuel.

9 The State of Nevada has done its own analyses and
10 we think it's very optimistic to think you can get up to 95
11 percent. We think it's more likely that 25 to 35 percent of
12 the spent fuel would be moved by truck. So, the first issue
13 is the majority of the waste can be moved by rail, assuming
14 that you can build a railroad to Yucca Mountain.

15 Now, the second thing that we want to talk about,
16 looking at the national system, if we look at the rail
17 linkages, is that under current assumptions about how the
18 rail routes would be chosen, and how the rail contracts would
19 be drawn up, and that's an important part of this, because
20 the contracts assume that the first railroad to pick up the
21 spent fuel keeps it on their system as long as possible in
22 order to maximize the tariff. So, you aren't necessarily
23 picking the shortest route from A to B when you're
24 determining the rail routes.

25 And, then, there's also a matter of whether general

1 freight service or dedicated trains would be used. That has
2 implications for safety. It has implications for economics.
3 It has implications for routing. In the past, the Department
4 of Energy, over the last 30 years, adamantly opposed
5 mandatory use of dedicated trains, which means shipping the
6 spent fuel and high-level waste in its own short trains
7 rather than putting them in mixed freight trains. And, it's
8 only in the last eight years or so that the Department has
9 grudgingly said that it would voluntarily make its shipments
10 of commercial spent fuel in dedicated trains. It reserves
11 the right to ship Naval reactor fuel in mixed freight trains
12 if it so desires, although those shipments have often been
13 made in dedicated trains.

14 So, there's still a little bit of a gray area there
15 as to whether dedicated trains would actually be used,
16 because there's no regulation that requires it. The
17 railroads strongly favor the use of dedicated trains. And,
18 we should say that the commercial utilities have been using
19 dedicated trains for all of their rail shipments.

20 Now, looking at the rail routes, the conventional
21 thinking all along has been that the majority of rail
22 shipments would move through a northern corridor, basically
23 running between Chicago or St. Louis, and Denver or Salt Lake
24 on the Union Pacific. The exact estimates of that flow vary
25 somewhat. Generally speaking, I think we're talking about

1 upwards of two-thirds of the rail shipments of spent fuel
2 coming across this northern corridor. Most of it, in fact,
3 on the Union Pacific through Nebraska and Wyoming, although
4 the Union Pacific has said differently than DOE's studies,
5 that they do not want to use a section of track that's called
6 the Red X here, which basically connects at Gibbon, Nebraska
7 and is a very heavily used line for eastbound shipments of
8 coal from the Powder River Basin and also a lot of shipments
9 of box traffic of freight, a lot of it originating at West
10 Coast ports, coming to the east.

11 So, the Union Pacific has said they do not want to
12 use the lines that DOE has identified in their routing
13 studies as being the most heavily used for spent fuel. About
14 15 percent of the rail shipments would come down from the
15 Pacific Northwest on the Union Pacific. And, then, about 10
16 percent would come from east to west, either on the
17 Burlington Northern or the Union Pacific, coming into
18 California, coming through San Bernardino and Barstow. These
19 are the shipments that are of great concern in Nevada,
20 because those are the shipments that would go through
21 downtown Las Vegas on the Union Pacific mainline.

22 The State of Nevada has done some routing studies
23 that look at alternative arrangements, and it is conceivable,
24 depending on the way the contracts were carried out, that in
25 fact the vast majority of all the spent fuel and high-level

1 waste in the east might be routed on the southern routes, and
2 end up coming through Las Vegas. And, indeed, some of the
3 modeling that we've done shows that perhaps only 15 percent,
4 or so, of the rail shipments would come from the Pacific
5 Northwest through Utah, entering Nevada at a place called
6 Uvada on the Union Pacific mainline. And, that as much as 85
7 percent of the rail shipments could actually come into
8 California and then go through Las Vegas on the way to the
9 proposed Caliente rail spur.

10 And, that's a very great concern precisely because
11 DOE has said that they would not accept any restrictions on
12 the numbers of shipments that would go through Las Vegas.
13 Basically, they have left it up in the air by saying six to
14 eight percent of the shipments would likely go through Las
15 Vegas, but our argument is if you allow six to eight percent,
16 and there's no way to cap that, then we need to consider a
17 worse case national routing scenario, which would heavily
18 impact Las Vegas. And, that's a major problem for the state
19 with the selection of the Caliente rail corridor.

20 The truck routes primarily break down into an I-80
21 to I-15 route across the north central part of the country,
22 and then an I-10 to I-40 east/west route coming across the
23 southern corridor. Again, these shipments would go into
24 Barstow and then catch I-15 and come into the Las Vegas area,
25 that is, the shipments from Florida, Texas, Arizona and

1 California. And, then, the shipments from the northeast and
2 the north central states would come down through Salt Lake
3 and would enter the northern portion of the Las Vegas Valley
4 on I-15.

5 DOE's plan is to use the new beltway around Las
6 Vegas to then connect with U.S. 95, and have those truck
7 shipments continue out through Mercury to Yucca Mountain.
8 There is some uncertainty about the legal status of DOE's
9 plans to use the Las Vegas beltway.

10 Now, there is also a possibility that large numbers
11 of these shipments could be made by truck and that just as it
12 could be either financially from an institutional impact
13 standpoint, preferable to consolidate those shipments on the
14 southern routes. Remember, we talked about the possibility
15 that the rail routes might all be taken on a southerly
16 approach, which only increases the overall distance by 10 to
17 15 percent, but allows you to avoid a lot of highly congested
18 rail lines that are of concern to the rail industry.

19 Similarly, large numbers of truck shipments could be brought
20 down to connect with I-40, come into California and then find
21 their way to Yucca Mountain, again around the I-215 beltway.

22 Now, is there anything else here that we want to
23 say about the base case routing, as it has been set forth in
24 the 2008 Supplemental EIS? I think we want to mention that
25 there are some highway routes not shown on this map,

1 potential alternatives that could be designated by the State
2 of Nevada, which would, I think the most likely one would be
3 to come down U.S. 93 and U.S. 6 to connection with 95 near
4 Tonopah, and that would eliminate shipments through the Las
5 Vegas area for most of these shipments coming from the east.

6 There are less clear alternatives for the shipments
7 that would come from California because of the concerns that
8 California has expressed about using California State Route
9 127.

10 And, I think now we might want to go and consider
11 the way that the national rail shipment routing might change
12 if a Central Nevada corridor such as the Carlin corridor were
13 to be developed. Remember, we said if licensing were to be
14 resumed, we think it would be likely that some variations of
15 the Caliente corridor would be considered. Some variations
16 of the Mina corridor would be reconsidered, and I would
17 certainly expect variations of the Caliente corridor to be
18 reconsidered.

19 I think this would be a good time to take a break
20 and go look at the map, another map that would show how
21 development of rail access along the Carlin corridor would,
22 in effect, allow those shipments to bypass Las Vegas.

23 MR. WALKER: Bob, let's go back and take a look at
24 the Nevada map and tell us what's happening.

25 MR. HALSTEAD: Well, you will remember we were

1 talking about the national flow of rail shipments if the
2 Caliente corridor were developed, and the concerns that the
3 State of Nevada had that up to 85 percent of the rail
4 shipments to Caliente could, under some circumstances, be
5 routed from east to west into California, and then come back
6 through Nevada, entering from the west going through downtown
7 Las Vegas on the UP mainline, and then going up to Caliente
8 in order to catch the rail spur to Yucca Mountain.

9 It's quite a different situation if rail access
10 were to be constructed along the Carlin corridor, no matter
11 which variation of the Carlin corridor were chosen, the
12 routing from the east would then come in on the Union Pacific
13 from the Salt Lake City area primarily, coming from the east.
14 And, then, for those shipments coming from the west, there is
15 actually an option on the Federal River Canyon Line that goes
16 into Winnemucca, so that those shipments could conceivably be
17 routed in such a way as to avoid Reno. Because certainly
18 just as rail shipments through downtown Las Vegas are
19 politically controversial in Nevada, those types of shipments
20 through Reno would also be controversial. And this is a
21 route that has been used, for example, for return shipment of
22 foreign research reactor fuel from California through Nevada
23 on its way to Idaho.

24 Now, there's no way to know for sure how that
25 routing would actually end up. It's possible that there

1 could be some shipments through Reno, but it would be such a
2 long and circuitous route for the majority of shipments, that
3 that concern that Nevada had that the Caliente route could
4 result in massive shipments coming through Las Vegas, that
5 seems much less likely to occur. The maximum number of rail
6 shipments that might enter Nevada from California, if a north
7 and central corridor like Carlin were to be created, would
8 probably be capped at somewhere in the neighborhood of 10 to
9 15 percent of the rail shipments.

10 So, a reason why the Carlin corridor, along with
11 the Mina corridor, would likely receive very strong
12 reconsideration in any new assessment of the transportation
13 options if Yucca Mountain re-licensing should be reopened, is
14 precisely because the rail routing could largely, or even
15 completely, avoid the Las Vegas Metropolitan Area.

16 Now, there also are some options to consider in
17 terms of impacts in Nevada of truck shipments. Remember, we
18 said that the base case for truck shipments would be about
19 5000 over 50 years in the event that there's no second
20 repository, and all the truck shipping sites actually shipped
21 by truck and the rail shipping sites shipped by rail. We've
22 also said it's possible that there could be four or five,
23 even six or seven times as many truck shipments because of
24 those reactors that have difficulty achieving rail access.

25 So, truck shipment impacts are not trivial in any

1 event, and they could be considerably larger than the
2 Department of Energy has considered in its Supplemental EIS.
3 And, as we said, under DOE's base case, most of those
4 shipments would come into the Las Vegas area on I-15, take
5 the beltway around Las Vegas, and then continue out U.S. 95.
6 It's important to remember, however, that there are some
7 sites that might ship on I-80. It's possible that those
8 shipments could come down 95 and connect with Yucca Mountain
9 from the north off of I-80, in which case, those shipments,
10 either from the east or from the west, could travel this
11 section of I-80.

12 I'd also possible that shipments that would
13 normally have shorter distances and shorter travel times
14 using I-15 might, for various reasons, be routed onto I-80.
15 The most obvious reason, I think, is that every six to eight
16 years, you would have cycles of major maintenance on the
17 interstate highway, not just in Nevada, but in the connecting
18 interstate routes. And, so, it certainly seems to me that in
19 reality, this truck transportation routing would be
20 considerably more complicated than the almost cartoon
21 caricature simplistic approach that DOE has presented in its
22 Supplemental EIS. And, that's even assuming that you don't
23 have alternate routes designated by the State of Nevada.

24 To further complicate the situation, it is possible
25 that the State of Nevada might designate alternative routes

1 to keep those shipments out of the Las Vegas Valley. It's
2 also possible that states to the east and west of us will
3 designate alternate routes. And, one of the routes that has
4 been previously studied would be a route in which truck
5 shipments enter Nevada on I-80 and turn south at Wendover on
6 93 to Ely, and then take U.S. 6 to Tonopah and pick up 95.
7 That's the so-called B-route from about half a dozen routes
8 that were seriously studied by the Nevada Department of
9 Transportation in the late 1980's and Nineties.

10 There also have been some variations on that route,
11 including shipments coming off at Wells. I don't know of any
12 other routes that would affect Eureka County directly. It
13 seems to me unlikely that there would be shipments on U.S.
14 Highway 50, particularly because of the difficult mountain
15 crossing at Austin. But, again, there are, even there, there
16 are some circumstances where either due to emergency closures
17 of other routes or maintenance closures of other routes,
18 where really all of these routes could potentially be used
19 for small numbers of shipments for limited periods of time
20 under certain circumstances.

21 Now, what about safety, you ask. The State of
22 Nevada, and the affected counties have raised a lot of
23 concerns about safety and security about both rail and truck
24 transportation over the last 30 years. And, the brightest
25 spot in that three decades discussion of safety occurred in

1 2006 when the National Academy of Sciences Special Study
2 Group on Nuclear Waste Transportation came out with a report
3 called "Going the Distance" where they basically adopted
4 about 90 percent of the safety and security recommendations
5 that Nevada and the affected counties had made. The only
6 problem, of course, is that there's no guarantee that the
7 Department of Energy will voluntarily adopt those safety
8 recommendations, and because the Department of Energy
9 shipments would not be regulated by the Nuclear Regulatory
10 Commission under the current legal setup, it isn't clear that
11 those safety and security recommendations, which have now
12 been adopted by the National Academy of Sciences, will
13 actually be implemented. And, that's really an important
14 issue for safety and security.

15 MR. WALKER: Well, thank you very much, Bob. It
16 has been a pleasure having you.

17 MR. HALSTEAD: Thank you.

18 (Whereupon, the interview was concluded.)

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TRANSCRIBER'S CERTIFICATE

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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 this matter.

Dated at Aurora, Colorado, this 19th day of April, 2011.

s/ Mary Chevalier

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