

## Appendix P

AT-G-2 One of the things that has to be acknowledged I think or anticipated is the failure of the United States nuclear waste program on all levels, so that low level dumps are not getting established, high level dumps are not getting established. Therefore, we may really have to keep a lot more of this radiation on site than we had anticipated.

AT-G-3 There's a financial assurance gap here, I feel, and this has been mentioned several times tonight. I'll say two syllables -- Enron. And we've got nuclear power plants, you know, they're fast becoming white elephants and getting snapped up at Salvation Army prices by multi-national corporations -- Enron. And we don't really know if we're saving up enough money -- and I could be wrong about this but I thought the money was somewhat linked to the rate base and all these plants are not operating for their design life.

And so I'm real concerned that the fund was never -- the goal was never set correctly to begin with and that we would fall short on raising the money, it may not be enough. There is inflation. So what I don't know is are these figures periodically revisited and adjusted -- they are. I would think the utilities would tend to howl about that.

Is there assurance or something for a corporation a couple of generations removed from the corporation that actually originally licensed and built the plant? They are paying, you know, sometimes a tenth or a quarter of the decommissioning fund that they acquire with the plant, and so, you know, I would like to know what the assurance is that that money won't be absconded with and just disappear -- Enron.

AT-G-4 Love Canal, kudzu, gypsy moths, zebra mussels. One idea that we've talked about for a long time, and we actually had a big meeting about it and I think the idea is probably still alive, the site-specific advisory board. Really this is outside of engineering and physics, this is thinking political science, archaeology. But thinking archaeology ahead of time, how can the people remember -- whatever we decide, how can the people remember, how can we regulate -- you know, what kind of systems can we set up?

AT-G-5 And so I'm an artist by profession that wandered into this arena. I don't get this lax visual imagery, I'd like to see more pictures. So I'm going to describe an idea I have for you -- entombment taken to an aesthetic level.

You've got like contaminated soil, maybe even mill tailings if we could figure out how to get them there -- fill everything in and just build out soil barriers, barriers, barriers, make it a pyramid, make it vast, make it huge -- sell tickets for the first few generations. And I even think possibly the geometric -- the geology of this might even be an earthquake that just keeps falling in on itself. You hit it with something, it just keeps falling in on itself.

Now there's a question of subterranean -- what's the subterranean issue here and, you know, forget practicality, forget cost, which I would like to do that, I mean I really would not like cost to be much of a factor here. We need to do what it takes. So probably you need some subterranean things, definitely a site-specific idea I've got here.

And then let's plant spider worts around it because everybody knows that spider worts are shown to -- they have these little blue hairs, maybe they're called stamens or something that's the pollinator part of it, and they are like these incredible plants that -- there's this perfect correlation for the amount of radiation exposure it gets.

These little things turn pink, these little hairs turn pink. And it's been like studied and it's a good correlator. So we need to plant the spider worts, which is basically a weed and then we need to teach the people how to analyze. You know, we can't forget the technology of microscope. That's pretty easy -- lenses. And the site-specific advisory board and actually, you know, this sounds kind of corny, but I'm your artist speaker tonight -- the nuclear priesthood has been talked about seriously. Religion is probably a good model for long memory.

I cannot thank my colleagues enough for being really prepared with really thoughtful, with technical comments. I think the fact that we've been working on this for nine years -- I remember you from previous meetings -- this is deliberate and it's what's required to do it.

Thank you.

Ms. Carroll: I'm not going to invoke Atlantis or Elvis -- I could -- and Diablo. I figure it's getting subducted over there on that leading edge and that might be a solution, you know, underneath the mantle.

AT-H Mr. Ferguson: Tom Ferguson, Physicians for Social Responsibility. Very few words.

AT-H-1 My executive director asked me to express our concern for we want this process to be transparent. Allow public accessibility to the process, knowledge of the standards. Do no harm. We represent physicians who take the Hippocratic Oath. Take no risks that can be avoided. It seems ridiculous to come in here and say to professionals "be careful." But Adele quoted the too cheap to be metered promise and there's some credibility problems, so be careful.

We'll be submitting written comments.

Mr. Cameron: Okay, thank you, Tom.

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I think there's a number of things that we might be able to clarify. This is not the time for the NRC staff to try to comment on the comments that we've heard, but there were a number of questions within the comments that I think that it might be useful since we have a little bit of time, for the NRC to provide some clarification on.

I'm just going to list some of these that I took down and then I'm going to ask Barry Zalzman from the NRC staff to just give us a little bit of a review of what the NRC is doing. We heard this top to bottom or bottom to top, whatever, review.

But I think Sara Barczak indicated that there was some ambiguity about how was spent fuel treated under this decommissioning process and of course there's various ways to store spent fuel and maybe Eva can talk a little about that one when we get there.

Again, Sara talked about using the example of how do you explain to a fisherman small, medium, large; that that might not sit well. And I thought, Eva, perhaps you could just talk a little bit more about the small, medium and large. I know you already talked about where that was derived from, from the Council on Environmental Quality, but perhaps you can say a little bit more about that.

Lou Zeller read a statement from the executive summary about non-radiological after license termination being considered, but yet some radiological not being considered. And I think there's a fairly straight-forward answer to that, that I think Eva can also address.

And finally, I think it might be -- Glen brought up Enron and decommissioning and is the fund tied to operation. And Steve, it might be worthwhile for you to just say a little bit about that fund and what happens, the bankruptcy implications, all that sort of deal so that we can give some assurance on that.

And I think that other people in the audience may have some comment. I don't want us to be commenting on other people's comments, okay? Because I don't think that that's appropriate to do that. But if you do have a fact that might be useful information for people, I'm thinking, Paul, you said that you had a couple perhaps comments, maybe facts we can get out here to increase all of our understanding of this.

And before we get to those questions, Barry, do you want to come up and just say a little bit about what the Commission is doing in what we call Safeguards, protecting these facilities against possible terrorist attack? Barry -- it's Barry Zalzman.

Mr. Zalzman: Barry Zalzman again from staff.

Actually I was going to talk a little more --

Mr. Cameron: I hate to give this to you since you said I'm going to talk a little bit more --

Mr. Zalzman: I like this instrument a little better.

Before I go into security, I touched on it at the outset, I'll talk a little more about it, I want to bring us back because there's a lot of good points that you had raised, all of you, about issues perhaps that don't apply to this supplemental GEIS. I want you to understand what happens with information that comes to the agency. We take away your comments and we identify what is relevant to the action that we're trying to deal with now -- this is a supplemental GEIS, we identified what the scope of the GEIS is.

It's operating in environmental space under the guise of the National Environmental Policy Act and the agency's regulations in that arena. It is not operating in safety space -- that's an important distinction. There are matters in safety space that have environmental components. You talk about the design of the facility and the environmental factors that lead to adequate protection -- earthquakes, tornadoes and the like. Those are environmental factors but they are considered part of the design basis of the facility. That is different than what we look at in environmental space under NEPA -- that's an important distinction.

And a couple of the issues that you raised, while they may not be directly attributable to the scope of the environmental impact statement, we think are going to be sufficiently important to share with the other groups within the agency and particularly issues associated with the events of September 11. The Safeguards Group, we will share that information with them as they consider what the actions of the agency should be in response to the events of September 11.

Now we have already taken some actions. We've gone into high alert, we've issued advisories, licensees have enhanced their security activities at the plants. The agency has an operations facility, operations center, it's manned 24 hours a day. We beefed up our staffing of that. Management is engaged in that process as well as additional staff. Our regions have incident response centers, they have been manned as well.

I can share with you that we do have an ongoing intergovernmental dialogue at the federal level. We also have it at the state level, interactions with state organizations, governors and the like.

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So there are a lot of activities that are already ongoing immediately in response to September 11 and then we have to look at where do we go from here. That's where I talked about the top down review. The Commission has already directed the staff, there is a task force underway looking at what needs to be done. That is likely to result in perhaps changes. That will be shared in a public arena.

Now I lament the same challenge that you have -- and I'm looking at Sara -- the same challenge that you have. When the events of September 11 occurred, the nation went into a lockdown. We were looking at not just the infrastructure that was challenged, meaning our economic base in the World Trade Center, but there is our entire infrastructure across the country that is vulnerable and we are looking at target assessments. I'm talking about the federal government, not just the Nuclear Regulatory Commission -- target assessments to decide what additional measures need to be taken.

We're in contact with Homeland Security, we're in contact with the NSC/NSA, National Security Council, National Security Agency, as to what we need to deal with. And we're not alone, it's going to affect a lot of other things as well.

So looking forward as the agency comes out and lays out its recommendations, I will share with you that some of it is not going to be publicly accessible. You don't want us talking about this in public. Some things will be publicly accessible and we will seek stakeholder engagement on those issues and when the opportunity presents itself, do stay aware of it.

Now what is the formal mechanism for the agency releasing information? It's through the Federal Register. The agency did make an attempt to release it. Since we went into lockdown as the government, we decided that there was information that could lead to vulnerabilities that could support unlawful acts that we had to guard against. And because of that, we brought down our website and we are rebuilding it as best we can. It is still [www.nrc.gov](http://www.nrc.gov).

If you go to that, you'll be able to see the best information that we have available. Our ADAMS system is back up, but there is information regarding sites that we are not going to share until we feel comfortable enough that we're sharing the right information.

When we did release the GEIS for public comment, it did go through the Federal Register, but it is a GEIS, it is not all things to all people. It's not going to satisfy every single issue. In some of the issues that you have raised, we've identified what is within scope and what is outside scope. There are different processes involved.

You know, license termination is at the back end of decommissioning. Some of these activities are at the front end of decommissioning. And it's not that we're parsing the issues, but we have a fundamental responsibility to provide the best information available. The GEIS is 13 years old, we have additional information that we can share with the public. We think it's fundamental to share that with the public. It is a living document. This is Supplement 1. There will be a Supplement 2, there will be a Supplement 3. There will be additional information that we gain through the experience that we have to continue to update this information.

Sara, you have the opportunity to participate with us on license renewal. We have a commitment, we have a GEIS for license renewal, we have a commitment every 10 years to revisit that, just to make sure we learn from the experience and we update the information. So we are moving in that direction, we are going to update the information.

Hopefully that brings you back to focusing your opportunity. We've taken your comments already, we look forward to written comments and hopefully this kind of dialogue is what can expand your understanding of the document, focus your issues and we look forward to receiving them certainly before the end of the year.

We hope that that provided sufficient opportunity, we distributed how many, over 300 copies of the GEIS nationwide through our earlier experience with scoping and through the interactions that we've had trying to reach out to those parties that did have an interest, expressed an interest already. We may not have covered everybody, but we're hoping that communication does exist within the public as well to focus issues, target the issues and get us the best information you can share with us.

So hopefully that is useful. I didn't want to take anybody else's thunder away, but this kind of interaction is essential and how we operate in safety space may not be the same as how we operate in environmental space. This is an open process, this is a transparent process.

I don't know if any of you realize but Sara has changed the way we do our environmental documents already. There was an issue that was raised on Hatch between scoping and the draft document, there wasn't a clear path and we have changed not just the document you worked on, which was the Hatch Environmental Impact Statement, but even in this one, Appendix A is the in scope activities that were raised during the scoping period, and from now and hopefully forever more, that's the way we're going to do business. But it's through the public interaction that helps us do our job better.

So with that, thank you.

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Ms. Hickey: Okay. Spent fuel is one of those issues where there were parts of the spent fuel issue that we looked at in decommissioning activities and that was removing the fuel from the reactor and putting it into the spent fuel pool. The storage of spent fuel from there on out either in the spent fuel pool or in dry cask storage is one of those activities that's considered outside of scope. And in Appendix D, we talk about where those issues on spent fuel are further addressed.

From our perspective, it's not that they aren't addressed, it's just that we're not addressing them in this GEIS. They are addressed in other documents.

And I guess with that, likewise I will say once again that's also true for the radiological impacts after license termination. Those impacts are addressed in NUREG-1496, I think is the appropriate number. And that's the GEIS for license termination.

What we tried to do in the document is direct the reader where the other areas were addressed. And there are a number of them, but in Appendix D, there's a little more discussion about that. Okay?

Ms. Hickey: Okay. I think the thing to do is discuss that right now. Because the radiological impacts are discussed elsewhere, we've chosen to say they are out of scope. However, the non-radiological impacts after decommissioning are not addressed in other NRC documents, and therefore, that's why we've addressed those in our document. We say they are in scope.

I like to think that in fact what we've tried to do is look at this process holistically. I think somebody used that term. We couldn't put everything in the supplement, it would have been too large and too difficult to handle. But what we've tried to do is tell the reader where to go to find the other information.

And hopefully with your comments, if that's -- if we weren't totally successful in that from your comments, we can go back and take another stab at that.

But that's why we've addressed non-radiological impacts in this document, following license termination, but not the radiological impacts.

Okay, now let me talk a bit about the small, moderate and large. And since you were specifically interested in some of the aquatic impacts, I'm going to put Duane on the line here. I'd like you, Duane, if you could just explain the evaluation and the conclusions from the aquatic analysis and the fact that we've said that those impacts are small, and what that means.

Mr. Neitzel: I need that definition.

Mr. Cameron: And I would just note while Duane is coming up that in reference to where Sara was starting from in terms of the fishermen, for example, that the fact that an impact is said to be small doesn't mean that it's not an important issue, an important resource to be looked at. And I don't know if there's any confusion about that or not.

Ms. Hickey: Oh, okay.

Mr. Neitzel: When we were doing the impact stuff and going through those matrices, I was responsible for focusing on the aquatic stuff. As a team, we kept looking back to this level of significance that's listed here in the executive summary and then it occurs again, it's on page xiii in the executive summary.

And that's what we kept coming back to, small being not detectable or so minor that it won't destabilize or noticeably alter the attribute or the resource that we were dealing with. Moderate, sufficient to alter but not destabilize. And large, clearly noticeable and are sufficiently large and could alter the system -- so we looking at those. Again, whether it was aquatic, terrestrial, but in those terms -- detectable -- or not detectable, detectable but not going to destabilize the situation, or clearly detectable and could cause some alterations.

So that was our guidance and then when we looked at issues and subissues like in aquatic, we looked at fish, plants, the community -- you know, all these issues. And are the activities that are within the scope -- and then we went back to the definition of generic, which is also in here, that the impacts -- again, this starts on, in the executive summary on page 8 of the executive summary. Has the issue been determined to apply to all plants or some plants of specific -- we've got examples here -- specific size, specific location.

I remember on location, we were dealing with fresh water versus marine, riverine versus lake. So specific location. For specific type of cooling system or site characteristics and then looking now does this type of impact to fishery apply to all sites, or do we have to lump them in marine or freshwater.

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Then we described, we looked at these criteria for small, moderate and large, and assigned that. And those are in these matrices that are in the appendix, on how we stepped through that matrix each time, each time going back and looking at these definitions. That's what we dealt with and we're hoping we communicated to all the readers. And then, you know, what does it take to mitigate that if there is some associated impact.

So it was stepping through the matrices that are in here by those definitions. And I think one of the things that we talked about a lot on Eva's team and we talked with NRC on this, on making these statements, is the generic, we were not asked to preclude an assessment of an impact at a later date.

Generic was at this point in time with this information to say here are the impacts that are going to require site-specific information, you know, as this process proceeds. And one of the important things that we keep hammering ourself with, NRC keeps saying is there's always new and significant information that can arise and working for NRC, it's our responsibility. NRC has it, I know they look for it, the licensees do. We get stuff from the public also. You know, new and significant information means a new assessment.

So don't take -- or at least this is the way I've been taught in working this -- don't take generic as it's off the table, take generic as, you know, we've lumped these together so you can focus on what we think at this time is important and then look for new and significant information so we can come back to these that are new and significant. But these definitions were really important to following that. And I think if you apply that -- no disruption, you can apply that to terrestrial plants, to a fish community, a mussel community -- all these other issues.

Ms. Hickey: So in fact when we say that to the aquatic ecology, the impact is small and generic, what we're saying is for all the decommissioning activities and the evaluation that we did, that we didn't see any disturbance in --

Mr. Neitzel: Detectable, nothing detectable.

Ms. Hickey: Detectable disturbance to the aquatic ecology.

Mr. Neitzel: And that's based on information we got from the public, it's based on the review of literature, it's based on our visiting power plants that were being -- were in the process of decommissioning. The -- what do you call it -- history or the experience -- you had a specific phrase, what we've learned so far, what we're learning as we go along. And then the open literature, technical reports and published documents.

And so what we're saying is based on all that information, we don't see where the activities inside the operating fence for aquatic communities will even be detectable, they're so small that you won't even see them, they're small, they're going to be the same everywhere and that's the statement we've -- that was the conclusion we came up with. That's how we did that.

Mr. Lewis: Steve Lewis, General Counsel's Office, NRC.

One thing I wanted to say is that a number of comments that I heard which were to the effect that we ought to include more on the costs of decommissioning in this GEIS, was something that struck me as a very, very thoughtful comment and I'm accordingly, thinking about them, which means I don't have a response to them right now, but I thought they were good points.

The -- as far as bankruptcy goes, this is obviously a point of considerable concern to the federal government and fortunately the Department of Justice agrees with us that there's a good deal of case law that we have on our side to the effect that these funds are not part of the assets of the estate that are available to be invaded, if you will, or used by other creditors. They're treated as outside the estate for that purpose. They are considered to be governmental in nature and they also partake of a protection that is related to their health and safety and environmental protection function.

Having said that, bankruptcies are very contentious proceedings and so we don't just rest on the fact that we have cases that say what we think will protect us. We go to the Department of Justice and we get the Department of Justice attorneys to represent us and vigorously make sure that those cases are accepted by the bankruptcy judge and that the monies in those trust funds are preserved for the purpose that was established.

That's really all I had to say unless there was some aspect of this that I missed.

Mr. Cameron: No. I think that what you're -- in case it isn't clear, but that the decommissioning fund is not going to be affected by bankruptcy because the fund is there and the creditors of that corporation can't get at that fund. It's preserved. So I think you've done it, Steve.

Mr. Lewis: That's correct.

Mr. Cameron: Thank you very much.

This is, is the fund tied to operation. Is that what you're going to talk about? Who knows what you're going to talk about.

(Laughter.)

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Mr. Masnik: Rather than try to interpret your understanding of his question, I'll just respond directly to hers. She had a couple of comments. One had to do with periodically updating the fund, which periodically it is updated, and the staff does an assessment of burial costs which change over time, and licensees then adjust their amount of money that they put aside. That was the question.

AT-G-7 Ms. Carroll: And the other is, isn't this fund built through rates, so what happens if it goes off line or even if the company is no longer billing. There seems to be a couple of vulnerabilities.

Mr. Masnik: Yeah, the requirement of the regulations is to put the fund aside. It doesn't really specify how the licensee gets the money. Licensees of course hope that they can pass that cost on to the ratepayers but if the PUC, for example, doesn't approve it, the licensee has to put in the funds out of their own profits.

You mentioned also that you were concerned about premature shutdowns and we've actually had a number of plants -- the regulation to establish a decommissioning trust fund came into being in 1988. We had a number of plants shut down in the late '80s and early '90s and obviously the fund was not fully funded.

In those cases, the licensee has continued to collect funds and contribute to their decommissioning trust fund. And what they have done, of course, is model their decommissioning activities around the availability of funds. If they still have 60 years to do it, in some cases the licensee would either put the plant in long term storage for a couple of years or they would pace the decommissioning activities to match the funds.

In one case, in Trojan, there was a period of time where they actually exceeded the amount of funds that they -- or they speculated that they would exceed the amount of funds in their trust fund, in which case they went out and borrowed money to continue the decommissioning.

So the bottom line is that licensees have been very creative about obtaining the money and continuing the decommissioning process. We were very concerned about these plants, particularly the premature shutdowns, whether or not they would be able to accumulate the funds. It appears that so far everything has been going along reasonably well.

Mr. Genoa: Thank you, Chip. Paul Genoa, Nuclear Energy Institute.

AT-E-2 It was Ed Martin who asked the question about sort of the discrepancy or the debate between the EPA and the NRC standard for site cleanup or license termination and I think that has been an obstacle to public understanding and acceptance of decommissioning. While it's not unexpected, if you gave two different regulators authority over the same activity that they might develop different approaches towards regulating that activity -- and in fact that is the case.

They did develop different approaches, but when one looks into it and if one really goes in depth into looking at it -- and of course, these are technical issues and we all like to sort of come up with a quick sound bite like answer and unfortunately they don't always lend themselves to that, the reality is, as was noted in a GAO report on the EPA and NRC standard, that the results actually are very similar, of the two approaches, that they both protect public health and safety.

Now one would think that 15 millirem on average per year versus 25 millirem on average per year -- that one would look at that and say well obviously 15 is less than 25, therefore, it must be more protective. In fact, one has to look more closely at what the assumptions are. Twenty-five millirem by the NRC is an all pathway analysis that assumes the worst case in any year.

EPA assumes a 30-year average, what is the average exposure over an entire 30-year period. In fact, when you look at light water power reactors that we're talking about here, who typically have cobalt and cesium as the prime isotopes that drive the exposure, you find that the NRC model of 25 millirem for those isotopes which doesn't take into account decay because it's the worst case, generally the first year after license termination -- actually results in a more strict standard than a 15 millirem average over 30 years. In other words, you can leave more radioactivity behind under the EPA standard, by the way it's designed, for light water reactors than you can under the NRC standard.

So that was the point I wanted to make. And the most recent policy issue that you could look to is that recently at the West Valley Project, the EPA found that the NRC standard of 25 millirem was acceptable and was protective of public health and safety at that site. It met EPA's criteria.

Mr. Cameron: Thank you very much, thank you, Paul.

Janet, do you want to give us one comment before we adjourn for tonight?

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AT-B-19 Ms. Zeller: I guess I'd like to just comment that to the public and to many non-profit organizations, generic means you may say this, you may not say that; this is on the table, that is not on the table. And what happens is that people do make comments that affect their communities and affect their safety and if they are indeed outside the scope of a particular process, I would truly love to believe that those comments are not lost. But at this point, my experience doesn't lead me to be sure that that's the case.

AT-B-20 So I'm challenging NRC staff, all of you I believe are genuine in your concern about our welfare, and I would challenge you not to lose any of the comments that have been made about security or any other issue that you consider outside the scope. And make certain that those do surface somewhere.

AT-B-21 I'd also like to point out that what happens in the real world is different from your idealistic presentations and your idealistic views of what ought to be happening. And we have such things as the nuclear waste train carrying Yankee Rowe waste coming into the town of Roanoke at 9:00 on a Friday evening with a street festival going on and you know where the railroad track goes in Roanoke, it comes right into downtown.

And all of the highways were blocked off for the festival, there were thousands of people there, having come into the county for this festival. And that train sat there for hours. And if they were really only emitting 10 millirem per hour at six feet -- and believe me, people were closer than six feet, a bunch of them ran up to it, although our people who were there tried to stop them and get the crowd to move away from the train. There was nobody there who was doing that function except us.

And so, you know, in the real world, what -- the decisions that you make come down to people's communities and so I don't need to preach at you -- well, yeah, I do. You've got to do better, you've got to make assumptions that are way more conservative than what you're doing. And you've got to assume human failings.

AT-B-22 And so much of what is in this document depends on the skills and the experience level, which are lacking, because decommissioning is new, just like plutonium fuel is new. NRC does not know what it's doing, the people who are on these reactor sites don't know what they're doing and so if safety depends on human capability, it does too much by the way in this document, then you know, that's not very reassuring and I'm glad I've got the last word.

(Laughter.)

November 2002



11/9/01  
66 FR 56721  
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A Edward Scherer  
Manager of Nuclear  
Oversight and Regulatory Affairs

December 27, 2001

Chief, Rules and Directives Branch  
U.S. NRC Division of Administrative Services -2-

December 27, 2001

Chief, Rules and Directives Branch  
Division of Administrative Services, Mail Stop T6 D59  
U.S. Nuclear Regulatory Commission  
Washington, DC 20555-0001

Subject: "Notice of Availability of the Draft Supplement to the Final Generic Environmental Impact Statement on Decommissioning of Nuclear Facilities and Notice of Public Meetings," 66 Federal Register No. 218, page 56721 (November 9, 2001)

Gentlemen:

In the subject Federal Register Notice, the U.S. Nuclear Regulatory Commission (NRC) solicited comments on the draft supplement to the Generic Environmental Impact Statement (GEIS) on Decommissioning of Nuclear Facilities as issued in October, 2001

For the past thirteen years, the original GEIS on Decommissioning of Nuclear Facilities, NUREG-0586, has provided a comprehensive and robust evaluation of the environmental impacts associated with decommissioning of nuclear facilities. Nevertheless, we support the NRC's current efforts to update the GEIS for nuclear power plants to reflect the industry's experience in decommissioning and to more fully consider issues like partial site release and re-use of concrete rubble as fill

The draft supplement provides a detailed discussion of the impacts of decommissioning on eighteen environmental issues. Overall, the conclusions provided in the draft supplement seem reasonable. There are, however, some issues that would benefit from additional clarification by the NRC:

- CL-01/1
- CL-01/2 1. The time frame for assessing the magnitude of the environmental impacts is not clearly discussed. In some instances (terrestrial ecology page 4-20, lines 39-41), the draft acknowledges that some impacts will be temporary but once decommissioning is completed, not significant. The discussion of other issues is silent with regards to when the impact is assessed. For example, dewatering for a relatively short period while sub-surface foundations are removed would be performed in accordance with a National Pollutant Discharge Elimination System (NPDES) permit (section 4.3.2).

Template = ADM-013

E-REDS = ADM-03  
Call = J. Serletti (dgeis)

P O Box 128  
San Clemente, CA 92674-0128  
949 368 7501  
Fax 949 368 6083

However, the impact on the water table during this period of decommissioning would probably be noticeable. Once dewatering has ceased, the water table would most likely return to its pre-decommissioning level. The licensee would reasonably conclude that dewatering during decommissioning is a SMALL (not noticeable, does not de-stabilize any important attribute of the resource) impact once decommissioning has been completed and is addressed in this GEIS Supplement. The NRC should revise the GEIS Supplement to clarify that the magnitude of the impact should be assessed once decommissioning activities have ceased and the license is terminated

- CL-01/3 2. Activities that require State or local permits or approval should be considered to have a SMALL impact under the GEIS. Licensees will be required to obtain approval from State and/or local agencies for several activities performed as part of decommissioning and site restoration. These activities may include routine discharge of non-radiological liquids, dewatering, removal or modification of circulating water conduits, and use of portable combustion engines. Typically, the regulations governing approval for these activities require that the regulatory agency perform an assessment of the environmental impact(s) and, as appropriate, establish mitigating measures as permit conditions. In the case of water quality issues, the NRC relies on the licensee's compliance with the NPDES permit to conclude that the magnitude of the impact(s) is SMALL. The NRC should revise the GEIS Supplement to clarify that the NRC will consider the impact of an activity to be SMALL and rely on the licensee's compliance with a state or local permit, including any mitigating conditions
- CL-01/4 3. The water quality (section 4.3.3) discussion does not address the potential impact of dewatering on the quality of ground water. If, for example, the ground water is a source of potable water and the facility is located near an ocean, dewatering could impact the quality (salinity) of the potable water. The NRC should revise the GEIS Supplement to clarify that the NRC will rely on the licensee's compliance with the NPDES permit for dewatering to conclude that the impact is SMALL.
- CL-01/5 4. The potential impacts of removing circulating water conduits on water quality or aquatic ecology are not consistently discussed or are considered an exception from the staff's conclusions. The Executive Summary states that the "removal of uncontaminated SSCs (such as the intake structure or cooling towers) that were required for the operation of the reactor" are included in the scope of the GEIS. However, chapter 4 does not discuss the potential impacts of removing circulating water conduits on water quality (section 4.3.3) and the staff considers removal of these structures to be an exception to the generic evaluation for aquatic ecology (section 4.3.5). Similarly, the tables in Appendix H do not address this issue. Realistically, the licensee will have to comply with state and/or local regulations to

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Chief, Rules and Directives Branch  
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remove the circulating water conduits or cooling towers. The state and/or local agency would perform an environmental assessment and, as appropriate, establish conditions in the permit to mitigate any environmental impact(s). As in the case of water quality issues, the NRC relies on the licensee's compliance with the NPDES permit to conclude that the magnitude of the impact(s) is SMALL. The NRC should revise the GEIS Supplement to clarify that the NRC will rely on the environmental assessment performed for and any mitigating conditions included as part of the state or local permit for removal of circulating water conduits.

- CL-01/6 5. **Facilities included in the NRC's review of information during preparation of the draft supplement should be able to use the NRC's conclusions on socioeconomic impacts instead of performing an additional assessment along with a license-amendment request.** In section 4.3.13, the results of the evaluation stated (page 4-56, lines 30-32) that "In the 21 decommissioning case studies observed, it is concluded that facility decommissioning should have a SMALL socioeconomic impact on low-income and minority populations". At the same time, given that populations differ near each reactor site, the staff concluded that environmental justice was a site-specific issue. The NRC should revise the GEIS Supplement to clarify that licensee of a plant that was one of the case studies can refer to the staff's assessment that this was a SMALL impact instead of having to perform a site-specific evaluation and submit a license amendment request.

- CL-01/7 6. **Public opposition to a facility is not an objective criterion for determining the impact of decommissioning on aesthetics.** In section 4.3.15.2, the magnitude of potential impacts on aesthetics is described as proportional to how vigorously the plant is opposed by the host community. Opposition to a facility is frequently expressed by a few vocal individuals or groups who do not necessarily reside in the area but who are philosophically opposed to the peaceful use of nuclear power. These individuals will continue to speak in opposition against a facility as a matter of principle, even when the facility begins decommissioning and site restoration. Since aesthetic issues are a function of each individual's perception, opposition to the facility should not be used as a criterion for assessing environmental impact. A more objective and justifiable approach would be to apply the other criteria described in this section (the facility's impact on the skyline, noise, land disturbance, traffic) or to consider recreational use, if any, in determining the magnitude of decommissioning impacts.

- CL-01/8 In a related issue, there continues to be a gap in regulations concerning the release of slightly contaminated solid materials. In both partial site release without a license termination plan and license termination for the entire site, residual radioactivity may

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U.S. NRC Division of Administrative Services -4-

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remain as long as the exposure criterion of 10 CFR 20 Subpart E is satisfied. Conversely, this same residual radioactivity is treated as licensed material prior to license termination — regardless of how little the amount, concentration, or dose significance — and can only be disposed of at a licensed facility. This double standard poses an incentive to retain radioactive material on-site until the license has been terminated to avoid potentially excessive costs for radwaste disposal, while creating a longer term risk for additional site cleanup required by other regulatory authority or court of law. While we recognize that the US Nuclear Regulatory Commission (NRC) is seeking to resolve this discrepancy through study by the National Academy of Sciences and further agency deliberation, this process may take several years. Prolonged delay contributes to the erosion in public understanding and confidence in government policy as well as the lack of resolution mentioned above for licensees. Public policy is needed to define the quantitative dose and radionuclide characteristics that have no discernible public health consequences.

Southern California Edison appreciates the opportunity to comment on the draft supplement. If you have any questions concerning these comments, please contact me.

Sincerely,

*A.E. Scherer* for  
A.E. Scherer

November 2002

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11/9/01  
66 FR 56721  
(2)

December 28, 2001

BEFORE THE

**UNITED STATES NUCLEAR REGULATORY COMMISSION  
OFFICE of NUCLEAR REACTOR REGULATION  
Washington, D.C. 20555-0111**

**THREE MILE ISLAND ALERT &  
The EFMR MONITORING GROUP's  
COMMENTS on the NUCLEAR REGULATORY COMMISSION's  
GENERIC ENVIRONMENTAL IMPACT STATEMENT on  
DECOMMISSIONING of NUCLEAR FACILITIES, NUREG-0586:  
DRAFT SUPPLEMENT DEALING WITH  
DECOMMISSIONING of NUCLEAR POWER REACTORS**

*Prepared by Eric Joseph Epstein,  
Chairman, Three Mile Island Alert  
Coordinator, EFMR Monitoring Group*

Rules & Records  
11/2/01

Letter 2, page 2

December 28, 2001

Mr. Michael T. Leaser, Chief,  
Rules and Records Branch  
Division of Administrative Services  
Office of Administration  
Rules of Directives Branch  
Mail Stop T 6 D 59  
United States Nuclear Regulatory Commission  
Washington, D C. 20555-0001

Dear Mr. Leaser:

Enclosed please find Three Mile Island Alert's (TMIA) and the EFMR Monitoring Group's (EFMR) Comments on the NUCLEAR REGULATORY COMMISSION's GENERIC ENVIRONMENTAL IMPACT STATEMENT on DECOMMISSIONING of NUCLEAR FACILITIES; NUREG-0586: DRAFT SUPPLEMENT DEALING WITH DECOMMISSIONING of NUCLEAR POWER REACTORS

The comments were prepared by Eric Joseph Epstein, on behalf of Three Mile Island Alert and the EFMR Monitoring Group. Mr. Epstein is Chairman of TMIA and the Coordinator EFMR. (See Enclosure I). Since 1985, Mr. Epstein has testified and intervened in hearings and proceedings before the Nuclear Regulatory Commission (NRC) and Pennsylvania Public Utility Commission (Pa PUC) on nuclear decommissioning and radioactive waste isolation issues (See Enclosure II). Mr. Epstein's research and testimony have focused on the following nuclear generating stations: Peach Bottom 1, 2 & 3, the Susquehanna Steam Electric Station (SSES) 1 & 2, and Three Mile Island (TMI) 1 & 2. Since 1993, EFMR, along with General Public Utilities Nuclear (GPU) and Exelon have sponsored and invested \$1,590,000 in remote robotics research relating to nuclear decommissioning (See Enclosure III).

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*Template = ADM-013*

*EXIDS = ADM-03  
ADM = D. Soggetti (dgsis)*

Respectfully submitted,

*Eric Joseph Epstein*  
Eric Joseph Epstein,

Chairman, Three Mile Island Alert

Coordinator, EFMR Monitoring

4100 Hillsdale Road  
Harrisburg, PA 17112  
Office: 717-238-7318  
Voice: 717-541-1101  
Fax: 717-541-5487  
eepstein@igc.apc.org

DATED: December 28, 2001

*Donna L. Zumbo*  
NOTARY

NOTARIAL SEAL  
Donna L. Zumbo, Notary Public  
City of Harrisburg, Dauphin County  
My Commission Expires October 25, 2003

State of Pennsylvania  
County of Dauphin  
Sworn and subscribed before me this  
28 day of DECEMBER, 2001  
*Donna L. Zumbo*

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## I. INTRODUCTION

CL-02/1 Three Mile Island Alert (TMIA) and the EFMR Monitoring Group (EFMR) do not dispute the contention of "electric utilities" (1) and the Nuclear Regulatory Commission (NRC) that radiological decommissioning and radioactive waste isolation expenses are subject to change and likely to increase. However, the Nuclear Regulatory Commission has

CL-02/2

The NRC promulgated revised rule making for decommissioning nuclear power plants, including an amendment to its regulations.

"...on financial assurance requirements for the decommissioning of nuclear power plants. The proposed amendments are in response to the potential deregulation of the power generating industry and respond to questions on whether current NRC regulations concerning decommissioning funds and their financial mechanisms will need to be modified. The proposed action would require power reactor licensees to report periodically on the status of their decommissioning funds and on the changes in their external trust agreements (Federal Register, Financial Assurance Requirements for Decommissioning Nuclear Power Reactors, 10 CFR Part 50, RIN 3150-AF 41, September 10, 1997, (Volume 62, Number 175, pp. 47588-47606.)

In fact, the Commission specifically addressed the particular condition of nuclear utilities under the jurisdiction of regulatory authority:

"...the NRC is proposing to revise its definition of "electric utility" to introduce additional flexibility to address potential impacts of electric industry deregulation. The Commission notes that the key component of the revised definition is a licensee's rates being established either through cost-of-service mechanism or through other non-bypassable charge mechanisms, such as wire charges, non-bypassable customer fees, including securitization or exit fees, by a rate-regulating authority. Should a licensee be under the jurisdiction of a rate-regulating authority for only a portion of the licensee's cost of operation, covering only a corresponding portion of the decommissioning costs that are recoverable by rates set by a rate-regulating authority, the licensee will be considered an "electric utility" only for part of the Commission's regulations to which those portions of costs pertain. (Pages 47593- 47594.)

Clearly, the NRC has anticipated the nuclear industry's financial apprehension, and acted accordingly by promulgating regulations to resolve the industry's concerns. Furthermore, the Commission extended the definition of an "electric utility" to include

"An entity whose rates are established by a regulatory authority by mechanisms that cover only a portion of the costs collected in manner Public utility districts, municipalities, rural electric cooperatives and State and Federal agencies, including associations of any of the foregoing, that establish their own rates are included within the meaning of "electric utility." (Section 50.2, Definitions, p. 47605 )

1

steadfastly refused to address the fundamental problem that has created and perpetrated financial gaps between "target" (2) decommissioning funding and actual assets on hand to complete radiological decommissioning (3). In fact, the Commission has no statutory authority to compel "electric utilities" to physically raise, maintain, secure and account for radiological decommissioning funding. The NRC can authorize and mandate a preferred "mode of decommissioning", but the Commission lacks the ability to ensure the existence of adequate funding levels, i.e., accretible external sinking funds

The NRC's GENERIC ENVIRONMENTAL IMPACT STATEMENT (GEIS) on DECOMMISSIONING of NUCLEAR FACILITIES-NUREG-0586: DRAFT SUPPLEMENT DEALING WITH DECOMMISSIONING of NUCLEAR POWER REACTORS does not adequately factor the financial disconnect between NRC "funding targets" and actual and realized funding pools accrued by "electric utilities". Moreover, there

2 By the NRC's own admission, a "funding target" is below the actual amount an "electric utility" will actually need to complete radiological decommissioning

Prior to deregulation, and in states not affected by deregulation, "Electric utilities" must petition state utility commissions to recover "targeted" funding levels "suggested" by the NRC. But the Companies are not mandated by the Commission submit detailed funding plans until two years prior to site closure. In addition, if a utility has been saving for DECON, but SAFSTOR is necessitated, the funding package becomes grossly inadequate.

3 The amount of monies necessary to complete non-radiological decommissioning fluctuates from plan to plant, and in many cases "electric utilities" are not saving the eventuality.

2

remains a chronic shortfall between "targeted" funding levels and actual costs for nuclear decommissioning. (4)

- CL-02/3 In addition to the economic gash in the GEIS portal, this fatally flawed document does not adequately address, acknowledge, account for, or compute a number of significant barriers related to radiological decommissioning; including: Cost Estimates for Radiological Decommissioning; Planned Operating Life of a Nuclear Generating Stations; Spent Fuel Isolation; "Low Level" Radioactive Waste Isolation; Rate payer Equity; Plant Valuation, Joint Ownership; and, Regulatory Ambiguity.
- CL-02/4-10

TMA and EFMR's comments also include: III. SUMMARY; IV. THE PROBLEM with NEPA & "PSYCH STRESS"; V: CRITICISMS & SUGGESTIONS of 4.0 ENVIRONMENTAL IMPACTS of DECOMMISSIONING PERMANENTLY SHUTDOWN NUCLEAR POWER REACTORS; VI. APPENDIX J: INCORRECT or MISSING DATA; and, VIII. TRANSPORTATION.

4 WASHINGTON, Dec 20, 2001 (Reuters) - The Nuclear Regulatory Commission falls short in its oversight of funds for U.S. nuclear power plant decommissioning, according to a report released on Thursday by Congress' main investigative arm.

Decommissioning a retired nuclear plant typically costs between \$300 million and \$400 million, and involves dismantling it and removing its radioactive components for safe storage.

The General Accounting Office report said that in some instances, the NRC's reviews were "not always rigorous enough" to ensure adequate decommissioning funds, according to the report.

"The commission will review the report carefully and take whatever action they feel is appropriate," an NRC spokesman said. The agency oversees all 103 U.S. nuclear plants.

- CL-02/11 The Nuclear Regulatory Commission can no longer evade its responsibilities and duties without considering the practical consequences, financial limitations, and political realities. Does any one of sound mind or body residing within the Commission really think that a nuclear power plant can be radiologically decommissioned if the funding is inadequate and the plant is prematurely shut down? Can the Commission identify a pragmatist, physicist, chemist, policy analyst, or behavioral scientist who is willing to testify that radiological decommissioning can be achieved with the fate of Yucca Mountain in perpetual limbo and the three, current "low-level" radioactive waste facilities limited by finite capacity and geopolitical considerations? Did the Nuclear Regulatory Commission "encourage" its economists, accountants, and actuaries to ignore the impact of deregulation and plant devaluations on local communities? Is it unreasonable to ask the NRC to view decommissioning through a global lens that accounts for economic reality, objective science, and fiduciary accountability? Or is the Commission intent on viewing radiological decommissioning through surrealistic prescription monocles prescribed by the Nuclear Energy Institute, the Edison Electric Institute, Electric Power Research Institute, and the Institute for Nuclear Power Operations?
- CL-02/14
- CL-02/15 The NRC, once again, has missed an opportunity to constructively participate in solving the nuclear decommissioning riddle. Radiological decommissioning requires inter-agency cooperation among federal, state, and local shareholders. At some point, the NRC will have to create a decommissioning vessel that incorporates reality as its guide. Frankly, the GEIS resembles a script for "Abbott and Costello" prepared by Norman C. Rasmussen, Bernie Snyder and Ken Lay.
- CL-02/16

II. BARRIERS TO NUCLEAR DECOMMISSIONING:

A. Current Problems Associated with Cost Estimates for Radiological Decommissioning

CL-02/17 Power reactor licensees continue to rely heavily on nuclear decommissioning projections provided by the industry consultant, Thomas LaGuardia and TLG, Inc. Furthermore, TLG continues to base decommissioning estimates on flawed and specious "field" studies extrapolated from small, minimally contaminated, and prematurely shutdown nuclear reactors

No reasonable, sound or prudent financial officer operating outside of the nuclear industry would accept funding formulas and that rely on so many fluid caveats and assumptions. Recently, David Hayward, president of Hayward Consulting stated:

In my judgment, AmerGen Energy Co.'s strategy to purchase and operate nuclear power plants does not make a lot of sense for the following reasons First, from a historical perspective, many nuclear power plants have closed down prior to the expiration of their licenses Thus, their financial performance has been lower than that originally anticipated Second, nuclear plant owners have historically underestimated the cost of decommissioning nuclear power plants (Bold face type added) Third, the issue of disposing nuclear waste has not been fully settled. ("Plant Valuation: Book Value and Beyond", Public Utilities Fortnightly, September 1, 1999, p. 58.)

The wild fluctuation in the cost estimates for radiological decommissioning are attributable to the lack of actual decommissioning experience at large nuclear generating stations ( over 1,000 MWe, or at plants that have operated for their full and planned lifespan. (See Discussion B. Planned Operating Life of Nuclear Generating Stations) The largest commercial nuclear power plant to be fully decommissioned, Shippingport, is a 72 megawatt (MWe) light-water breeder reactor and is substantially smaller than the Susquehanna Steam Electric Station-1 & 2 (1,050 Net MWe for each unit) (5) During Pennsylvania Power & Light's Base Rate Case ("PP&L" or "PPL") (PA PUC v. PP&L, 1995; Docket No R-00943271; R-00943271COO1, et seq). Company witness Thomas LaGuardia, President of TLG, admitted that Shippingport was "almost like a pilot plant." (1995 PP&L Base Rate Proceeding; Official Transcript, Page 2103, Lines 17-20) (6) Shippingport was owned and operated by Duquesne Light Company under special agreement with the Department of Energy. The entire core was removed and replaced three times prior to decommissioning, and as noted by Company witness LaGuardia during cross examination, "[T]here were several cores at Shippingport starting out as a

5 PPL announced it would petition the NRC to increase the capacity of SESS by 100 megawatts, while decreasing the property value of the plant "The 120 million of improvements at the Susquehanna plant are expected to add to earnings as soon as they go into operation" (Reuters, April 23, 2001.

On July 17, 2001, the NRC approved PPL's capacity expansion request. Unit 1 will be increased this month while the upgrade at Unit 2 is planned for Spring, 2002, after the planned refueling outage.

6 This methodology was reconfirmed in 1997:

The cost estimating methodology employed in developing the decommissioning estimates, have been field verified by the Company's decommissioning consultant [TLG] in work performed during the decontamination and dismantling of the Shippingport Atomic Power station, Shoreham Nuclear Station and Pathfinder Atomic Station as well as for activities ongoing at the Yankee Rowe, Trojan and Rancho Seco nuclear units (Question & Answer 155, PP&L's Response to Interrogatories of Environmentalists, Set 3, Dated May 19, 1997.)

## Letter 2, page 11

pressurized water reactor and later being converted to a light water reactor." (1995 PP&L Base Rate Proceeding; Page 2105, Lines 19-21). Furthermore, the reactor vessel was shipped to the Hanford Reservation (through an exclusive and unique agreement with the Department of Energy) thus depriving the industry of critical hands-on decommissioning experience. In fact, Shippingport was dismantled and not decommissioned. The immense differences between Shippingport and the large, commercial nuclear generating stations make any financial comparison between inadequate and baseless.

Several other nuclear reactors are being prepared for decommissioning but provide little meaningful decommissioning experience that could be used reliably to predict decommissioning costs.

For instance, Yankee Rowe was cited during the 1995 PP&L Base Rate Case as a reliable predictor of the decommissioning cost estimates associated with a large commercial reactor. Yankee Rowe, however, is a small commercial plant (167 MWe) that had a unique advantage which make it an unlikely predictor of decommissioning costs at other nuclear plants: The most significant component removal, steam generators, was completed without Nuclear Regulatory Commission approval. PP&L's witness, Thomas LaGuardia, admitted, "[t]hat's correct, at the time. They [Maine Yankee Atomic Power Company] didn't have the decommissioning plan approved at that time." (PP&L Base Rate Case, Page 2095, Lines 17-18.) Moreover, this plant is only in the initial phase of decommissioning and costs have already mushroomed from \$247 to \$370 million from 1993 to 1995 primarily for spent fuel management costs. (PP&L witness, Thomas LaGuardia, confirmed the figures on Page 1029, Lines 16-22 )

Shoreham, a large Boiling Water Reactor (809 MWe), was decommissioned after two full power days of operation or 1/7,300 of the "expected" operating life of the SSES. Therefore, Shoreham is also an unpredictable and unreliable indicator of future decommissioning costs at the Susquehanna Steam Electric Station

## Letter 2, page 12

The Nuclear Regulatory Commission and "electric utilities" rely heavily on TLG, to construct decommissioning cost estimates based on work completed at Shippingport, Shoreham, Yankee Rowe and small, prototype reactors such as: BONUS (17 MWe) placed in ENTOMBMENT; Elk River (20 MWe) a reactor approximately 2% of Susquehanna's size which operated for five years; and, Pathfinder (60 MWe), which operated for 283 full power days (PP&L Base Rate Case, LaGuardia, Page 1044, Line 1) before being placed in SAFSTOR in 1989.)

TLG's are specious and depend on: 1) The development of nonexistent technologies; 2) Anticipated projected cost of radioactive disposal, and, 3) The assumption that costs for decommissioning small and short lived reactors can be accurately extrapolated to apply to large commercial reactors operating for forty years.

In Response to Interrogatories of the Environmentalists, Set 3, Dated May 19, 1997, PP&L stated: "However, at this time, the Company cannot predict future changes in decommissioning technology, decommissioning costs or nuclear regulatory requirements. Accordingly, the Company cannot anticipate future decommissioning cost requirements or the associated rate recovery levels." (Q. & A., 157.)

At the Susquehanna Steam Electric Station, projected costs for decommissioning have increased by at least 553% in the last 19 years. In 1981, PP&L engineer Alvin Weinstein predicted that PP&L's share to decommission SSES would fall between \$135 and \$191 million. By 1985, the cost estimate had escalated to \$285 million, and by 1991 the cost in 1988 dollars for the "radioactive portion" of decommissioning was \$350 million.

The Company then contracted out for a site-specific study which projected that the cost of immediate decommissioning [DECON] would be \$725 million in 1993 dollars. The 1994 cost estimate remained steady at \$724 million, but the market value of securities held and accrued in income in the trust funds declined, and thus the estimate reflected another increase in decommissioning costs. (7) (PP&L Base Rate Case, Page, 1016, Lines 7-27 and Page 1017, Lines 1-24.)

7

"PP&L has not performed an analysis which compares the PP&L estimate of \$4.6 billion to \$5.6 billion in stranded costs to the \$3.1 billion estimate prepared by Resource Data International/POWERdata reported on page 12 of the May 1997 edition of Public Utilities Fortnightly." (PP&L's Response to Interrogatories of the Office of Small Business Advocate, Set 1, Dated May 22, 1997, Q. & A. 38.)

However, three days earlier, the Environmentalists asked PP&L (Q. & A. 156 b): "Is the Company aware of any such [decommissioning] studies conducted by others? Please identify and provide each such study conducted by others and in the Company's possession or control."

"PP&L is unaware of any such studies." (PP&L's Response to Interrogatories of the Environmentalists, Set 3, dated May 19, 1997.)

Furthermore, PP&L has never analyzed or evaluated decommissioning cost discrepancies and predictions offered by separate entities

Q.4 a. "Are you aware that PP&L's decommissioning estimates from 1981 (Alvin Weinstein, \$135 to \$191 million) through 1995 have increased by 553% when TLG projected nuclear decommissioning costs at \$724 million?"

A. 4. a. The S.M. Stoller Company study and the TLG studies were prepared using different assumptions. PP&L has not done any study that would compare or equate the two estimates. (PP&L's Response to Interrogatories of Eric Joseph Epstein, Dated June 3, 1997.)

8

The industry "leader", Exelon, has filed comments attesting to the imprecise and speculative nature of radiological decommissioning estimates (See diagram below). Unfortunately, these figures (8) are already anachronistic, inaccurate, and grossly underestimate decommissioning since they represent data from studies conducted by TLG (9) from 1995-1996, but *not* filed until January 1, 1998. Therefore, Exelon is not preparing to revise decommissioning estimates until 2003.

Generating Station(s)	1985 Study/1995 Study	\$ Increase/% Increase
Limerick 1 & 2	\$272m/\$986m	\$714m/610%
Peach Bottom 2 & 3	\$273m/\$947m	\$674m/724%
Salem 1 & 2	\$271m/\$701m	\$430m/600%
Three Mile Island 1 (a)	\$60m(b)/\$368m or \$431m(b)	\$308-\$371/(c)

(a) GPU reported that the cost to decommission TMI-2 more than doubled in 48 months by 1997, the decommissioning estimate had risen 110% in four years to \$433 million. (1997 GPU Annual Report.)

(b) TMI-1 total, projected decommissioning expense based on ENTOMB, (1988 GPU Annual Report, p. 39).

(c) TLG's estimate as referenced in the 1998 Annual Report, p. 59.

8 PECO Energy's Response to Eric Epstein's: I-4, BEFORE THE PENNSYLVANIA PUBLIC UTILITY COMMISSION, Eric Joseph Epstein's Testimony APPLICATION OF PECO ENERGY COMPANY, PURSUANT TO CHAPTERS 11, 19, 21, 22 AND 28 OF THE PUBLIC UTILITY CODE, FOR APPROVAL OF (1) A PLAN OF CORPORATE RESTRUCTURING, INCLUDING THE CREATION OF A HOLDING COMPANY AND (2) THE MERGER OF THE NEWLY FORMED HOLDING COMPANY AND UNICOM CORPORATION, DATE, Docket No. A-110550 F0147, FILED APRIL 17, 2000)

9 All of the above referenced studies were conducted by TLG Industries (TLG) ComEd's net nuclear decommissioning costs have almost doubled from 3,089 million in 1990 to 5,426 million in 1999, (PECO Energy's Response to EE-I-4)

In 1995, ComEd estimated that its decommissioning costs had risen from \$2.9 billion to \$4.2 billion

9

However, should Limerick, Oyster Creek, Peach Bottom 2-3, or TMI-1, shut down prematurely, the entire residue of decommissioning funding must necessarily be derived from shareholder and/or Company resources due to the advent of deregulation.

The Company added that, "The original [1985] and current [1995] mode of decommissioning funding is geared toward a DECON method of decommissioning." (PECO's Response to EE-I-4, d ) However, since there is no permanent nuclear waste isolation site for spent fuel, SAFSTOR is the most likely decommissioning mode available when PECO's nuclear plants come off-line. (10)

CL-02/18 The GEIS stated, "Based on the number of reactors shut down and the date that they permanently ceased operations, over 200 facility-years' worth of decommissioning experience have accumulated since the 1988 GEIS." (Executive Summary, xl). However, based on this statement, and NRC's inability to grasp the "exponential nature" of radiological decommissioning estimates, it appears that the Commission has had the same experience 200 times. Moreover, the GEIS's sophomoric tone in declaring vast decommissioning experience is similar to the NRC's rhetoric at the time of the 1988 GEIS. On May 26, 1988, in Harrisburg, Pennsylvania, the Commission confidently stated they have "considerable experience [decommissioning] with reactors that have not had a significant accident before the end of their useful lives". (NRC, TMI Advisory Panel, May 26, 1988).

<sup>10</sup> "A search of ComEd's records reveals that ComEd does not have records of the initial estimates of the indicated decommissioning costs." (PECO's Response to EE-Infomal-I-4.)

## B. Planned Operating Life of Nuclear Generating Stations

CL-02/19 Experience at large commercial nuclear power plants over 200 MWe has clearly demonstrated that TLG's assumption that nuclear units will operate for 40 years, i.e., "PP&L expects that Susquehanna will operate for its full license life" (11) contradicts existing nuclear reactor experience. The Company's witness, Thomas LaGuardia, was asked by Mr. Epstein: "[H]ow many commercial nuclear power plants in this country have completed their full operating lives?" Mr. LaGuardia replied, "[N]one, essentially." (PP&L Base Rate Case, Page 1023, Lines 20-22.) Additionally, George T. Jones, Vice-President of Nuclear Engineering, was asked by Mr. Epstein:

Q: "In your experience, which is rather extensive at TVA, Entergy and CE, can you at least let me know what is the longest life of a plant you've been associated with?"

A: Mr. Jones, I've never been associated with one that -- none of them have ever reached the end of their licensed life

There has been a lot of work done and continues to be done on life extension, not by us but by the industry. I don't know." (Page 2272, Lines 8-16.)

<sup>11</sup> Pennsylvania Power & Light Company, Response to Interrogatories of the Environmentalists, Set 3, Dated May 19 1997, Question and Answer: 167 (Also see, Pennsylvania Power & Light Company, Response to Interrogatories of the Office of Consumer Advocate, Set III, Dated April 17, 1997 and PP&L's Response to Interrogatories of Eric Joseph Epstein, Set I, dated June 3, 1997.)

Additionally, PPL admitted (in the same set of Interrogatory Response of the Environmentalists) that TLG "has not performed, nor is he aware of, any generic studies or studies that address the premature closure of a nuclear unit and the cost of decommissioning under such a scenario" (Q. & A. p. 190 )

Moreover, PP&L believes that while the SSES may operate for 40 years, they are not confident that this critical assumption applies to other commercial nuclear power plants

Q 9. "Is the Company aware that if the Susquehanna Steam Electric Station operated for 40 years, it will be retired at the same time as the majority of nuclear reactors in America?"

A. 9. "This question is premised upon an assumption that the majority of other nuclear reactors in America will operate for their full license lives **There is no evidence that this premise is correct.**" (Boldface type added.) (PP&L's Response to Interrogatories of Eric Joseph Epstein, Set I, Dated June 3, 1997.)

Even Mr. MacGregor, counsel for PP&L, wavered on Susquehanna's ability to operate for its full-life. Mr. Epstein asked him: "But his [LaGuardia] methodology is based on the fact the plant will operate for 40 years; is that not correct." Mr. MacGregor answered, "I'm not sure that's true." (Page 456, Lines 15-18.)

The Company reconfirmed the 40 year assumption in the 1997 Rate Case. "PP&L expects that Susquehanna will operate for its full license life. Moreover, the Company believes that it can meet 'higher than expected decommissioning costs,' if they arise, and can avoid 'financial difficulties at the responsible entity' by operating its system in a efficient and cost effective manner. The Company has not contemplated additional measures at this time." (Pennsylvania Power & Light Company Response to Interrogatories of the Environmentalists, Set 3, Dated May 19, 1997. Q. & A. 167.) This assertion **contradicts PP&L's direct testimony** about their apprehension and financial vulnerability if the Company is no longer defined as an "electric utility." (Bold face type added.)

Mr. LaGuardia's and Mr. Jones's acknowledgments are confirmed by empirical data contained in the GEIS. (Appendix F & J.) For example, the following reactors have been shut down prematurely: Shoreham, 809 MWe, operated for two full-power days (which is .000136986% of the estimated life of the Susquehanna Steam Electric Station) and closed before it could begin commercial operation in May 1989; Trojan, 1095 MWe which operated for 40% of its operating life, and completed a unique disposal arrangement with the Hanford Nuclear Reservation (May 1976 to November 1992); Three Mile Island-2, 792 MWe which operated for 1/120 of its operating life (December 1978 to March 1979); Dresden, 200 MWe which operated for 45% of its operating life (July 1960 to October 1978); Indian Point-1, 257 MWe which operated for 30% of its planned operating life (January 1963 to October 1974); San Onofre-1, 436 MWe which operated for 35% of its expected life (from January 1968 to November 1992); and, Fort Saint Vrain, 330 MWe which operated for 27.5% of its expected life (January 1979 to August 1989) and Big Rock Point a 67 MWe General

Electric BWR which began commercial operation in March 1963 prematurely shut down on August 29, 1997. (World List of Nuclear Power Plants: Operable, Under Construction, or on Order (30 MWe and Over) as of December 31, 1994, "Nuclear News," March, 1995, pp. 38-42.)

On December 4, 1996, Haddam Neck, a 582 MWe Pressurized Water Reactor operated by Connecticut Yankee Atomic Power Company, closed prematurely in the hope of saving rate payers \$100 million ("Nuclear Monitor", p. 4, December 1996.) The plant came on-line in January 1968 and operated for 72.5% of its predicted life. Six months later, on May 27, 1997, Main Yankee was shut down and became the first Combustion Engineering reactor to be prematurely retired. The plant, an 860 MWe Pressurized Water Reactor, opened in December 1972 and was scheduled to operate through 2008.

The Connecticut Department of Public Utility Control removed Millstone-1 from the rate base on December 31, 1997. Millstone-1, a 660 MWe General Electric Boiling Water Reactor operated by Northeast Utilities, began operation in March, 1971 before being prematurely retired. More importantly, the decision prevents Northeast Utilities from charging rate payers for costs associated with the shutdown.

And, on January 15, 1998, Commonwealth Edison (ComEd) announced it was permanently shutting down Zion-1 and Zion-2, 1040 MWe Westinghouse PWRs. Zion-1 began commercial operation in December 1973 followed by Zion-2 in September 1974. ComEd also reported this decision will cost shareholders \$515 million or \$2.38 per share. With the shutdown of Zion, premature closure has occurred for every nuclear reactor type and supplier in the United States of America.

A sense of fair play, intergenerational equity, and risk sharing between rate payers and taxpayers on one hand, and shareholders and Board Members of on the other, necessitate that the Nuclear Regulatory Commission and licensees plan for decommissioning based on the assumption that their nuclear units will be prematurely shut down. As previously noted, operating capacity and historical evidence from commercial nuclear power plants give no valid indication that nuclear generating stations will operate for 40 years. (12) On the contrary, reactor history has resoundingly demonstrated that nuclear power plants have not operated for the term of their license.

CL-02/20 Obviously, there are chronic shortfalls between "targeted" funding levels and actual costs for nuclear decommissioning. The burden of proof rests squarely on the shoulders of power reactor licensees, their partners and the NRC to demonstrate that a 40 year operating life, which they predicate their financial planning upon, is realistic. Furthermore, the nuclear industry has exacerbated this problem by resolutely refusing to put aside adequate funds for non-radiological decontamination and decommissioning

<sup>12</sup> In *Re Wolf Creek Nuclear Generating Facility*, 70 PUR 4th 475 (1985), the Kansas State Corporation Commission was confronted with the pendency of the construction of a nuclear generating plant. On the issue of decommissioning, the Commission stated that "Decommissioning cost estimates are inherently uncertain and speculative" and that "[t]o date, there has been no actual experience decommissioning a large, commercial nuclear plant and cost estimates have been traditionally low."

In addition, the Commission held that "The current shortage (indeed nonexistence) of the site for the disposal of large quantities of radioactive waste makes detailed estimates of shipping distance and cost virtually impossible." *Id.* at 540-41. In the *Wolf Creek* rate case, Mr. LaGuardia (also a Company witness in the 1995 PP&L Base Rate Case) failed to include inflation in his cost estimates and assumed a forty year operating life for the nuclear plant. *Id.* On the basis of this omission and the speculative predictions of operating life, the Commission chose a "midpoint" of LaGuardia's testimony.

The Commission also declared, "We believe that the NRC and general industry estimates of 30 years is a valid and realistic life to utilize for purposes of decommissioning estimates." *Id.* at 541. (Bold faced typing added.) The NRC must adopt and promulgate consist decommissioning mandates, which includes planning for nuclear decommissioning around a thirty (30) planned operating life

C. Spent Fuel Isolation

CL-02/21 Spent fuel "disposal" is an unresolved and hugely problematic area. Each reactor produces approximately 20 to 30 tons of I high-level radioactive waste per year. There is presently, and at least until 2010, nowhere to put this waste. The technology to safely manage spent fuel for an indefinite period of time does not exist. While the manner of spent fuel management may differ, i.e. re-racking and possibly dry cask storage all operating nuclear power plants are forced to store high-level, radioactive waste in the form of spent fuel on-site.

There is no location to permanently store spent fuel and high level radioactive waste (HLW) generated by nuclear power plants. This is significant problem for Exelon Nuclear which operates the largest nuclear fleet in America (13) In fact, many of Exelon's reactors are close to losing Full Core Off load Capability.

Reactor	Core Size	Lose Full Core Off load Capability
Limerick 1	764	2006
Limerick 2	764	2006
Oyster Creek	560	LOST
Peach Bottom 2	764	2000
Peach Bottom 3	764	2001
Salem 1	183	2012
Salem 2	193	2018
Three Mile Island	177	NA

(Source: PECO Energy's Response to Eric Epstein's, I-12, Unicom Merger Proceedings, PA PUC, 2000)

<sup>13</sup> "...PECO Energy Company, each decommissioning cost evaluation presumes a date for a permanent high level radioactive waste (HLRW) facility This allows for a cost comparison with other estimates. The following dates are included as 'presumed' in the cost estimates...Oyster Creek: DOE commences pickup in 2010...TMI: DOE commences pickup in 2010...PBAPS [Peach Bottom Atomic Power station] 2 & 3: DOE commences pickup in 2010, LGS [Limerick Generating Station]: DOE commences pickup in 2010, Salem 1 & 2: DOE commences pick up in 2010." (PECO Energy's Response to EE-I-10 )

Exelon's response to the critical shortage in spent fuel capacity has been to gamble, CL-02/23 and increase storage capacity through an untested, commercial dry cask technology

Station	Dry Cask Technology	Deployment Date	Contractor
Limerick	BD	Summer 2010	TBD
Oyster Creek	NUHOMS 52B (c)	July, 2010	None
Peach Bottom	Trans-Nuclear TN-68	June, 2000	Raytheon
Salem (a)	None	TBD	None
TMI (b)	None	TBD	None

(Source: PECO Energy's Responses to EE-I-11 & EE-I-12.)

(a) Salem has no plans to extend spent fuel capacity though dry cask storage or re-racking

(b) TMI-1 plans to increase spent fuel storage capacity by re-racking in 2002.

(c) Holtec is the new vendor chosen to provide dry cask services at Oyster Creek (PECO's Response to Eric Epstein's Informal I-8)

CL-02/22

When, and if, spent fuel storage is increased (14) at the above mentioned facilities, the additional upward "adjustments" will have a significant impact on decommissioning funding. This cost, which was omitted from TLG's estimate, "None of the estimates we have prepared include the cost of disposal of spent nuclear fuel" (1995 PP&L Base Rate Proceeding, Page 1032, Lines 20-12) is the main contributing factor to the escalation of decommissioning costs at Yankee Rowe. Thomas LaGuardia, the Company's witness, admitted the increase during cross examination:

Mr. Epstein: "Are you aware that the cost has increased for the decommissioning of Yankee Rowe from \$247 million to \$370 million over the last two years?"  
Witness: "Yes. I'm aware of what the estimate concludes."

Mr. Epstein: "And half of the cost was attributable to spent fuel storage?"  
Witness: "That's correct." (Page 1029, Lines 16-22.)

<sup>14</sup> "PECO Energy Company is participating in research projects on spent nuclear fuel (SNF), and Transportation methods for SNF, through EPRI and NEI. The total spending on these projects is in excess of \$250,000 per year." (PECO's Response to EE- Informal-I-11).

Aggravating the critical shortage of HLW storage space is the bleak estimate for the completion of Yucca Mountain, the designated repository for high level nuclear waste. The earliest date this repository could be available is 2010. Lynn M. Shishido-Topel served as the Overseeing Commissioner of the Illinois Commerce Commission testified on behalf of the National Association of Regulatory Commissioners before the House Subcommittee on Energy and Mining Resources and the House Committee on Oversight and Investigations (March 17, 1995.) Shishido-Topel recognized eight years ago that she was "fairly certain that DOE would not meet its revised 2010 deadline to begin accepting spent fuel from commercial reactors" (Bureau of National Affairs (BNA), "Federal Facilities: Industry, DOE Struggle to Find Acceptable Solution to Interim Storage of Spent Fuel, Daily Environment Report News, March 18, 1994 [1994 DEN 52 d10]. She also predicted that the amount of spent fuel generated by 2000 will be 40,000 metric tons (MTU). This amount of waste would exceed Yucca Mountain's capacity, and the State of Nevada has demonstrated that Yucca Mountain will probably hold about 20% of the total 85,000 MTU of spent fuel earmarked for the facility. (State of Nevada, Nuclear Waste Project Office, Scientific and Technical Concerns, pp 8-11.)

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As early as 1995, concerns about Yucca Mountain's integrity surfaced from scientists at Los Alamos National Laboratories. Dr. Charles Bowman warned that plutonium would remain after the steel casks holding the nuclide dissolved. Plutonium could then migrate and concentrate. (*The New York Times*, p 1, March 13, 1995.) And in February 1999, the scientific peer review panel for Yucca Mountain commissioned by the United States Department of Energy (DOE) produced a "highly critical" report. "The review panel said the model [DOE's computer model] has so many uncertainties - like the corrosion rates of waste containers, the area's vulnerability to earthquakes and how climate changes would affect rainfall - that its reliability was limited" (*The New York Times Science*, "New Questions Plague Nuclear Waste Storage Plan," Jon Christensen, August 10, 1999)

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CL-02/25 Furthermore, on October 4, 1999, LeBoeuf, Lamb, Green & MacRae, filed a complaint alleging a conflict of interest by the Department of Energy in their selection and awarding of \$16 million legal contract to Winston & Strawn. Former general counsel to the Energy Department, R Tenney Johnson, in a sworn affidavit, stated: "[A] situation has been created which an entity [Winston & Strawn] will pass judgment on its own work." (Matthew Wald, *New York Times*, October 5, 1999.)

Exelon's "political strategy" relative to finding a solution for a permanent spent fuel storage facility has been disappointing, and reflects the philosophy of the Nuclear Energy Institute

The planned fall-back scenario in the event of unavailability of low-level radioactive waste disposal facility would be to continue political pressure on the States and US Government to support the development of permanent low-level waste facilities. In the event that a high-level radioactive waste facility is unavailable, the station would continue spent fuel management under "dry storage". Any station without dry storage capability would establish dry spent fuel storage management if it is likely that the DOE would not receive spent fuel in a prudent time frame and wet fuel storage is no longer feasible.

(PECO Energy's Response to EE-14 )

CL-02/26 Isolation of high-level radioactive waster, which is primarily composed of spent fuel, can not be separated from radiological decommissioning. The earliest Yucca Mountain will be available is in the year 2010. Nuclear generating stations can not be decommissioned or decontaminated with the presence of HLW on-site or inside the reactor vessel. Aggressive decontamination process will be precluded, necessitating utilities to place retired reactors into extended-DECON or SAFSTOR. If a long term solution to spent fuel isolation is not found in the immediate future, some of the nation's nuclear generating stations will be shut down prematurely due to an absence of spent fuel storage capacity. **Cost projections by "electric utilities" must be revised to necessarily include funding scenarios that anticipate premature closure.**

CL-02/27

## D. Low Level Radioactive Waste Isolation (15)

CL-02/28 TLG provided nuclear waste storage and nuclear decommissioning costs estimates for all Pennsylvania utilities regulated by the Public Utility Commission. However, TLG's testimony during the 1995 PP&L Base Rate Proceeding discredits their projections. Mr. La Guardia based his cost estimates for low-level radioactive waste (LLW) disposal on the assumption that the Appalachian Compact would be available when the SSES closes (PP&L Base Rate Case, Page 1034, 17-20). He concluded that the disposal of LLW is the most expensive component in the decommissioning formula (Page 2091, Lines 21-25.) Furthermore, Mr. LaGuardia conceded that it may be necessary to recompute cost estimates for disposal because it now appears imminent that Barnwell will open for seven

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This term is imprecise and "low-level" is not analogous to low-risk

The GEIS definition of LLW on M-11 is misleading and is symptomatic of problems embedded in Appendix M: Glossary.

The overwhelming majority of "low-level" nuclear waste comes from nuclear power plants and includes irradiated components and piping; control rods, poison curtains, resins, sludge, filters and evaporator bottoms; even the remains of entire nuclear power plants if and when they are decommissioned.

Radioactive medical waste comprises less than .1% of the radioactivity to shipped all "low-level" radioactive waste sites. If you factor academic waste into the formula, 2% of all "low-level" radioactive waste is derived for biomedical sources

The above mentioned figures are national averages derived from the Department of Energy between 1987-1990. What does the "low-level" radioactive waste stream look like in the Appalachian Compact? Of the compact states of West Virginia, Delaware, Maryland and Pennsylvania, the Commonwealth generates approximately 85 % of the radioactive waste or 170,000 cubic per year. The source of radiation is as follows: nuclear power plants: 80%; industry: 12%; medical: 5%, and academic institutions less than 1%. However, the amount of radioactivity present in the volume is even more unbalanced: nuclear power plants: 92%; industry 7%; medical .1%; and academic institutions: .07%. The nuclear waste site planned for Pennsylvania is primarily for the use of the nuclear industry

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to ten years for all states except North Carolina (Page 2108, Lines 4-9.) However, the Company has not yet taken the step of reconfiguring costs of LLW disposal now that Barnwell has been open since July 5, 1995. (Bold face type added.)

Q. 7. "Has TLG or the Company recomputed decommissioning estimates since Barnwell has reopened?"

A. 7. "No." (Pennsylvania Power & Light Company Response to Interrogatories of Eric Joseph Epstein, dated June 3, 1997.)

Barnwell is currently operating and has the capacity to function through 2006 In a response to a formal inquiry posed by Mr. Eric Epstein, Chairman of Three Mile Island Alert, Inc., on May 18, 1996, concerning Barnwell's operating and capacity status, Chem-Nuclear Systems, Incorporated, the owners and operators of the Barnwell, declared:

Our analysis is based on the insights and understanding that come from having a major operation in South Carolina. The realities are that Chem-Nuclear LLRW disposal facility in Barnwell, S C. has sufficient disposal capacity to remain open to the nation for approximately 10 years based on volume received (Walter E. Newcomb, Ph D., Vice President and Project Manger, CNSI Pennsylvania Office, May 18, 1996.)

CL-02/29

In addition to recomputing the cost of LLW disposal, the reopening of Barnwell has indefinitely postponed the siting of a waste facility in Pennsylvania Marc Tenan, Appalachian Sales LLW Commission executive director observed: "If Barnwell's going to open to the entire country for at least the next 10 years, is there really a pressing need to continue work on regional disposal facilities?" ("ACURIE Newsletter, About Low-Level Radioactive Waste Management," May 1995, Page 1.)

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On June 18, 1998, the Appalachian States LLW Commission voted to support the Pennsylvania Department of Environmental Protection's suspension of the siting process for a Low-Level Radioactive Waste Disposal Facility.

CL-02/30 Limerick, Oyster Creek, Peach Bottom, Salem, and Three Mile Island are among the nation's nuclear generating stations currently serving as "temporary" repositories for low-level radioactive waste. Limerick, Peach Bottom, and Three Mile Island do not meet the standards set by the Appalachian Compact in regards to a permanent LLW facility.

Neither PECO nor ComEd consider its nuclear generating sites to be appropriate for permanent isolation of either low-level or high-level radioactive wastes generated as a result of operations. ComEd will continue to store only radioactive waste generated at each site on a temporary, as-needed basis.

(PECO Energy's Response to EE-1-13 )

**E. Rate Payer Equity**

CL-02/31 Objective empirical data clearly demonstrate that the majority of commercial nuclear power plants will not operate through their planned operating life of forty years (40) While the power reactor licensees are entitled to recover a portion of decommissioning funding through the rate, they are not entitled to a full and complete rebate on "stranded investments", and shortfalls that will certainly arise do to the underfunding of nuclear decommissioning "funding targets". Shareholders and Board Members of electric utilities and Rural Electric Cooperatives (REC) must assume responsibility for their business decisions. These aforementioned entities aggressively sought to license, construct, and operate nuclear power plants To allow artificial definitions concerning ownership of nuclear generating stations to insulate those who cogently made capital investments is immoral, unethical, and an endorsement of corporate socialism That is, shareholders profit from imprudent investment decisions and are accorded relief when error of mismanagement becomes manifest.

The issue of rate payer equity and the mandated feasibility of shared costs was highlighted in PP&L's Base Rate request before the PUC. The Company went on record during the hearings as being disgruntled with the manner in which decommissioning costs are unfairly distributed among rate payers. Mr. Douglas A. Krall, Manager-Integrated Resource Planning for PP&L is on record decrying the current decommissioning formula during the PP&L Base Rate Case:

Mr. Epstein: "That if the rate increase for decommissioning fossil fuel plants are delayed future customers would unnecessarily be at risk "

Mr. Krall: "Yes. There would be an exposure that a customer who came on the last day of operation of the plant would get very little service from the plant and end up paying the whole cost of decommissioning." (Page 1925, Lines 16-24.)

Mr. Epstein: "But you would not be adverse to assessing future customers who got no electrical benefit from a plant decommissioning costs?"

Mr. Krall. "It doesn't seem to me to be an equitable situation." (Page 1927, Lines 9-13.)

Yet, PP&L sidestepped the issue of intergenerational rate equity and focused on intraclass and interclass cost shifting prior to the *Joint Petition For Full Negotiated Settlement of PP&L Inc 's.'s Restructuring Plan and Related Court Proceedings*, August 12, 1998:

For any customer, a change in the recovery of CTC costs from a usage rate to a customer charge does not constitute an intraclass or interclass shift in cost recovery, as long as those charges are developed consistent with the rate cap and so that the customer's total bill is held constant during rate restructuring, absent any changes in usage. The Company's approach meets these tests. No customer is picking up costs for another customer within his or her class or from other rate classes. (S.F. Tierny, Pennsylvania Power & Light Company response to Interrogatories of the Pennsylvania Petroleum Association, Set A, Dated June 10, 1997. Q. & A. 20.)

This formula only serves active and hostage PP&L rate payers. The Company has made no provisions to insulate near future customers (seven to ten years) from financing stranded debt on a nuclear generating station.

The Pennsylvania Public Utility Commission cited Nuclear Regulatory Commission guidelines that suggested five criteria for evaluating alternative financing mechanisms for nuclear decommissioning. One of the components of was titled "Intergenerational equity - that the cost of decommissioning be spread equitably to all rate payers throughout the life of the facility." Unless a more equitable funding formula for nuclear decommissioning is established, rate payers and tax payers who received little or no direct electrical benefit from nuclear generating, will be financially exposed.

The nuclear industry must assume responsibility for their investment strategies. Creating and perpetuating intergenerational debt is reckless and fundamentally inequitable and undemocratic

Future generations may be exposed to gross rate payer inequity if adequate decommissioning funding based on realistic estimates (and not "funding targets") are not assured. The solution should not be a financial safety net provided by hostage rate payers and tax payers excluded from internal corporate decision making "Electric utilities" must assume financial responsibility for their decisions to invest in nuclear power which necessarily means the shareholder should bear a substantial portion of post-deregulation decommissioning expenses. Clearly, a formula must be established that recognizes rate payer and tax payer equity for the realized service that power reactor licensees provide. It is time for the Nuclear Regulatory Commission to recognize, through its Environmental Impact Statements, that consumers and tax payers are human beings and not abstract, hypothetical billing invoices

#### F. Nuclear Plant Valuation

CL-02/32 Since deregulation, numerous nuclear plants have changed hands. To "cushion" the transition from regulated monopoly to competitive marketplace, many states allowed "electric utilities" to recover "stranded costs". Rate payers are saddled with paying for the industry's uneconomical investments, i.e., "stranded costs." Two of the most "bullish" nuclear corporations, Exelon and PPL, recovered over \$8.3 billion in "uneconomical investments". This figure does not include the millions in savings Exelon and PPL have accrued by unilaterally devaluing the combined PURTA and Real Estate tax assessments for their nuclear generating stations.

The Susquehanna Steam Electric Station is the most glaring example of a company "devaluing" their property at the expense of taxpayers, while billing the same hostage rate payer for uneconomical investments, and exposing this rate payer/taxpayer to further financial exposure related to the underfunding of nuclear decommissioning.

In the of Winter 1999-2000, PPL unilaterally devaluated the combined PURTA and Real Estate tax assessments for the SSES. Prior to the 1998 Joint Petition for Negotiated Settlement, the nuclear power generating units were assessed by PP&L at approximately \$1 billion. PPL now claims that the SSES is only worth \$74 million or the same amount as the valuation of the Columbia Hospital. Not only did the Berwick School District and Luzerne County experience revenue shock, but PPL refused to pay or escrow any monies they owed to Luzerne County and the Berwick School district while the case was being appealed.

PPL's behavior is all the more egregious in an era where nuclear plant's value on the open-market are equal to, or in excess, of fossil generating stations. For example, Entergy and Dominion resources engaged in a bidding war to purchase the Fitzpatrick and Indian Point 3 nuclear generating stations from the New York Power Authority (NYPA). The sale established a record high.

According to press reports, Entergy's winning bid for the total 1,805 megawatts of capacity offered \$967 million, or 535 per kilowatt...The price per kilowatt not only exceeds the previous average unadjusted price for nuclear assets - \$75 per kilowatt-but also exceeds the average price paid for fossil capacity-\$360 per kilowatt." "NYPA's Nuke Auction: More at Stake Than Price?", *Public Utilities Fortnightly*, July 15, 2000, p. 90.

CL-02/33 The GEIS failed to address the issue of nuclear plant "devaluation" and revenue

CL-02/34 shock. This "revised" document also failed to adequately address and factor the

socioeconomic impact of "Greenfield" on the revenue base of local municipalities.

*(Please refer to Enclosure IV for a report on the impact devaluation has had on communities in Pennsylvania).*

G. JOINT OWNERSHIP

CL-02/35 The most disturbing and financially bizarre component of radiological decommissioning is the relationship between a "power reactor license" and the "minority power reactor licensee". Unlike "power reactor licensees", "fractional licensees" are not subjected or mandated by the Nuclear Regulatory Commission to empirically verify, report or monitor record keeping relating to nuclear decommissioning funding mechanisms. In some instances, even Public Utility Commissions lack the ability to mandate or regulate savings levels from "fractional licensees", e.g., Rural Electric Cooperatives.

At PPL's Susquehanna Steam Electric Station, the "minority licensee", the Allegheny Electric Cooperative, is scheduled to contribute 10 (ten) to the total cost of decommissioning funding. The "power reactor licensee's" estimated PPL's share decommissioning share to \$724 or 90% of the total cost of decommissioning. Based on this calculation, AEC's 10% share of \$804 million should be \$79 million. However, Allegheny is setting aside a figure based on 5% of the final decommissioning costs even though Laurence V. Bladen, Director of Finance and Administrative Services told Mr. Epstein that AEC is basing its decommissioning costs on data supplied by PP&L. (Telephone conversation, March 30, 1995) "Allegheny's portion of the estimated cost of decommissioning SSES is approximately \$37.8 million (same figure enumerated in the AEC 1993 Annual Report, p 27) and is being accrued over the estimated useful life of the plant." (Decommissioning Trust Fund Allegheny Electric Cooperative, 1994 Annual Report, Cost of Decommissioning Nuclear Plant, p 49) The AEC's cost projections have not changed since 1993.

Unfortunately, Exelon has a similar financial relationship at Peach Bottom with its proportional partner, Public Service Electric and Gas (PSE&G). At Salem, where, PSE&G is the "power reactor licensee," PECO has a similar financial stake but asserted:

The 42.6 % ownership share in Salem requires that the percentage of the decommissioning be PECO Energy's responsibility. A decommissioning trust fund has been established by PECO Energy and coordinated with PSE&G for that portion of the ownership share

(PECO Energy's Response to EE-4-5a)

PECO and PSE&G have a history of protracted and acrimonious litigation, and decommissioning coordination can not be guaranteed or mandated. After the NRC ordered the shut down of Peach Bottom 2 & 3 in 1987, PSE&G, Delmarva Power & Light Company and Atlantic City Electric sued PECO in 1988, and alleged the Company had "breached" its contract under the Owners Agreement. Several tort claims were also filed "As part of the settlement, Philadelphia Electric will pay \$130,985,000 on October 1, 1992 to resolve all pending litigation." (Joseph Paquette, President & CEO, PECO, April 8, 1982.)

After Salem's chronic mechanical and technical kept the plant shut down for a prolonged outage, beginning in 1995, Exelon sued PSE&G, and,

On December 31, 1997, the Company received \$70 million pursuant to the May 1997 settlement agreement with PSE&G resolving a suit filed by the Company concerning the shutdown of Salem. The agreement also provides that if the outage exceeds 64 reactor unit months, PSE&G will pay the Company \$1 million per reactor unit month. (PECO Energy, 1997 Annual Report, Note 21. Other Income, p 44)

Clearly, this history of protracted litigation does not foster an ideal environment of comity nor does it facilitate a rational coordination of decommissioning funding

ComEd also has a dysfunctional relationship with its proportional shareholder at Quad Cities. "ComEd [power reactor licensee] does not know the mode that MidAmerica Energy [proportional owner] uses for nuclear decommissioning nor the amount of money being set aside by MidAmerica Energy." (PECO Energy's Response to EE-I-6.)

The impact of this uncertainty between decommissioning partners is clear. PECO has no enforcement mechanism to compel PSE&G to fund 42.49% of the decommissioning costs at Peach Bottom. While PSE&G may be obligated to come with their share of decommissioning costs, the "minority licensee" is under no obligation to accept the "power reactor licensee's" estimates or mode of decommissioning. PSE&G tenuous financial position in regard to inadequate decommissioning savings will place a greater fiscal burden on PECO and, thereby, 1) Create further uncertainties about the Company's ability to meet its financial commitments to decommission Peach Bottom 2 & 3; 2) Undermine TLG's net decommissioning estimates; and, 3) Dilute TLG's contingency factor.

CL-02/36

The cost estimates for non-radiological decommissioning (an imprecise term) are not mandated by the NRC. "For PECO Energy Company and ComEd, the costs for 'Greenfield' are included in the cost estimates and in the funding streams established for decommissioning." (PECO Energy's Response to EE-I-8b.) However, Greenfield, i.e., the original environmental status of nuclear generating station prior to construction of the nuclear power plant, has never been achieved by an operating nuclear generating station. Moreover, this site status is unattainable if a station is placed in delayed-SAFSTOR, DECO, or ENTOMB.

One only need look at Three Mile Island to see why this is a potential financial boondoggle. Three Mile Island is owned by three different companies, and controlled by one holding company: General Public Utilities. Jersey Central Power & Light (JCP&L), which owns 25% of the plant, was granted permission to raise decommissioning funds anticipating DECON as the method of decommissioning. Metropolitan Edison (Met Ed), which owns 50% of the plant, was denied decommissioning funding based. Met Ed is anticipating SAFSTOR as the preferred method of decommissioning. As it stands, 25% of the decontamination and decommissioning of TMI-2, a plant that operated for 1/120 of its projected life is being picked by JCP&L customers while the other 75% (Pennsylvania Electric owns 25% of TMI) remains in limbo and will most probably be assessed against the shareholders. In turn, the shareholders are likely to opt for the cheapest method of decontamination and decommissioning, i.e, ENTOMB.

Exacerbating an already bizarre situation is the fact that AmerGen (PECO Energy and British Energy) owns TMI-1. AmerGen has sole financial and technical responsibility for decommissioning this facility. GPU owns the Possession Only License at TMI-2 which has yet to be decommissioned or decontaminated. Further complicating the situation is First Energy's merger (November 7, 2001) with GPU which includes ownership of Three Mile Island Unit-2.

## H. REGULATORY AMBIGUITY

CL-02/37 Former Senator John Glenn and the General Accounting Office announced in November 1994, that it is time for the Environmental Protection Agency (EPA) and the NRC to coordinate radiation protection standards which are based on risk-assessment. **Eight years later**, the agencies have been unable and unwilling to settle their conflicting regulatory standards. As it stands, how would the nuclear industry determine what levels constitute "Greenfield?" (16) Worker exposures remain decidedly liberal. The NRC allows a 1-in-286 lifetime fatal cancer due to "acceptable" routine releases from NRC licensed facilities and NRC occupational standards for workers is 1-in-8 lifetime fatal cancer. Translating this into human terms, Dr. Peter Gartside, Professor of Bio-Statistics at the University of Cincinnati, found workers at Fernald died at significantly younger ages and suffered a higher incidence of intentional and blood cancers than the US population (April, 1994). The Commission has already approved a 1-in-285 lifetime cancer, or 100 MR/year and rejected the Staff's recommendation of 3 MR/year of residual radiation.

CL-02/38 The most formidable governmental regulations facing nuclear related industries is conflicting regulatory authority. Uncertainty is the enemy of the electric industry. This is most clearly evident in the decontamination and decommissioning of nuclear power plants.

CL-02/39 Funding targets to bring a site back to "Greenfield" are set by the Nuclear Regulatory

CL-02/40 <sup>16</sup> The GEIS's glossary superficially glosses over "Greenfield" and equates it with an "an end state of decommissioning..." (M-7 & 2-5).

According to NRC Regulations, Greenfield is achieved when a nuclear generating station is returned to "original status" prior to licensing, construction, and generation of nuclear power. The NRC would then clear the site for "free release" and allow a "school or playground" to be constructed at the former nuclear power plant.

Commission and do not include spent fuel disposal or non-radiological decommissioning. However, the NRC has no rate making authority and electric utilities must go before state utility commissions to recover funding levels "suggested" by the NRC. But the Companies are not mandated by the federal government to submit detailed funding plans until two years prior to site closure. In addition, if a utility has been saving for DECON, but SAFSTOR is necessitated, the funding package becomes grossly inadequate.

Moreover, as Mr. LaGuardia attested (1995 PP&L Base Rate Case, Page 2100, Line 24), there are conflicting radiation clean-up standards for soil, water and surface as defined by the Environmental Protection Agency and the Nuclear Regulatory Commission and each agency has conflicting cleanup standards for site restoration (16). (Witness, LaGuardia, Page 2099, Lines 20-25 and page 2100, Lines 1-18 )

<sup>17</sup> For further discussion see FR 52061, October 23, 1981; 42 FR 60956, November 30, 1977; 40 CFR 192, 12, July, 1989 and US NRC, "Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use of Termination of Licenses for Byproduct, Source, or Special Nuclear Material " Policy and Guidance Directive FC 83-23, Division of Industrial and Medical Nuclear Safety, Washington, DC, August, 1987.]

## III. SUMMARY

I find it highly unlikely, in today's uncertain utility industry, that anyone would invest in the new plant designs for nuclear power, which are still highly capital intensive. "The Bush Plan and Beyond: Toward a More Rational U.S. Energy Policy," *Public Utilities Fortnightly*, July 1, 2001, p. 37.

- CL-02/41 **As of this filing, no commercial nuclear power plant has been decommissioned, decontaminated, and returned to free-release. Nuclear decontamination and decommissioning technologies are in their infancy and several identifiable industrial trends are apparent when reviewing the Nuclear Regulatory Commission's treatment of prematurely shutdown reactors: 1) There is a reluctance to undertake, initiate or finance decommissioning research;**
- CL-02/42 **(18); 2) Prematurely shutdown reactors place an additional financial strain on the licensee; and, 3) These reactors have been retired for mechanical or economic reasons. [United States Nuclear Regulatory Commission, Advisory Panel for the Decontamination of Three Mile Island Unit-2, September 23, 1993.]**

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Q 12. "What technological initiatives are PP&L pursuing to ensure decommissioning technology is available when the SSES is no longer operational?"

A. 12. "PP&L expects that appropriate decommissioning technology will be available at the time Susquehanna is decommissioned, and accordingly, is not pursuing additional technological initiatives at this time." (Company's Response to Interrogatories of Eric Joseph Epstein, Set I, Dated June 3, 1997.)

## IV. NEPA &amp; "PSYCHOLOGICAL STRESS"

- Before discussion the ENVIRONMENTAL IMPACTS of DECOMMISSIONING PERMANENTLY SHUTDOWN NUCLEAR POWER REACTORS; Conclusions, it is important to address NEPA and "psychological stress." CL-02/43 (Scope - D) The GEIS correctly paraphrases PANE vs. Metropolitan Edison, and excludes "psychological stress" from the "scope of this supplement". (1-8). However, the reality is that "psychological stress" exists, and will continue to exist. In fact, if the NRC had revisited the issue of "psychological stress" and the TMI community, it would have found the following:

On June 22, 1979, Governor Richard Thornburgh (R) wrote to the NRC, expressing his "deeply felt responsibility for both the physical and psychological well being of the citizens of Pennsylvania." Thornburgh affirmed his "strong opposition to any plans to reactivate Unit -1 until a number of very serious issues are resolved."

Three years later, on January 7, 1982, the D.C. Circuit Court decided psychological (psych) stress does not need to be covered during the restart hearings. However, the Court ruled, that under the National Environmental Policy Act (NEPA), psych stress must be addressed. The Court ordered an injunction on restart until a study on psych stress was conducted. However, on April 19, 1983, The United States Supreme Court reversed the D.C. Circuit Court's opinion on psych stress and ruled an environmental study is not necessary.

Two months later, on May 5, 1983, GPU revealed for the first time to the NRC that management audits, including psychological evaluations, concluded by BETA and RHR, completed in February and March, 1983, were critical of plant operations and management.

In August 1985, Marc Sheaffer, a psychologist at the Uniformed Services University of the Health Sciences in Bethesda, released a study linking TMI-related stress with immunity impairments.

Subsequently in August, 1987, James Rooney and Sandy Prince of Embury of Penn State University reported that chronically elevated levels of psychological stress have existed among Middletown residents since the accident.

Additionally, in April, 1988, Andrew Baum, professor of medical psychology at the Uniformed Services University of the Health Sciences in Bethesda discussed the results of his research on TMI residents in *Psychology Today*. "When we compared groups of people living near Three Mile Island with a similar group elsewhere, we found that the Three Mile Island group reported more physical complaints, such as headaches and back pain, as well as more anxiety and depression. We also uncovered long-term changes in levels of hormones. These hormones affect various bodily functions, including muscle tension, cardiovascular activity, overall metabolic rate and immune-system function .."

The NRC can hide behind NEPA or any other convenient acronym, but "psychological stress" is a verifiable fact of life for people who live and work, in and around, nuclear power plants

**V: CRITICISMS & SUGGESTIONS of  
4.0 ENVIRONMENTAL IMPACTS of DECOMMISSIONING  
PERMANENTLY SHUTDOWN NUCLEAR POWER REACTORS**

**CL-02/44 (4.1.1) Terms of Significance of Impacts**

The Nuclear Regulatory Commission employed a "standard of significance" developed by the Council of Environmental Quality (CEQ).

**Context** means that the significance of an action must be analyzed in several contexts, such as a society as a whole (human, national) the affected region, the affected interests, and the the locality (4-1.)

However, no "electric utility" constructs, operates, or decommissions a nuclear station without economics being the paramount consideration. Yet, the NRC and CEQ have created a nuclear Potomac Village where economic imperatives are subordinated to the behavioral science flavor-of-the-day. In the NRC's world, an "electric utility" can apply for a loan using NEPA as collateral. I hope that at the end of the GEIS process the Commission can provide me with an address so that I can relocate my family to a neighborhood-without-economic considerations

**CL-02/45 (4.3.1.4) ENVIRONMENTAL IMPACTS of DECOMMISSIONING  
PERMANENTLY SHUTDOWN NUCLEAR POWER REACTORS; On site/Off site  
Land Use - Conclusions:**

The GEIS stated, "It is rare for decommissioning activities to affect off-site land use ." (4-7) This statement fails to recognize that most nuclear generating stations are located in close proximity to substantial water resources. The Susquehanna Steam Electric Station, Three Mile Island and Peach Bottom are located on, or adjacent to the Susquehanna River which feeds the most productive estuary in America, i.e., the Chesapeake Bay.

CL-02/46 Decommissioning and decontamination tasks affect people's perception, especially when these visibly intrusive and audibly offensive activities are in close proximity to their homes and recreational areas Peach Bottom and Three Mile Island are located next to prime water skiing and boating areas on the Susquehanna River. Dozens of summer cabins are located less than 100 yards from TMI on Sholley. Fishing takes place on a daily basis, and Boy Scout badges are available by completing outdoor activities on Three Mile Island.

CL-02/47 The Staff should visit TMI and then travel to Clinton Lake to examine how perceptions and reality affect "off site land use".

After the terrorist attacks, the U.S. Nuclear Regulatory Commission advised all nuclear power plants to move to the highest level of security. Exelon Nuclear, which operates the Clinton nuclear power plant and owns the sprawling, 5,000-acre Clinton Lake, promptly ordered all boats off the lake and closed it.

It remains closed to this day nearly two months later. The power plant uses water from the lake to cool the reactor core.

The closure is causing economic hardship for a number of businesses that cater to boaters, who value Clinton Lake because of its size and its lack of restrictions on boat horsepower. Some business owners say they'll have to shutdown if the lake isn't reopened by next spring.

*(The News Gazette, Champaign, Illinois, November 4, 2001)*

The GEIS must acknowledge the potential for adverse economic impacts on a community during decommissioning

CL-02/48 (4.3.2.4) ENVIRONMENTAL IMPACTS of DECOMMISSIONING PERMANENTLY SHUTDOWN NUCLEAR POWER REACTORS; Water Use - Conclusions: (The discussion 4.3.1.4 is also relevant)

The GEIS stated, "The overall water use of a nuclear facility will dramatically decrease one the once the reactor has stopped operating and the demand for cooling and makeup water ceases." (4.9-4.10) On the surface, this statement appears to be correct. However, at Three Mile Island, a considerable amount of "cleanup water" was created *after* the plant was shut down:

In 1980, the Susquehanna Valley Alliance, based in Lancaster, successfully prevented Met Ed (GPU) from dumping 700,000 gallons of radioactive water into the Susquehanna River. Ten years later (December, 1990), despite legal objections, GPU began evaporating 2.3 million gallons of accident-generated radioactive water (AGW). From December, 1990 to January 1991, the evaporator was shut down five times due to electrical and mechanical "difficulties." And from April-May 1991, the evaporator was shut down for most of this period so GPU could "rewrite the main operating procedure." The Nuclear Regulatory Commission (NRC) issued a Notice of Violation related to evaporator operations. Two months later (June, 1991) the NRC noted repeated mispositioning of AGW valve. The valve in question was also involved in the NRC's Notice of Violation issued in April.

By February 1992, the "portable" evaporator was shut down again due to the failure of the blender-dryer. Replacement of the blender was delayed until August. By May 1992, GPU decided to use a "temporary" blender-dryer until a permanent replacement was installed in August. However, from August-September 1992, some of the water in the evaporator's borated water storage tank was "processed" twice due to "slightly higher activity levels." And in November 1992, approximately 600,000 gallons of AGW was processed twice due to "slightly higher activity levels." Two months later, (January, 1993) GPU "discovered" they failed to take periodic samples of approximately 221,000 gallons of AGW in the borated water storage tank

Finally, in August 1993, over six months behind schedule, evaporation of 2.3 million gallons of accident, generated clean-up water was completed...Can anyone at the NRC point to an official document that classifies 700,000 gallons of radioactive water (which later grew to 2.3 million gallons) as "SMALL"?

The people who live and work around TMI have found that the risks associated with additional cleanup water are not "SMALL".

CL-02/49 **(4.3.3.4) ENVIRONMENTAL IMPACTS of DECOMMISSIONING PERMANENTLY SHUTDOWN NUCLEAR POWER REACTORS; Water Quality - Conclusions:** (The discussion in 4.3.2.4 is also relevant.)

"The staff concludes that the issue of surface or ground water quality for all decommissioning activities is generic and that the environmental impacts for these activities will be SMALL " (4-12).

Persistent "water quality" problems continue to plague TMI, a prematurely shut down reactor

On November 2, 1993, in a letter to the NRC, GPU Nuclear acknowledged: "During the TMI-2 accident, the cork seam located in the Auxiliary Building Seal Injection Valve Room (SIVR) was contaminated with radioactive water. Attempts to contain the contamination within the room have been unsuccessful. During the past 14 years, radioactive material has spread along the joint in one direction into the Annuls, and in the other direction into the Auxiliary Building, Service Building and Control Building West (R L Long, GPU Nuclear, Director, Services Division/TMI-2)"

On June 4, 1998, "GPUN found several pipes penetrating the wall between the turbine building basement and the control building in Unit-2 to be open on both sides of the wall. This condition was contrary to the Unit-2 post-defueling monitored storage safety analysis report (PDMS-SAR) which requires entrances to the control building area to be watertight or provided with flood panels and openings that are potential leak baths to be sealed." (NRC Inspection Report, 50-289/98-08.) Less than a month later, on July 2, 1998, an LER was necessary due to the breaching of flood barriers "between the turbine building and the control building area due to inadequate fieldwork documents" (NRC Inspection Report, R 50-289/98-08.)

As recently as January 9 and 19, 1999, elevated tritium levels and potential leaks from the waste evaporator condensate storage tank for the months of January, February and March, 1999 were reported. (NRC Inspection Report, 50-289/99-01).

Based on the above documented water quality problems the staff should revisit the rating of "water quality "

CL-02/50 **(4.3.1.4) ENVIRONMENTAL IMPACTS of DECOMMISSIONING PERMANENTLY SHUTDOWN NUCLEAR POWER REACTORS; Air Quality - Conclusions:**

"Fugitive dust from those activities performed outside of the building is temporary (19), can be controlled mitgative measures, and will generally not be noticeable off site." (4-16). Once again the experience of TMI-2 is instructive:

19 Please note that the term "temporary" has been applied unevenly in the GEIS. "Temporary" storage of LLW and HLW is essentially analogous with "indefinite."

In June-July, 1980, for 11 days, Met Ed vented 43,000 curies of radioactive Krypton-85 (10-year half-life; beta and gamma) and other radioactive gasses into the environment without having scrubbers in place. Yet in November, 1980, the United States Court of Appeals for the District of Columbia ruled that the krypton venting was *illegal*.

From July 24-27, 1984, during the reactor head lift, which was delayed to brake failure on the polar crane, GPU vented radioactive gasses into the environment. The venting occurred despite pledges by GPU and the NRC that no radioactive releases would take place during the head lift operation. GPU was fined \$40,000 for the violation by the NRC.

On July 12, 1985, two workers who participated in the initial phase of the cleanup and contracted cancer, joined 2,500 area residents suing GPU.

On September 25, 1989, two cleanup workers received radiation exposures while handling a "small piece of reactor core debris" in the decontamination area. "Officials said preliminary calculations show one worker may have a radiation exposure on the hands above 75 rem. The second worker may have an exposure greater than 18.75 rem. The federal occupational limit for exposure to extremities is 18.75 per calendar quarter." By November 1, 1989, one of two workers involved in a radiation exposure "incident" may have received 220 rems to the hands, i.e., "extremities." The other worker harmed the incident is projected to have received 35 rems of exposure. The incident began when the workers picked up an object they thought was a "nut" or "bolt", but was in fact a piece of highly radioactive fuel. The workers were then advised to throw the "object into the reactor vessel." Since the fuel was "discarded", GPU had to use models to predict dose calculations and exposure rates

GPU was also in violation for failing to report this incident in a timely fashion. Additionally, the workers have reported contradictory statements about the event. On January 13, 1990, GPU was fined \$50,000 for a violation of "requirements protecting workers."

After ten years of defueling activities, 5,000 TMI workers had received "measurable doses" of radiation exposure. The NRC staff should reconsider the placement and value of the terms "temporary" and "fugitive", and rethink the adverse affects of "air quality" on workers.

CL-02/51 (4.3.5.2) ENVIRONMENTAL IMPACTS of DECOMMISSIONING PERMANENTLY SHUTDOWN NUCLEAR POWER REACTORS; Aquatic Ecological Resources- Conclusions:

(Discussions in 4.3.2.4 & 4.3.3.4 are also relevant.)

The staff found that "the impact to aquatic ecology for all decommissioning activities is generic and that the environmental impact for these activities is SMALL". (4-19) Unfortunately, the staff biologists are unfamiliar with the unique water chemistry of the Susquehanna River and historic infestations that have afflicted Three Mile Island.

In February 1986, one celled organisms believed to be fungus, bacteria and algae-like creatures were discovered. These creatures obscured the view of the reactor core, and impeded the cleanup of Three Mile Island -2.

On June 23, 1999, "Three Mile Island, trying to rid itself of clams, recently released too much of a potentially hazardous chemical into the Susquehanna River. State regulations allow TMI to release 0.3 parts per million of Clamtrol back into the Susquehanna River. For about an hour, the plant was releasing 10,500 gallons per minute containing twice the amount" (York Daily Record, July 7, 1999.)

CL-02/52 The NRC staff correctly concluded, "...the magnitude, (i.e., SMALL, MODERATE, LARGE) of potential impacts will be determined through a site specific study...: (4-19). This flexible barometer should be applied to all of the above mentioned Conclusions.

CL-02/53 (4.3.6.4) ENVIRONMENTAL IMPACTS of DECOMMISSIONING PERMANENTLY SHUTDOWN NUCLEAR POWER REACTORS: Conclusion - Terrestrial Ecological Resources:

The NRC staff aptly stated, "...the magnitude, (i.e., SMALL, MODERATE, LARGE) of potential impacts will be determined through a site specific study..." (4-23). These flexible barometer should be applied to all the above mentioned Conclusions

CL-02/54 (4.3.10.1) ENVIRONMENTAL IMPACTS of DECOMMISSIONING PERMANENTLY SHUTDOWN NUCLEAR POWER REACTORS; Occupational Issues - Conclusions:

(The discussion in 4.3.1.4 is also relevant)

Labor relations is an essential component, and potential impediment to prompt decommissioning activities. For example:

On August 12, 1982, William Pennsylv, a cleanup worker, was fired for insisting he be allowed to wear a respirator while undressing men who entered highly radioactive areas Pennsylv filed a complaint with the U.S. Department of Labor. William Pennsylv settled out-of-court two days before an administrative law judge was scheduled to hear his case. (April 11, 1984).

On March 22, 1983, TMI-2 senior-safety engineer Richard Parks publicly charged GPU and Bechtel Corporation with deliberately circumventing safety procedures, and harassing him and other workers for reporting safety violations Parks filed a complaint with the U.S. Department of Labor. On August 12, 1985, GPU and Bechtel were fined \$64,000 for the incident by the Nuclear Regulatory Commission (NRC). Between March 22, March 27, and April 2, 1983, three senior level plant employees, Richard Parks, Larry King, and Edwin Gischel, charge GPU and Bechtel with harassment, intimidation and circumvention of cleanup safety procedures.

On July 31, 1990, the NRC announced "that an allegation that a shift supervisor on duty at Three Mile Unit 2 control room, during defueling operations in 1987, had sometimes slept on shift or had been otherwise inattentive to his duties, was true..."

Although some key members of the site management staff were aware of the sleeping problems and some actions were taken to correct it, it [sic] was not effectively corrected until utility corporate management became involved. The NRC staff proposes to fine GPU Nuclear, Inc. (GPUN) the company that operates the TMI site, \$50,000. The staff also proposes a Notice of Violation to the former shift supervisor.

Also, in February 1991 an operator "inadvertently flooded the vaporizer" and several days later an operator was discovered "apparently sleeping "

CL-02/55 In 1986, the TMI-2 defueling work force peaked at 2,000 Today less than a dozen AmerGen employees police Unit-2...

Based on the experience at Three Mile Island, the SMALL and MODERATE evaluations need to be upgraded to "LARGE".

CL-02/56 (4.3.10.3) ENVIRONMENTAL IMPACTS of DECOMMISSIONING PERMANENTLY SHUTDOWN NUCLEAR POWER REACTORS; Costs - Conclusions:

TMIA and EFMR object to the absence of a Conclusion in this section, and reassert the merits of its argument articulated in: **A. Current Problems Associated with Cost Estimates for Radiological Decommissioning**, pp. 5- 10.

CL-02/57 The most troubling aspect of this section is the assertion that, "The cost of decommissioning results in impacts on the price of electricity paid by rate payers." (4-45) Due to deregulation, additional decommissioning recovery is either limited or "under-funding" is the sole responsibility of the "electric utility," e.g., Three Mile Island Unit-1. The "hostage rate payer" is being replaced by the shareholder who is not likely to advocate paying for the "under-collected" portion of the fund after the plant is permanently shut down.

This section needs to be redrafted and include the following variables:

Cost Estimates for Radiological Decommissioning (20); Planned Operating Life of Nuclear Generating Stations; Spent Fuel Isolation; Low Level Radioactive Waste Isolation; Rate Payer Equity; Plant Valuation, Joint Ownership, and, Regulatory Ambiguity.

<sup>20</sup>

On January 25, 2000, the Citizens Utility Board (CUB) petitioned the Illinois Commerce Commission, and requested that ComEd's \$480 million decommissioning charge for Zion be denied. "CUB cited a state court ruling that decommissioning costs may be collected while a plant is in service. Zion was taken out of service in 1997 and shut down permanently in 1998." (*Public Utilities Fortnightly*, March 15, 2000, pp. 18-19.)

CL-02/58 (4.3.1.4) ENVIRONMENTAL IMPACTS of DECOMMISSIONING PERMANENTLY SHUTDOWN NUCLEAR POWER REACTORS; Socioeconomics - Conclusions: (Also Refer to discussion on F. PLANT VALUATION, pp. 26-27.)

The staff concludes that shutdown and decommissioning of nuclear facilities produces socioeconomic impacts that are generic. The impacts occur either through the direct effects of changing employment levels on the local demands for housing and infrastructure or through the effects of the decline of the local tax base on the ability of local government entities to provide public services.(4-53)

There can be no generic measure of the socioeconomic impact of any community without an in-depth study of a number of driving variables. Nuclear plants are subject to various regulations and tax codes based on location, plant history, levels of corporate investment, composition of work force, state and municipal legislation, economic diversity, and municipal relationships.

The number of employees working at TMI has decreased from 900 in 1999 to 650 in 2001. Unlike GPU, AmerGen is a non-union entity, and out of the 650 employees at TMI, it is not clear how many reside in Central Pennsylvania since the Company rotates workers on a regional basis. TMI was once a large corporate donor, and one of the region's top 50 employers. Within the last five years, community giving has decreased, and GPU, along with former community scions, AMP, Armstrong Industries, and Rite Aid, have slashed thousands of jobs. Any further cuts in tax revenues, community giving or employment levels, i.e., "SMALL 10%" or "MODERATE 10-20%", create undue economic hardships

The amount of taxes paid by TMI-owners prior to the plant's acquisition are listed below, and contrasted with current corporate assessments. The plant's assessment value at market rate was \$92 million after the purchase in July, 2000. AmerGen has disputed the \$49 million valuation (October, 2000).

	AmerGen	GPU
School District	\$394,500 (Net)	\$210,000-220,000
County:	\$148,940 (19)	\$635,000 (PURTA)
Township:	\$30,000	\$8,000
	\$571,440	\$853,000-\$863,000

**Amount of Revenue Decrease: \$281,560 - \$ 291,560 (21)**

(Follow-up data from Exelon will be provided by mid-January, 2001. Similar decreases have occurred at Peach Bottom 2 & 3.)

CL-02/59 Before TMI reaches decommissioning, the community has already lost 250 jobs, and over \$220,000 in tax revenues. Pennsylvania is not similar to Connecticut (22) whereby the difference in pre- and post-deregulation revenues are made up by the state. These are jobs and revenues are lost forever. Most local and state taxing authorities classify "Greenfield" as non-commercial, tax-paying status.

Moreover, TMI and Peach Bottom are located in rural areas that are sensitive to seasonal fluctuations. Farm revenues in the 1980s were sharply down due to drought, avian flu epidemics, and an informal boycott by consumers who did not want to purchase TMI-tainted produce, dairy products, or beef and poultry.

<sup>21</sup> Refer to discussion in *Enclosure IV*

CL-02/60 **(4.3.13.4) ENVIRONMENTAL IMPACTS of DECOMMISSIONING PERMANENTLY SHUTDOWN NUCLEAR POWER REACTORS Environmental Justice - Conclusion:**

The NRC made the appropriate demarcation and concluded, "...the issue of environmental justice requires a site-specific analysis" (4-57) (For further discussion please refer to VI. APPENDIX J: INCORRECT or MISSING DATA; 6)

CL-02/61 **(4.3.14.2) ENVIRONMENTAL IMPACTS of DECOMMISSIONING PERMANENTLY SHUTDOWN NUCLEAR POWER REACTORS Cultural Resources; Conclusions:**

The NRC properly concluded, "...the magnitude, (i.e., SMALL, MODERATE, LARGE) of potential impacts will be determined through a site specific analysis." (4-61)

CL-02/62 One issue that needs to be factored into the equation is what happens when the object of decommissioning has been declared a historical marker, i.e., Three Mile Island-2?

CL-02/63 **(4.3.15.4) ENVIRONMENTAL IMPACTS of DECOMMISSIONING PERMANENTLY SHUTDOWN NUCLEAR POWER REACTORS On site/Off site Aesthetics - Conclusion:**

The staff posited that, "any visual intrusion (such as the dismantlement of buildings or structures) would be temporary (22) and would serve to reduce the aesthetic impact of the site" (4-63) By nature, aesthetics is subjective. Therefore the staff's conclusion is arbitrary. "Because there will be no readily noticeable visual intrusion beyond what is already present from the an operating facility, consideration of mitigation is not warranted" (4-63-64)

<sup>22</sup> Please see footnote for a brief discussion on the concept of "temporary"

CL-02/64 The GEIS could have looked more closely at TMI-2, and considered the following "visual scenanos"

On August 5, 1992, GPU "declared an event of potential public interest when the Unit-2 west cooling tower caught fire " The fire lasted for ten minutes. This was the third fire at TMI-2 during the cleanup The Department of Environmental Resources subsequently instructed GPU to dismantle the wooden paneling and waffling at the base of the cooling towers. The cooling towers now serve as a nesting ground for "fugitive" swallows.

**(4.3.16.4) ENVIRONMENTAL IMPACTS of DECOMMISSIONING PERMANENTLY SHUTDOWN NUCLEAR POWER REACTORS; Noise - Conclusions:**

Please refer to the discussion in 4.3.1.4.

CL-02/65 **(4.3.17.4) ENVIRONMENTAL IMPACTS of DECOMMISSIONING PERMANENTLY SHUTDOWN NUCLEAR POWER REACTORS; Transportation - Conclusions:**

Please refer to *Enclosure V* which features articles highlighting problems with transporting damaged fuel from TMI to Idaho.

**\* VI. APPENDIX J: INCORRECT or MISSING DATA**

CL-02/66 1) All references to Three Mile Island-2 as a "decommissioned reactor are in error The plant has not been decommissioned or decontaminated. TMI-2 was placed in Post-Defueling Monitored Storage in December, 1993.

The plant has been substantially defueled, and debate remains around the K-effective:

Dr Michio Kaku, Professor of Theoretical Nuclear Physics at City University of New York, evaluated studies conducted or commissioned by the NRC on the amount of fuel left in TMI-2. Kaku concluded: "it appears that every few months, since 1990, a new estimate is made of core debris, often with little relationship to the previous estimate...estimates range from 608.8 kg to 1,322 kg...This is rather unsettling...The still unanswered questions are therefore precisely how much uranium is left in the core, and how much uranium can collect in the bottom of the reactor to initiate re-criticality. (August, 1993)

Three Mile Island Unit-2 was built at a cost to rate payers of \$700 million, and had been on-line for only 90 days, or 1/120 of its expected operating life, when the March 1979 accident occurred. One billion dollars was spent to defuel the facility. Three months of nuclear power production at TMI-2 has cost close to \$2 billion dollars in construction and cleanup bills; the equivalent of over \$10.6 million for every day TMI-2 produced electricity. The above mentioned costs do not include nuclear decontamination and decommissioning or restoring the site to "Greenfield."

At the time of the accident, TMI's owners had no monies put aside for decommissioning. General Public Utilities' (GPU) customers contributed three times as much for the defueling effort than the corporation that caused the disaster, i.e., \$246 versus \$82 million (GPU Nuclear Press Release, January 10, 1985). In January 1993 the Public Utility Commission (PUC) refused GPU's request to hand their customers the TMI-2 decommissioning bill estimated to be at least \$200 million. However, several months later the PUC reversed itself and gave GPU permission to pass the cost of the decontamination and decommissioning of TMI-2 onto the rate payer. This decision to financially assess GPU rate payers for the accident was upheld by the Pennsylvania Supreme Court. In 1995, GPU hired a consultant to conduct a site-specific decommissioning study for TMI-2. The "retirement costs" for TMI-2 was estimated to be \$399 million for radiological decommissioning and \$34 million for non-radiological removal (GPU, 1997 Annual Report, Nuclear Plant Retirement Costs, p. 52.)

Although TMI-2 is scheduled to be decontaminated and decommissioned in 2014, if AmerGen requests a license extension at TMI-1, decommissioning will not begin until 2034 or 55 years after the accident.

CL-02/67 2) In Table J-2, the location of Peach Bottom is incorrect. Peach Bottom resides in Delta, and is located less than a mile from Lancaster County and the State of Maryland.

3) In Table J-2, the location of Three Mile Island by county is incorrect. Three Mile Island resides in Londonderry Township, Dauphin County. "Northampton" County is located in Northeastern Pennsylvania

In addition, there are four counties located within five miles from Three Mile Island, i.e., Cumberland, Lancaster, Lebanon, and York.

CL-02/68 4) J.1 2. and Table J-3. All relevant information is provided on pages 45-46.

CL-02/69 5) Table J-4 should incorporate data provided in F. Nuclear Plant Valuation pp. 26-27 and pages 44-45.

CL-02/70 6) In Table J-5 fails to acknowledge that the "white" population is not monolithic. In the case of Three Mile Island a "special white population", i.e., the Amish does not utilize electricity, telecommunications, or mechanical transportation, and lives in close proximity to the plant.

VIII. TRANSPORTATION

CL-02/71 Please refer to (4.3.17.4) ENVIRONMENTAL IMPACTS of  
DECOMMISSIONING PERMANENTLY SHUTDOWN NUCLEAR POWER  
REACTORS; Transportation - Conclusions:

Please refer to the *Enclosure V*, which features articles highlighting problems with  
transporting spent fuel from TMI to Idaho.