

# ROCKY FLATS CITIZENS ADVISORY BOARD MINUTES OF WORK SESSION December 7, 1995

---

**FACILITATOR:** Reed Hodgins, AlphaTRAC

Linda Murakami called the meeting to order at 6 p.m.

**BOARD / EX-OFFICIO MEMBERS PRESENT:** Alan Aluisi, Jan Burda, Lloyd Casey, Tom Clark, Ralph Coleman, Mike Freeman, Tom Gallegos, Sasa Jovic, Michael Keating, Jack Kraushaar, Beverly Lyne, Tom Marshall, LeRoy Moore, Linda Murakami, David Navarro, Gary Thompson / Jeremy Karpatkin, Tim Rehder, Steve Tarlton

**BOARD / EX-OFFICIO MEMBERS ABSENT:** Tom Davidson, Eugene DeMayo, Kathryn Johnson, Albert Lambert

**PUBLIC / OBSERVERS PRESENT:** Kenneth Werth (citizen); Mary Holland (ECA); Seth Kirshenberg (ICMA); Jim LaVelle (CDM); Joe Rippetoe (IMAA); Lou Johnson (EPA); Al Teter (citizen); Howard Bachman (citizen); Ray Horton (citizen); Robert Warther (DNFSB); John Barton (Local 8031); Bob Pressey (RMI); Bob True (CDPHE); Mike Gasser (citizen); L. C. Keenan (Bio Ecologics); L. A. Helmerick (DOE/CED); Jim Stone (RFCC); T. DuPont (citizen); Kelly Coleman (CSM); Patrick Etchart (DOE); Jonathan Wade (citizen); G. E. Moore (citizen); Susan Johnson (NCSL); Kay Ryan (SWEIS); Delores W. H. Schierkolk (citizen); Carl Spreng (CDPHE); John Golden (CSM); Jill Paukert (K-H); Nancy Tuor (K-H); Allen Schubert (K-H); Peter Bierbaum (ERM); William P. Harroun (K-H); Gerd von Glinski (citizen); Doyle Corlis (citizen); Jill McLaughlin (K-H); Don Scrimgeour (CAB interim project administrator); Ken Korkia (CAB staff); Erin Rogers (CAB staff); Deb Thompson (CAB staff)

**PUBLIC COMMENT/BOARD RESPONSE RE: EPA PLUTONIUM STANDARDS** (Ken Korkia, CAB staff): At last month's Board meeting, a question was raised about the cleanup of radioactive contamination at Superfund sites. Ken contacted EPA and spoke with a person, a member of a working group at EPA, which is working on developing those standards. Ken distributed a two-page draft paper describing the working group's preliminary ideas for developing radioactive protective standards for cleanup. The working group has finished their work, and will next submit their work to the Office of Management and Budget. It will be published in the Federal Register, and the working group hopes to have the rules finalized by the winter of 1996. If anyone would like to get a copy, let staff know.

**PANEL PRESENTATION: RISK ASSESSMENT AND RISK MANAGEMENT:** A panel discussion was convened discussing risk issues: Jim LaVelle of Camp, Dresser & McKee and the Health Advisory Panel; Frazer Lockhart of DOE/RFFO; Diane Niedzwiecki of CDPHE; and Niels Schonbeck of Metro State College and the Health Advisory Panel. The panelists were asked to present their views in response to the following questions and scenarios developed by the Environmental/Waste Management Committee:

**How does or should the theory and practice of risk assessment relate to the development of cleanup standards?**

**Frazer:** From DOE's perspective, we are a user of cleanup standards more than a developer. What I've seen in development and working with some of the state Water Quality Commission efforts, is a very tight linkage between the science of the risk, and how they get applied to cleanup standards. DOE has to strongly consider the cleanup standards in our planning and budgeting more than development.

**Diane:** The result of risk assessment is often one of the primary determinants in whether a site is cleaned up or not. Because the state and EPA are charged not only with protecting human health but also the environment, there's another component that's often taken into account when developing standards. Those are called ARARs (applicable, relevant and appropriate standards), which is from the Superfund or CERCLA law. Often those standards are state standards - whether they're for air or water quality (most states don't have soil standards at the current time but are in the process of developing them). These standards are not only set to protect human health but also to protect environmental constituents like fish. Also such things as protecting against further degradation of the environment are taken into account when setting standards. Risk is only one component in developing standards. Risk managers who develop standards use the information that people like Jim or I develop to calculate risks. Risk managers take that information, combine it with technical feasibility considerations, economic considerations, political factors, whether something is legal or not, and use all that information to develop a standard. In 1983, the National Academy of Science made a recommendation that risk should be determined without influence by policy. That's why I don't work with that part of the health department - it's strictly regulatory; we're separate. Therefore, my calculations should not be politically or economically influenced too much. However, I also don't work in a vacuum. Because I work for a public health agency, a lot of my risk decisions tend to be more conservative than someone who works for Kaiser-Hill for example, or for any kind of industry.

**Jim:** I think it's reasonable to view risk assessment at sites where you're thinking about cleanup as trying to use the best science you have to make sure the remedy fits the exposure situation on that site. Generally you can't do a very good job of risk assessment

unless you talk a lot with the people who are going to make the final decisions and work toward an understanding of what the exposure situation is at the site or might be in the future. In essence, what you're trying to do is gauge how much you have to do at a particular site in relation to the kinds of land uses currently there or that you expect might be there in the future, or that you want to be there in the future. You can't really design a risk assessment to answer questions about what cleanup standards are going to be unless you have discussed and made some decisions about what kinds of exposures you want to protect people or environmental receptors from. It might be useful to look at some of the newest thinking in terms of how risk assessment fits into the entire process of starting with a site where you think there's something there to ending up identifying that and generating a remedy. That very often ends up with a lot of up-front scoping where you make some decisions very early on about what it is that you want to protect, and then design data collection and risk assessment and risk presentation to meet those objectives that you set up at the beginning. To some extent, that is in conflict with the separation between risk management and risk assessment. That's somewhat artificial - not because the science of risk assessment should be influenced by the politics or economics of the situation - but because I think a risk assessor has something to offer in terms of how you might want to manage a site. I think that interaction is a beneficial one rather than one that's in conflict.

**Niels:** My basic job is as an academic so I look at it from a different perspective. Of course, I'm a consumer as well because I'm eight miles from Rocky Flats, so I have some personal interest. But I don't own any land around there. In terms of standards, you have to ask: from whose perspective do you set these? Therein lies the controversy and conflict. For example, industry would like to have proof of what actually causes disease and then pick the highest level that does not show disease so that they don't have to spend enormous amounts of money cleaning up. From an economic point of view, that's perfectly understandable. From the point of view of the individual, they want more guarantees than that; they want to have a very conservative estimate. The whole business of risk assessment, you have huge uncertainties. Remember the Challenger accident in 1986? Before the shuttle blew up, the estimate by NASA was that the chance of such an accident was 1-in-100,000. That was based on their analysis of the engines and all the parts, their guesses. The nature of assessment of risk is trying to predict the future of accidents, which is inherently an oxymoron - how do you predict accidents? After the Challenger accident - it was the 26th ride of the shuttle, the actual risk was one-in-26, which is a huge difference - now every year that we have a successful Challenger ride, the risk goes down. But how do you assess that and how do you predict the accident? The difficulty with, for example, plutonium is that we don't know mechanisms of plutonium nearly as well as we know the mechanisms of the engines of the Challenger. It's extremely difficult to find the right standard. I can give you examples if we have time later tonight with the problems inherent with plutonium and how different agencies approach it. You have to ask the question: what agenda do you want to follow?

**What does the science of risk assessment tell us about practical problems such as**

**what might happen during a catastrophic event, or from airborne contamination that might be caused by workers disturbing the soil, or from the demolition of contaminated buildings?**

**Diane:** Risk assessment is only as good as the numbers that you throw into it when you do your calculations - what you get out of it is only as good as what you put into it. If your models are accurate - if you consider every possible factor that might play a role in how soil contamination is spread around an area, or how much airborne contamination might result from moving Caterpillars around the site - if you could as accurately as possible determine those numbers, you're going to get better risk assessments. If there's a lot of uncertainty in your model, there's going to be a lot of uncertainty in the risk estimates that come from that model. Because risk estimates are basically estimates of uncertainty, there's also other factors that play a role, like how good are your toxicity factors. It depends on your model.

**Jim:** There's always a little bit of a philosophical problem in risk assessment. It's usually used as a regulatory tool. It's not used, and can't really tell you, what the incidence of disease in a population is or is going to be in the future. It really is a tool you can use to put yourself in the right range for a given exposure situation. It allows you to make some educated guesses as to how much cleanup would be necessary to protect people from a given exposure - but not so much about what will actually happen. There seems to be some searching here for an answer of what is going to be the health impact if a plane crashes into Rocky Flats, or if there's a high wind event during remediation. Risk assessment generally is not going to be able to answer that question. What it can do, one would hope, is to provide you with some general indication of how serious a problem could develop and perhaps tell you where you want to take precautions. Maybe it would tell you that you don't want to implode a building. But to actually answer: what are the health effects going to be - risk assessment isn't going to help you very much.

**Niels:** An earthquake or an airplane falling into Rocky Flats, or whether buildings should be imploded - all of this should be put into the context of time. Plutonium and its toxic effects are around essentially forever. We can calculate a time, such as a half million years, but that has no meaning to me. We're going to have to look at this for a long period of time. That changes how we make judgments about risk assessment. The way I look at it is: you look at the chances of an accident happening, and then you factor in the severity of the outcome. If the outcome is unacceptable under any circumstance, there's no point in doing risk assessment - you just make sure the accident doesn't happen. Of course, you can't do that. So the question is: how much plutonium is going to be dispersed. Risk assessment is certainly going to be able to give you ballpark estimates and it's important to do those calculations. But the calculation is going to have huge uncertainties, which is something most people who are helping make these decisions do not like, nor do they have a real working knowledge of what it means to say the chances are between 1-in-10 and 1-in-1,000 of something happening. Finally, if I take the example of weather

prediction, there was a time when we thought that with computers we'd be able to predict weather far into the future. We now know that's impossible. In fact the theoretical analysis in the chaos theory is it is inherently impossible. If you want to know anything about the weather next week, you just have to wait until next week. You can predict what will happen tomorrow and a little bit about what will happen two days from now, but three or four days - you're only making a guess. Risk assessment with what's going on at Rocky Flats really has to take into account that you can't predict too far into the future. All of your plans have to be updated as you go along. An example of something that happened that we had no idea of is the spring rains and the effect of plutonium migration that Iggy Litaor discovered at the plant.

**Frazer:** I read the question as how well do these tools really compare to real life and the things that might happen. I have a more positive sense about that. When I look at the analysis that we do for assessing risk - particularly for the cleanup projects - I've seen a lot of focus on what actually happens. The examples here like disturbing the soil are some of the things that were looked at to try and make measurements - using factors that have been used in the construction industry, by the Corps of Engineers and other groups, to say how much dirt gets resuspended when you work with bulldozers, etc. - to factor those kinds of data into the analysis. The things that appear to be the major part of the work, the risk assessment process deals with fairly well. The difficulties come in with events that border on the incredible - when you're talking about major earthquakes or tornadoes that run down the center of the plant. The same analysis can be done, but since there are so many incredible events, you tend to pick one or two that seem to be worst-case. The other difficulty I see is that the science of assessing risk has a hard time dealing with the effects of multiple contaminants - the synergistic effects - which have been questioned at these meetings before. It's very true that  $2+2$  sometimes equals 5 or 6; it's also true on occasion that it equals 1 or 3. That analysis is very difficult and most of the risk methodologies try to deal with that by taking the ranges and always picking the more conservative ends - the 95th percentile or the far end of what would give the most conservative figure. That's one of the areas that the tools struggle with in terms of being objective - dealing with the various contaminants at a site like Rocky Flats that has dozens of different contaminants. It has to be done through conservatism.

**Diane:** At least two of the most recent incidents that have happened at Rocky Flats were not the result of some calamity, some totally unexpected event, they were the result of human error. It's one thing that always plays a role in accidents which often is not taken into account in estimating risk and projecting into the future what the risk is for plutonium being released from the site. It's a practical problem I think we all should consider.

**For each of the following contamination scenarios, how does the consideration of risk factor into cleanup decisions, and what might those decisions be?**

1) An area of soil is contaminated or a building is contaminated for which an air pathway

exists that allows for exposure to a human receptor.

**Jim:** Any time you have an existing exposure pathway, you're going to be more concerned. Perhaps any remedy that you put in place is going to be more aggressive. One has to consider the fact that just because there is a complete exposure pathway does not mean there's substantial risk. In many cases I've been involved with soil contamination (none involving plutonium), even though we know some dirt is lifted off the ground during high wind events and people do in fact breathe that material, the amount of material that is actually resuspended and the total amount of material that can actually be inhaled is extremely small. There's a lot of pollution that goes on, but not a lot that gets resuspended. This pathway often is not a very significant one. In the case of plutonium, you may have the exception to that rule, because all the work we've done on dose reconstruction seems to indicate the inhalation pathway is the one pathway that's most important. In looking at Rocky Flats, this may be a case where risk assessment points you in a direction that's counter to what happens at a lot of other waste sites around the country.

**Niels:** The way I interpret the question is how do our calculations figure into cleaning up the site, how we would clean it up and what the decisions would be. I would take the 903 pad as an example. The plutonium concentration in the soil was so high, they decided that the amount of dirt they'd have to take out was so large they just decided to put a cap over it to keep the plutonium from being resuspended in the air. If they were to dig that pad up and clean it up, because of the concentrations and the exposure pathway (inhalation, resuspension and the risk factor for actually getting plutonium in the lungs), people would probably have to wear full suits and masks and it's likely they would have to put a tent over the whole area in order to keep it from being transported off-site. That's one example of how risk assessment would be used in making decisions about whether to clean up a site and if so, what would you have to do. Another issue about this particular site is that there are unknowns. The records for where things were buried are not absolutely reliable. People can assume today that they know what is in a pit and start digging it up, then find out they were wrong.

**Frazer:** Looking at the problem of a soil pathway with a receptor, again the risk analysis depends on a lot of different factors - the contaminants and the concentrations. Along with that, it leads you to also look at both the short and long-term aspects of the risk. There are aspects involving both workers and public in a short-term scenario. The idea of digging up, even with tenting and other measures like that, there's still some release - it's inherent in digging up materials. There are some judgments that would come into play out of the risk analysis such as whether the short-term risks that are presented when you dig up offset the benefit of removing it. Sometimes it may indicate some method of dealing with the contamination - such as trying to fix it in place through chemicals or vitrification or some other technique, or cap it in place - would not remove the contamination. But if it's fixed and therefore doesn't have a pathway, you essentially eliminate the pathway piece of

the receptor. That may be a better risk scenario. There are trade-offs that the tools do help you look at. The other piece that plays in on occasion - certainly with soil - is the ecological impacts. The science of risk analysis doesn't just look at the human receptors. In fact, if your solution for a soil contamination problem is to excavate in total to a depth of a foot or six inches, you may destroy an ecological system that would be very difficult if not impossible to replace - at least at that location. One correction on the 903 pad: before they capped it, they actually dug out about 18 inches of soil and shipped it to Idaho.

**Diane:** One thing I want to emphasize: state policy generally is that every complete pathway should be included in the risk calculation for deriving a standard - whether it's plutonium, which is often dispersed in particulate form, or whether it's a volatile organic compound. However, such factors as bioavailability do play a role in the toxicity of the chemical. At Leadville for instance, lead was borne about all over the area, but it turned out the type of complexation of the lead with the soil and the type of chemical form that the lead was in at that particular site made it less toxic, so it was less of a problem. Plutonium is a special case because the greatest amount of toxicity from plutonium comes from inhalation. When you swallow plutonium, it's not absorbed very much through your gastrointestinal tract. With plutonium, you really do have to be careful to take inhalation into account - to take into account every pathway that people could possibly be exposed.

2) There is groundwater contamination with a complete exposure pathway to a human receptor.

**Niels:** As I understand it, the groundwater is very close to the surface at Rocky Flats and in some places seeps out of springs. The actual hydrology is important; it's idiosyncratic from spot to spot. When you make your risk assessment and you look at the exposure pathway, you have to take that into account. Focusing on plutonium - although that isn't the only thing out there but it's the one I'm particularly interested in - plutonium tends to stay close to the surface of the ground, it doesn't seem to migrate down. So you'd have to wait for the water table to rise as it did this spring, which is a unusual event but did happen.

**Frazer:** In this scenario, it is one of the most direct uses of risk tools where the applications seem to be direct and obvious. Analysis does depend a great deal on hydrology - that's a key factor; the difficulty would be to understand where and how quickly the groundwater is moving. Even groundwater, with fairly complex movement in the geology, is more constrained and confined. It's moving underground so it's easier to analyze than problems with soil and air distribution, where essentially you get a puff of air and some dirt in the air and it can move about literally unconstrained. We see groundwater problems as being more direct. The risk analysis methodologies and standards can be applied more directly in comparison with soil.

**Diane:** For groundwater, if there is possibility of direct human exposure, you'd look at water ingestion, volatilization from basement air if the chemical is a volatile chemical, and volatilization from non-drinking water usage of the water. For example: when you run a dishwasher, a lot of water vapor goes into the air. Along with that water vapor, whatever organic chemical that is volatile and in the water also evaporates and goes into the house, then you breathe it. If there's no water ingestion or usage such as is proposed in the future for Rocky Flats, you still have to take in account things like volatilization of chemicals from basement air. For instance, office workers or anyone working in a building on Rocky Flats that has a basement, could possibly be exposed to volatile organic chemicals that get into the basement air from cracks in the basement, from either groundwater or from soil contamination.

**Jim:** I agree that this is an area where you can apply risk assessment results fairly directly. Unfortunately, you often can't clean up groundwater effectively. Oftentimes the application of risk assessment is to ensure that you can establish a boundary within which you can contain the contamination so it doesn't spread elsewhere; for instance, you may have to institute restrictions on groundwater use for people living in the area. It may be a time where risk assessment can be used to help reach decisions on whether or not the effort to do anything with the groundwater is really going to be effective. With plutonium in groundwater, I don't know how easy that is to clean up because it hasn't been a great problem in many instances. In other cases, such as metal contamination, it's extremely difficult to get rid of groundwater contamination. Sometimes you're left with one scenario: break the pathway by using a different water supply and try to take whatever actions are necessary to keep things from spreading around.

3) There is groundwater contamination but at the current time there is no complete exposure pathway.

**Frazer:** The problem of contamination without a pathway would seem to be an easy one. But in fact that gives us more problems because of the difficulty of predicting the future; it becomes very difficult to predict. It's almost easier to have a pathway because it's in front of you and you can document it and know how to respond, even if the response is just a barrier or some other approach. When there is no complete pathway, we're obligated to look at likely future scenarios, not just the current status. That challenges our technical ability, and begs the question of geologic shifts, major floods, etc. The basic tools of risk assessment are still applicable and still brought into play. It technically becomes more difficult because you are into a mode of predicting and you have to use the predictions of a likely future to see if there will be some pathway in the future to drive the final risk analysis numbers for that kind of scenario.

**Diane:** The problem with trying to decide future uses: no one really has very much control over that use, at least legally the state doesn't. Zoning is generally left to local communities. For instance, Superior decided it wanted to build a new development

practically across the street from Rocky Flat, against the advice of the state and other local governments in the area. Because of that possibility, most often what the state would do in a situation where there's no current pathway is to try to use the most conservative estimates in calculating your risks, just so there's some cushion there in case something like that happens. Another thing that also needs to be taken into account is: where does the groundwater come to the surface, and what is the likelihood that someone could be exposed to the groundwater contaminants when they come to the surface in a seep? If it's coming to the surface at a seep on that outer buffer zone - which may be declared open space - what's the likelihood of someone eventually contacting it and getting exposed? In protecting groundwater standards, you also have to take into account protection of surface water standards. In general, right now those are maximum contaminant levels (MCLs).

**Jim:** I believe where you don't have a complete pathway, it's actually a little easier. The reason is you have more options. When there's a current exposure pathway, you're going to have to take steps right away to block that pathway; sometimes that leaves you very little that you can do. When there isn't a pathway, there's often many different options that you can take and still be protective. For example, where the groundwater that's contaminated is not potable, often you can establish a containment boundary or even establish that you can leave it in place and it won't effect water that is likely to be consumed by anyone at any time. Basically what you can do is design a remedy to protect a resource to whatever level you think that resource will be used. That allows you different options and time where you have something that will degrade (not plutonium obviously). But at Rocky Flats there are some organic contaminants in groundwater. There are some sites I've worked at where it's obvious the natural tendency is reducing concentrations dramatically. We're in a situation where there's no current exposure and over a couple of decades, it's certainly possible to make sure no one uses the groundwater. Overall I think it gives you more leeway in how you design a remediation.

**Niels:** What occurs to me about incomplete pathways is just human nature: if it isn't complete now, then we don't have to worry about it. You forget about the situation. There are a couple of scenarios that you could imagine where you'd run into trouble by forgetting. If a cleanup operation completed that pathway in some way - suppose you have groundwater contamination at a certain place but it's contained and it doesn't come up in a seep, and you happen to dig into it because you're building a new building. Suddenly it washes out and now you have a complete pathway. It's important to be vigilant about making sure that incomplete pathways are not forgotten in case they might be completed at another time. Another scenario of completing a pathway or generating a new one is plutonium. There is one isotope that decays quickly into Americium, which has slightly different chemical properties. So at a certain moment in time you know what the plutonium composition is, but then forget that within 80 years you're going to have a 50 percent increase in the alpha burden in the environment because of that, and you have forgotten there is a different pathway for the newly generated species. That's something to keep in mind.

4) Surface water contamination exists for which there is a complete exposure pathway to a human receptor (is there anything unique about surface water that would be different from what has been discussed already with the air and groundwater pathways).

**Diane:** With surface water, there are standards promulgated by the state that protect it. These are usually (but not always) based on human health risk, if the use of the surface water is ultimately drinking water. If the water is not used for drinking water, there are agricultural uses; those also have standards which are sometimes more strict and sometimes less strict than drinking water standards. Every stream in the state is classified as to its use. There are aquatic standards, such as cold water aquatic (mountain streams) or warm water aquatic (what the streams around Rocky Flats are classified). Those standards protect the types of fish, invertebrates or other animals in that type of water. Because there are already standards for protection of surface water, it's usually easier to regulate releases by industry into surface water because you have something promulgated in law to which you can measure values.

**Jim:** The biggest difference with surface water is so because you have aquatic communities. You can't always look just at human health as with groundwater, and in some cases soil. In applying risk standards, you would look at different sets of receptors. That brings up a set of problems that are unique to sites or regions. People are more or less the same across the country, but aquatic species certainly vary dramatically between states. So to generate a risk based standard in many instances becomes a more difficult thing to do.

**Niels:** The one thing about surface water in Colorado and at Rocky Flats is that it changes depth quite a bit. You can have just surface runoff. For example, Standley Lake receded last year significantly. What that means is you have a connection of pathways; that is, whatever was in the water now is in the soil and exposed to wind erosion. That's one thing you would have to take into account.

**Frazer:** I'd expand a little on the comments about its usage, as it opens up a broader band of possibilities of potential uses and scenarios to look at. Aquatic communities offer a lot more pathways: recreational uses like catching and eating fish, or people swimming in surface courses. There are different problems related to those water usages with uptake mechanisms that are different than groundwater. Groundwater typically comes through a well, or maybe seeps through basements and cracks - but presents a smaller grouping of things to analyze. Usages and potential scenarios need to be looked at so many different ways with surface water.

**End of Part I of 12/7/95 minutes, see [Part II](#)**

## Rocky Flats Citizens Advisory Board

### 12/7/95 Minutes Part II

---

#### **Q/A Session:**

**Comment:** Ralph Coleman: Regarding groundwater, you seem to think there is no way pathway existing at the present time, but the Arapahoe Sands outcrops around Rocky Flats. With snow and heavy rains, water charges those sands and there are around 40-50 water wells now in use just south and east of Rocky Flats. On my property, I've drilled five wells in the Arapahoe Sands. We have three wells now in use for stock water and household/drinking water. So there is a pathway now; there is a possibility that a lot of the contaminants are filtered out as the water goes through the sands. Also, the sands outcrops on the bottom of Standley Lake, so there is a pathway from Rocky Flats to Standley Lake through the groundwater.

**Response:** FL: I've heard this comment several times. I would really like for us to be able to put that to rest, or to find out how real it is and pursue it. The analysis that's been done at the site for decades has made us believe there is no groundwater leaving the site at contaminated levels. The deep aquifers travel underneath the site, but we don't think the plutonium or other contaminants migrate down enough to get to those. I realize that's all work done by site personnel and contractors. I wonder if we could find a way to work with the School of Mines or another university to get an independent look at that, and involve you.

**Question:** Jack Kraushaar: What estimates have you made on the number of lung cancer cases that have occurred due to the release of plutonium in the fires and the release from the 903 Pad?

**Answer:** **JL:** I don't know of any study which has clearly demonstrated a link between releases from Rocky Flats and cancer cases. The Health Advisory Panel is pursuing reconstruction of the history from Rocky Flats - in particular how much plutonium and other materials were released over time, and what kinds of exposures people living in the vicinity may have received. From that, we may be able to provide some indications of the kinds of risks that may have been present at the times of those releases and afterwards. But we won't be able to correlate any of our findings with lung cancer cases in the area.

**NS:** The workers are going to have far greater exposure than people in the environment. There is a study that has been published by the American Journal of Epidemiology, February 1987, which showed some indication that there were cancers to the lymph system and blood system. As far as I remember, no lung cancers showed a significant

increase. But it was just a beginning study. With that kind of data, you don't expect to find specific cancers in the population due to the exposures that we think have been manifested. We're hoping to come up with an estimate of risk and what we'd expect from the Health Advisory Panel in about two years. My belief is we will not be able to separate out the effects of Rocky Flats from the effects of living in an urban area. **FL:** I think the changing demographics presents a real challenge too. Also, a lot of the releases have now been covered over or are largely stable and not impacting as much. **DN:** They don't have results yet, but the Colorado Cancer Registry is trying to figure out the answer to that question. **JL:** It's probably worthwhile to recognize that there are things other than cancer to be worried about. For example, about 45 have been sensitized to beryllium, and I believe there are 14 active cases of berylliosis among Rocky Flats workers. **NS:** In addition to other contaminants, there are other end points for plutonium and radionuclides. Cancer is not the only end point of disease - anywhere from life-shortening in general to heart disease. It's a mistake to focus on cancer.

Question: David Navarro: Regarding events caused by human error, we would like to see the existing workforce be utilized in D&D cleanup. There's the historical site knowledge above and beyond classification or job knowledge. The question I have is have there been any studies to look at the direct correlation between work experience and also sites and historical plant experience and the potential for accidents or incidents - using workers who have been there for a long time versus utilizing workers who are imported or go from site-to-site? There's no guarantee there will be no accidents, incidents or mishaps, but I do believe there's a direct correlation. I would hope at some point there's an analysis done on that based on the risk.

Answer: **DN:** I don't know about any study that's tried to correlate those two. Common sense tells you maybe there is a relationship. **FL:** I am aware of some studies that looked at human behavior in general. The positive effect is that accumulated knowledge and experience comes into play in tasks in familiar surroundings and familiar conditions. The bad news is that humans have a habit of starting to ignore things that are the same. To the extent they can become too familiar, there's some danger on repetitive tasks that they fall into a pattern and start to not see the hazards any more. That's not a work study, but on human behavior in general. It offers some cautions to make sure that we try to do what is necessary to keep the awareness up, so that the positive training and experience aspects are not lulled into insensitivity.

Question: LeRoy Moore: I was surprised to hear Diane say the state had opposed the Town of Superior's plan to construct a big development near Rocky Flats. I wonder on what basis the state opposed Superior's development. Also, I'm interested in the relationship between what the state was doing and the state's plutonium in soil standard. How can the state, which adopted this kind of standard, oppose what Superior wants to do? Evidently the land around Superior meets the state standard.

Answer: **Steve Tarlton:** Our opposition to that development was based largely on emergency preparedness concerns, not on plutonium in soil standard. That development is within the four-mile emergency planning zone for Rocky Flats, and we try to discourage all development within those areas to at least low density developments. A high density development like the one proposed creates problems for us in administering off-site emergency preparedness activities. As you know, we have no control over local land use.

Comment: Beverly Lyne: Regarding epidemiological studies, there are problems with the Cancer Registry. There isn't enough specific kinds of information available in terms of geographic locations to correlate health effects with risks. The health subcommittee of CAB will look at the geocoding of the data and how we can do environmental monitoring that can be correlated with health information. It seems DOE is making a commitment to continuing the funding of the Cancer Registry and the Birth Defects Registry, which is a beginning. There are so many unknowns in terms of what happens: low-level exposure to plutonium, what kind of future accidents or releases might there be, future land use, groundwater. Spending time and energy and money on doing definitive risk assessment may not be the best way to go at protecting the public and worker health, but look at doing it some other ways.

Response: **JL:** I agree there are a number of different approaches. The most effective risk assessments one were when there were both risk and exposure information, and some information from the human population. You can use all that information together to design a remediation. Those studies are extremely costly, they take a long time to do, and they are not necessarily more cost effective. They may give you a better answer overall, but I would caution about the uncertainties of starting with health effects and trying to work back to a source.

Question: Tom Marshall: One thing I got from your presentation is that risk assessment is difficult because of the level of uncertainty and the assumptions you need to make. Now that we are looking at plans for cleaning up the site, how can we possibly come up with a credible estimate of risk? The risk estimates are based largely on the fact that you can use a combination of technical and institutional controls. I'm wondering how risk then comes into play.

Answer: **FL:** That's the hard part of the question. One of the reasons we are so anxious to discuss this in a public forum is because we see those kinds of trade-offs of the risks and difficulties and uncertainty start to translate into value judgments. It's nearly impossible to get total agreement, but if we can get a sense of agreement or a sense of where those values lie relative to the risk, that gives us some data on where to base decisions. **JL:** In an attempt to be informative, we've scared a lot of people by saying there are uncertainties in risk assessment. But you can live with big uncertainties, and we make perfectly good decisions in the face of those uncertainties. If you have 1-in-10 or 1-in-1,000 cancer risk, you're going to make pretty much the decision. The key to understanding the usefulness of

risk assessment is understanding that it's a tool to describe the severity of the problem, not a tool to tell you precisely what the risk is or will be in the future. You can't do that, and it's not necessary to make reasonable decisions about cleanup. Also, sometimes you make a decision on the uncertainty rather than on the risk number. **NS:** If you're thinking about something happening in the future at Rocky Flats, you can say: what happens if you have this much release? The exposure pathways are fairly straightforward. The piece we are uncertain about is what is the factor? The question is how do you assess a person's chances of getting a disease earlier than they might otherwise. That is something that will get much better in the future.

Question: Jim Stone: I just finished reading GAO's report on the standard for plutonium contamination, and the conclusion was between DOE, EPA and NRC, there was no consensus on what a standard should be. Are we doing anything locally to tie down a plutonium standard?

Answer: **DN:** Right now, with the vision negotiations for Rocky Flats, I believe they are trying to come up with soil cleanup standards for plutonium for Rocky Flats, as well as for both surface and groundwater. **FL:** The standard setting has been going on for more than just a year or two. The debate does seem to be narrowing, although there isn't yet agreement, and most of the numbers that are being debated are in the range of one or two times to as much as 10 or 20 times higher than the current Colorado standard.

Question: John Barton: Today I witnessed a management decision that scared me. Kaiser-Hill chose not to man Building 886's control with a Stationary Operating Engineer 24 hours a day. My concern is that you have 4,000 liters of highly enriched uranium nitrate and solution in three different densities in liquid form that if the temperature of the building reaches 20 degrees they come together and go critical. Kaiser-Hill's management made a decision not to staff that building with an operator who controls the alarms in response to emergencies of the heating and ventilation of that building. Provide me a risk assessment, if it's going to go critical or not during the winter months.

Answer: **DN:** I don't think anybody could do that off the top of their head. **NS:** I interpreted the question as rhetorical but it requires a response. The anecdotal stories I've heard since spring have been consistent and they've been disturbing to me personally and to other people on the Health Advisory Panel. I'm not sure what the answer is. But I think I'd have to turn to people such as the workers who are on plant who have a point of comparison to management in the past and management now, to make clear statements about what the dangers they perceive in these decisions. **Leanne Smith:** I'm concerned by the statement you made. DOE still has full responsibility for providing worker safety. I'm not aware of how the absence of this systems operations engineer actually impacts Building 886. But one of the critical factors in maintaining the safety margin of Building 886 is that we also maintain the temperature. That's part of one of limiting conditions of

operation for that building. I will make the commitment that I will follow up with our facility representative.

Question: Kenneth Werth: The panel has failed to address the number one issue at the site. I question your conceptual vision for RFETS when there is one overriding factor that will impede this project. That is the old Leyden coal mine that has over 50 miles of tunnels winding under RFETS, and stores over 1.5 billion cubic feet of natural gas. What would be the possibility of an earthquake or a terrorist using a small nuclear device to set off the natural gas in an underground explosion, creating an unanticipated phenomenon to the Rocky Flats plutonium storage vault? That could blow the Front Range off the map. I suggest you go to the Jefferson County archives and look at the configuration of the old Leyden coal mine.

Answer: **FL:** I would offer the same thing as before - to have an independent group that you deem to be credible, perhaps somewhere in the university system, to look at that issue. We have looked at that issue on the site. I can't recall the exact reports but I know the Leyden mines and the geology have been analyzed and have been found to not impact the site, even from a terrorist standpoint. But if an independent look would be helpful, that can be pursued.

Question: Joe Rippetoe: I live next to Standley Lake, which I believe is a Superfund site. A lot of fishing and water sports happen there. Recently we had a severe drought and the water level was low. I didn't see any testing of soil. Has there been a recent risk assessment associated with Standley Lake?

Answer: **FL:** Yes.

Question: Chuck Patterson: A couple of years ago at Savannah River, it was shown that americium was traveling in groundwater in a colloidal state rather than dissolved. Normally to take a groundwater sample, you filter out colloidal material. Is that being accounted for in the groundwater pathway?

Answer: **DN:** Yes. Usually when human health risk assessments are done on groundwater or drinking water, the assessment is done on the total sample, which includes the dissolved solvents. **FL:** We've also spent some research funding specifically on colloidal transport of plutonium and americium on the site. Dr. Litaor was involved in some of those studies several years ago. Those are published and could be made available.

**PRESENTATION: AGENCIES' VISION FOR ROCKY FLATS** (Jackie Berardini, CDPHE): The vision has two stages: 1) interim site condition, which includes completion of plutonium consolidation, major environmental remediation, decontamination and decommission and all other activities except SNM removal; and 2) final site condition,

where nothing exists at Rocky Flats but open space, industry, and monitored/capped areas (landfills). CAB is asked to comment on a couple of specific areas. First, the cleanup levels are tied to reasonably anticipated use of the resources - are those uses correct? Second, should there be any onsite waste disposal; if so, what types, and should that include retrievability? The agencies have developed a strategy that includes having the community help decide final site use, which will drive the cleanup standards; leaving some contamination onsite in restricted/capped areas; and minimizing migration of contamination; and integrating the cleanup needs of buildings, soil, surface and groundwater. Plutonium and SNM are expected to be removed from the site by 2015.

**Q/A Session:**

Comment: Lloyd Casey: I like ASAP and the vision. CAB has been around for two years, and we have discussed these issues numerous times. I'm ready for ASAP, to get going and get it done. Answer: JB: We are too.

Comment: David Navarro: I endorse and embrace the concept of the vision. ASAP, the vision and SWESA all had interesting parallels. I wonder if there wasn't a cart before the horse, so to speak. All three documents were saying the same thing and one should have precluded the other. In this vision, I did not see a description of the parameters and process for continuing public input. I would like to see that further defined and clarified.

Comment: Gary Thompson: I have to agree, we have spent a tremendous amount of time discussing these things. It's good to have a goal to clean everything up, but that's impractical. When we do make up our minds on our issues, I think we should include minority opinions. We need a more balanced approach.

Question: Beverly Lyne: Regarding the statement in the vision on cleanup levels and open space use: there is a statement that the creeks will form hydrologic barriers to contaminant migration. One of the big problems is airborne contamination, and the creeks aren't going to stop that. That should be addressed somewhere. Answer: JB: The notion here is that the creeks form hydrologic barriers to contaminant transport through the water, not through the air. There is a team of individuals from EPA, CDPHE, DOE and Kaiser-Hill discussing cleanup levels for surface and groundwater and soils to protect human health and the environment in the context of what are reasonably expected use of resources.

Question: Beverly Lyne: What about beyond the boundary and how are we going to do the monitoring as cleanup goes on to see what is happening? I'm not sure that's addressed in the vision statement. Answer: JB: We don't talk about monitoring in the vision, but it is part of the Agreement in Principle - we must come up with an integrated monitoring approach.

Question: Mike Freeman: Regarding regulations, where are the lines going to be drawn?

Answer: JB: The vision doesn't discuss that. The Agreement in Principle is dedicated to completing the regulatory agreement. The vision is our roadmap to do the regulatory agreement and the stabilization and consolidation activities that are necessary. The regulatory agreement is more focused on the how.

Question: Tom Clark: What are some of the community groups you've been presenting to?

Answer: Jeremy Karpatkin: We've already presented to the Jefferson County Commissioners and Congressman Schaefer. We will meet with staff of Colorado's Congressional delegation and members of RFLII, and are working on setting up individual briefings with municipalities in the area. There is a public meeting December 13 at the Arvada Center. Mike Konczal: We can get you a list of groups who were sent a copy of the Vision.

Question: Beverly Lyne: Wouldn't it be appropriate that a CAB member or a CAB staff person be a part of the environmental monitoring discussion? I'd like to see that. Answer: JB: Let me speak with my colleagues.

Question: Tom Marshall: The Agreement in Principle listed a number of work groups, most of them have a product to be produced by mid-December. Are they on schedule? And how soon after you get those can we see those? Answer: JB: I was hoping to have it in my hands by the close of business on December 8; I don't think that will happen. But mostly we're on track. We haven't had a discussion yet about when to release the information. It won't be secret, but I need to discuss with my colleagues first.

### **PUBLIC COMMENT PERIOD:**

Comment: Jim Stone: I see you presenting ASAP as a plan. I don't see it as a plan. There must be a dozen different concepts in ASAP. No one can agree until all the issues have been analyzed and you see the bottom line. Also, regarding this document - the radiation site cleanup summary - give me a standard to work by.

Comment: Leanne Smith: I'd like to respond back to a concern expressed earlier by John Barton. What he brought up was the potential absence of systems operations engineers in Building 886. Building 886 is the retired criticality lab at Rocky Flats. It is outside of the protected area, and although it has its own protected area, it houses 2,700 liters of highly enriched uranium nitrate. There is a concern that if you reach the temperature of 32 degrees, and if the liquid that suspends the highly enriched uranium begins to solidify then you start precipitating out the highly enriched uranium and there could be a criticality. There is a concern. I called the individual who is DOE's facility representative and has responsibility for overseeing the progress of activities in that building. She told me she was aware of how the control room in 886 is housed. It is housed with a systems operations engineer during normal operating hours. But on off hours and holidays,

weekends and the alternative work schedule (every other Friday), it's manned by an alarm will be set off either in Building 881 or 771. Also, she said an alarm goes off in the fire department; I need to verify this. There is a systems operations engineer who is on call, 24 hours a day, who has a responsibility for responding within a five-minute period when the temperature in 886 reaches 55 degrees, which allows us another 23 degrees to respond. We feel we have an adequate safety margin, and no compromise to building or worker safety. I'd like to go back and double check; I've agreed with David Navarro that I would do that tomorrow.

**Response:** David Navarro: There was some conflicting information that went out to what degree and levels of safety. I would request that at our next Board meeting we can get a report back with verification of the situation.

**Question:** Kenneth Werth: Is there a backup system? **Answer:** Leanne Smith: I believe there is a backup system.

**Question:** LeRoy Moore: To Nancy Tuor, at our last meeting there was a discussion about Iggy Litaor's relationship to Kaiser-Hill. Niels Schonbeck had written a letter, and there was to be an answer before this meeting. **Answer:** Nancy Tuor: You haven't received that yet. Since you raised a question about research funds, we decided to work on getting a joint DOE/Kaiser-Hill response. We have a draft now, and I hope to have that sent out next week. You will get a copy as soon as it's available.

## **CAB BUSINESS:**

**Summit Update:** A facilitator was chosen: Reed Hodgin. Reed is interviewing several key participants from different groups to get a sampling from the interests that would attend. A location has not yet been identified, hopefully that will be worked out this week. A draft invitation letter has been prepared. It will be sent to everyone on the invitation list. The committee is taking suggestions for persons who should be included. Approximately 120-140 people will participate - probably a few more than last year. There will be some kind of gathering on Friday evening, January 19. The Summit meeting will be all day Saturday, January 20. The focus will be on the vision and the path forward for Rocky Flats. Co-sponsors of the Summit include RFLII, CAB, EPA, CDPHE, and the League of Women Voters. The next meeting of the organizing committee is December 15, 9 a.m. at RFLII. If you have ideas on background materials, let them know.

### **Letter to Thomas Grumbly re: Changing Date of Workout Session.**

**Recommendation:** Send letter to Tom Grumbly asking that the date for the next workout session be delayed until after the Rocky Flats Summit is held on January 20, 1996.

**Action:** Motion to accept. APPROVED BY CONSENSUS.

**Letter to Mark Silverman re: ASAP Process/Schedule.**

**Recommendation:** Send a letter to Mark Silverman requesting that the ASAP schedule be modified to allow adequate time for review and input.

**Action:** Motion to accept. APPROVED BY CONSENSUS.

**Plutonium and Special Nuclear Materials Committee Approval of Recommendation to Thomas Grumbly:**

The committee brought a recommendation to CAB at last month's meeting on plutonium consolidation. After hearing a presentation at its November meeting, the committee determined that no changes should be made to the recommendation. It was approved to be sent to Thomas Grumbly in the same form as CAB approved last month.

**Board Comment on Future Agendas:** Would like Board member comments on what they would like to have presentations on for the future. Suggestions included: 1) broader and in-depth presentation on radiation and health - the human element; 2) British Nuclear Fuels, have them share their experiences with D&D work (suggest a written presentation to distribute to CAB members instead of a formal one on the agenda); 3) Kaiser-Hill performance measures; 4) decommissioning/methods and issues surrounding building removal.

**Update - National SSAB Chairs Meeting:** The meeting was held November 29 in Denver. The chairs of SSABs came together to collaborate and address the need for a national dialogue on waste issues. The boards agreed that a dialogue is important, they should be involved to a degree, and they will continue to collaborate and work with other national groups such as EMAB and STGWG.

**New National Issues Committee:** The Executive Committee recommends that a new committee be formed to deal with national issues: 1) to keep CAB abreast of what is going on nationally, 2) to see what impact CAB recommendations have on other sites and look at impact of other sites' recommendations on Rocky Flats.

**Recommendation:** Form new committee to deal with national issues.

**Action:** Motion to accept. APPROVED BY CONSENSUS.

**EXECUTIVE SESSION:**

- The Board authorized Don Scrimgeour to serve as interim project administrator for a period of time no longer than through June 1, 1996. Don submitted a proposal for the Board to consider on future activities. An agreement was made to allocate \$5,500 for his services for the next month. He will return to the next meeting with a document explaining outcomes/expectations for his service as interim project administrator, and with suggested goals/direction for the Board.

- The Board authorized expending up to \$25,000 for the purchase of new computers for the office.
- The Board authorized the Executive Committee to consider salary increases for staff.
- The Board approved Mary Harlow and Susan Johnson as new Board members.

**NEXT MEETING:**

Date: January 4, 1996, 6:30 - 9:30 p.m.

Location: Westminster City Hall, Multi-Purpose Room

Agenda: Recommendations: Rocky Flats Conceptual Vision; and Rocky Flats Accelerated Site Action Project

**ACTION ITEM SUMMARY: ASSIGNED TO:**

- 1) Report back on Building 886 safety issues - at next month's Board meeting Leanne Smith
- 2) Forward letter to Thomas Grumbly re: workout session date Staff
- 3) Forward letter to Mark Silverman re: ASAP schedule Staff

**MEETING ADJOURNED AT 10:10 P.M.**

\* Taped transcript of full meeting is available in CAB office.

**MINUTES APPROVED BY:**

---

Secretary, Rocky Flats Citizens Advisory Board

---

The Rocky Flats Citizens Advisory Board is a community advisory group that reviews and provides recommendations on cleanup plans for Rocky Flats, a former nuclear weapons plant outside of Denver, Colorado.

[Top of Page](#) | [Index of Meeting Minutes](#) | [Home](#)

[Citizens Advisory Board Info](#) | [Rocky Flats Info](#) | [Links](#) | [Feedback & Questions](#)