

**Department of Veterans Affairs  
Veterans' Advisory Committee on Environmental Hazards**

**Minutes of the Meeting  
July 17-18, 2008**

Committee Members Present:

George N. Hunt  
Carrie W. Nero, Ph.D.  
Nancy L. Oleinick, Ph.D.  
Henry D. Royal, M.D., Scientific Chair  
Amir H. Soas, M.D., Ph.D., Full Chair  
Mary Ann Stevenson, M.D. Ph.D.  
Ernest T. Takafuji, M.D., M.P.H.

In Attendance from VA:

Ersie Farber-Collins, VBA, Compensation and Pension Service, Designated  
Federal Officer  
Brad Flohr, VBA, Compensation and Pension Service, Assistant Director for  
Policy  
Bernice Green, VBA, Compensation and Pension Service,  
Caryl Kazen, Department of Veterans Affairs, Chief, Library Service  
Cynthia Jones, Department of Veterans Affairs, Library Service

In Attendance from the Public

Paul K. Blake, Ph.D., CHP NTPR Program Manager Defense Threat Reduction  
Agency

Absent Committee Members:

Edward R. Epp, Ph.D.

The meeting was held at the Department of Veterans Affairs (VA) Central Office,  
810 Vermont Avenue, Washington, DC 20420.

Ersie Farber, Designated Federal Officer, called the meeting to order at 8:10 a.m.  
on July 17, 2008.

Ms. Farber addressed a few housekeeping matters (refreshments, restroom  
locations, photocopying needs, telephone service, etc), and acknowledged

special guests (Library Service Staff and on tomorrow, Dr. Paul Blake). She also mentioned the need to approve minutes from the past three meetings, and establish future meetings dates. In addition, Dr. Epp will not be present for the meeting.

Dr. Royal made a correction to the agenda and included, "Summary Review of VA Decisions through February 2008, prepared by Dr. Neil Otchin before his retirement. In addition, he asked for an update regarding a replacement for Dr. Otchin.

Ersie Farber on Thursday and Brad Flohr on Friday addressed the current backlog of a little over 200 cases pending in Jackson regional office and VACO. VHA has had no one providing opinions since Dr. Otchin's retirement, however, a replacement for Dr. Otchin is currently underway. VBA is hoping VHA will have a replacement in place by end of month August. In the meantime, we have a part-time temporary replacement (Dr. Reeves) that is on loan from DTRA. Dr. Reeves has provided opinions in about 23 cases so far and they are now pending review by VHA, Dr. Hyams of the Environmental Hazards Office. In anticipation of Dr. Hyams concurring in the 23 cases and a replacement in place soon, we have asked the Jackson regional office to start sending their backlog of cases to VACO. We also want to thank Dr. Blake for assisting in this most urgent matter.

Dr. Royal suggested and the full Committee agreed to prepare a letter encouraging the agency to hire someone to replace Dr. Otchin.

*1. ACTION ITEM: Dr. Soas was tasked with preparing a letter to the Secretary addressing the need to hire a replacement for Dr. Otchin.*

After the brief discussion regarding the status of Dr. Otchin's replacement, the meeting was turned over to the general chair, Dr. Soas. The first order of business was self-introduction of all present in the meeting. The next order of business was the approval of the minutes from the past three meetings (November 13-14, 2006, July 30-31, 2007, and December 3-4, 2007). The minutes were accepted with a correction to the 2007 minutes; changed Ernest T. Takafuji, M.D., Ph.D. to "Ernest T. Takafuji, M.D., M.P.H."

Dr. Royal addressed the issuance of the Committee's written reply to Mr. Pamperin regarding non-cancer radiation related issues; the cancellation of the April meeting due to a number of Committee members not able to attend and the need to receive the minutes more timely to help in planning the next meeting. In addition, the Committee should specifically identify action items so that they can be reflected in the minutes.

*2. ACTION ITEM: Provide the Committee with the verbatim transcript and minutes more timely to help with the planning of the next scheduled meeting.*

*The Committee should specifically identify all action items so that they can be reflected in the minutes.*

Dr. Takafuji stated that it was noted in the December 2007 minutes that the Committee discussed having a presentation on Depleted Uranium (DU) Program from someone, possibly Dr. McDiarmid, VAMC Baltimore. Dr. Royal responded saying that he believes it's important for the Committee to have experts address this Committee and would like to see more of it. The Committee has had little to no success in getting someone to discuss "doses to submariners," however, we will continue trying and seek further assistance from Dr. Blake. Dr. Blake was consulted and suggested that the Committee address a letter to the Secretary regarding this matter.

*3. ACTION ITEM: Invite Dr. McDiarmid (previously spelled as Dr. McDormitt), Director of DU program at the VAMC Baltimore, she is an occupational health physician from the University of Maryland), and/or Dr. Squibb (consultant to the Capstone study). This was assigned to Ms. Farber.*

*ACTION TAKEN: Since the meeting contact has been made, however, no reply to the invite has been received.*

*4. ACTION ITEM: The Committee will prepare a letter to the Secretary requesting assistance in getting someone from the Marines to address the Committee regarding submariners. This was assigned to Dr. Soas.*

Dr. Royal continued with the agenda, open forum for members of the public and there was no response.

Dr. Royal acknowledged the librarians, and thanked them for their support and hard work.

Dr. Royal presented a review about radiation effects in the eye to learn more about the relationship between radiation and cataracts. He stated that not many of the Committee members knew much about cataracts, especially new data on cataracts and in Dr. Otchin's summary of opinions from his last presentation before us, he stated the two diseases most likely to get a favorable opinion from the VA are cataracts and skin cancer.

One of the articles reviewed is a general article from Mettler's new textbook (2007 edition) entitled, "Medical Effects of ionizing Radiation." Specifically, the first thing talked about in this book is the deterministic effects and the fact that

they were well known right from when radiation was first discovered in 1895 by Rotentgen. By 1897, people were aware that their eye was quite a radiation-sensitive organ, basically quite similar to the skin in terms of its radiation sensitivity. In terms of deterministic effects, the kinds of things that happen to the

skin also can happen to the eye. The author gets into the area most interesting to the Committee when he starts talking about cataracts as the most frequent delayed reaction in the eye; that it's one of the few kinds of lesions that can occur that's quite characteristic of how radiation might cause these unique injuries. The author goes on to point out that senile cataracts usually begin in the anterior part of the eye, whereas radiation cataracts usually occur in the posterior part of the eye.

The Committee continued with a brief discussion, again referring to Dr. Otchin's summary of opinions presented in prior meetings. Skin cancer and cataracts are getting favorable reviews because DTRA has modified its way of giving worst-case dose to the eye and skin. Another thing that has happened based on Dr. Otchin's notes is that if the dose is greater than 25 rads or 0.25 gray (Gy), a favorable opinion is given. Dr. Royal referenced one of graphs in Fred Metter's 2007 book, although from 1972, it summarizes what we thought about cataracts in the past. The idea here is that our traditional thinking has been that you'd have to have at least a 75 rad exposure over a short period of time before you would have a radiation-induced cataract. As you continue through the article/book, the author says that cataracts don't always interfere with vision. The author talks about the latent period there's really a lot of variation, typically 12 to 25 years after the radiation exposure. So even though these posterior cataracts are somewhat characteristic of radiation-induced disease, they're not the only cause.

Dr. Royal stated that the author goes through the data for the Hiroshima and Nagasaki survivors and points out that there's an age effect-younger people are more sensitive to getting cataracts than older people. Another point of interest is how different types of radiation might affect cataract formation. The concept of a RBE has not been studied well with cataract formation, that is, do neutrons cause cataracts? Are they 10 or 20 times more likely than with low energy photons-low LET photons? And it's become of particular interest in astronauts because of their exposure to this mixture of radiation that includes a lot of high-LET radiation.

The author goes on to talk about radiation therapy and cataracts, in utero radiation and what the likelihood is of getting cataracts from in utero radiation, and high-LET radiation, and what the chances are of getting cataracts from high-LET radiation. This is the summary of Fred Mettler's summary and it is pretty up-to-date with references through 2006.

Dr. Royal continued with the Chernobyl Forum, a report that was published on the 20<sup>th</sup> anniversary of the April 1986 accident in Chernobyl. The conclusion is that the incidence and changes of lens of the eye following radiation show that there is a relationship where there is an increased incidence associated with radiation exposure. Another important point is that a focus of the Chernobyl eye studies is the hypothesis that radiation cataracts detectable by an experienced

examiner may occur at doses lower than previously thought. These studies do not appear to support the older, classic literature on radiation cataracts, which included a relatively high threshold, 2Gy or 200 rads, must be exceeded for cataracts to appear following ionizing radiation. It's not clear that this high threshold exists, so that's sort of new information, and then the Chernobyl studies and the most recent A-bomb survivor studies provide uncertainty as to whether or not there is or is not a threshold.

Dr. Royal invited questions and comments based on his presentation on cataracts. The Committee went into a lengthy discussion and mentioned the need to have someone come in and talk about cataracts, because it's obviously a problem with astronauts. The thing we need most information about is not only whether there's a threshold or not, but also something about probability of causation-whether or not there's any way to do probability causation. The other thing is when you calculate the probability of causation for skin cancer, it makes a difference whether or not your entire skin surface was exposed to that dose versus only a portion; and you have to sort of prorate it depending on how big an area was exposed. This is basically the default dose for an atomic veteran, however, based on Dr. Otchin's reviews, it appears he was treating it as if it were the entire surface.

The Committee suggested inviting Dr. Frank Kusenada [possibly living in Houston or Baltimore and believed to have worked for NASA] to talk on cataracts. In addition, Dr. Paul Blake will present to the Committee on tomorrow.

*Unassigned Suggestion: Seek a speaker to speak on cataracts, Dr. Frank Kusenada was suggested.*

The Committee dedicated the rest of the morning to reviewing the scientific publications (63 articles) as shown in the attachment to the Agenda. The floor was opened for questions and answers after each presentation.

Dr. Soas resumed the afternoon session at 1:12 p.m. He addressed the following administrative matters:

- submission of travel expenses associated with the canceled meeting along with the expenses for the current meeting, and
- future meeting date(s).

*Future Meeting Dates: October 27-28, 2008 and March 23-24, 2009*

Dr. Royal continued the review of the scientific publications as shown in the attachment to the agenda.

The next article for review was assigned to Dr. Oleinick. She stated that the following article numbered 03/08-24 and entitled, "A short review of model selection techniques for radiation epidemiology," *Radiat Environ Biophys* 46(3): 205-13 by Dr. Walsh should be reviewed by somebody who is an expert in the statistical methods used.

The entire Committee joined in and suggested that we contact Dr. Theodore Colton to see if he is willing to reunite with the Committee. The Committee strongly feels that someone with epidemiological background is needed. It was also suggested that at any time the Committee could bring in needed expertise to present to the Committee. In addition, she encouraged the committee to work as a single.

The Committee was reminded that the vacant appointment is for lay membership, however, contact will be made with Dr. Colton. The Committee unanimously agreed to pull the appointment package currently in progress and seek out Dr. Colton to serve on this Committee again.

Ms Farber also stated that, Dr. Royal's appointment is expiring in November 2008 and the remainder of the members' appointments is expiring in November 2009. All members were asked if they were willing to serve another term and all agreed. All Committee members were asked to submit an updated CV to Ms Farber for reappointment.

*5. ACTION ITEM: Contact Dr. Colton to see if he is willing to serve as a lay member on this Committee. This task was assigned to Ms. Farber.*

*ACTION TAKEN: Dr. Colton was contacted and agreed to return to the Committee as a lay member.*

*6. ACTION ITEM: All Committee members were asked to submit an updated CV to Ms Farber as soon as possible.*

*ACTION TAKEN: To date, Dr. Stevenson has submitted an updated CV.*

*7. ACTION ITEM: Hold article number 03/08-24, entitled, "A short review of model selection techniques for radiation epidemiology," *Radiat Environ Biophys* 46(3): 205-13 by Dr. Walsh for the next meeting to be reviewed by Dr. Colton.*

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Dr. Royal resumed the review of the scientific publications. He also reminded everyone of Dr. Blake's presentation on tomorrow

The meeting was adjourned at approximately 4:08 p.m. on July 17, 2008.

Ms Farber reconvened the meeting at approximately 8:20 a.m. on July 18, 2008. She thanked Dr. Paul Blake for accepting our invitation to present before the Committee. In preparation for this meeting, we were asked if we wanted the Secretary to address the Committee. The offer was declined as the agenda was planned, guest invited, and we had a lot to cover due to the cancelled March meeting. Ms. Farber suggested that we invite the Secretary at one of the future meetings.

*Suggestion: Invite the Secretary to one of the future meetings scheduled for FY 2009.*

The meeting was turned over to Dr. Soas. Dr. Soas thanked Dr. Blake from Defense Threat Reduction Agency, Nuclear Test Personnel Review Program Manager for accepting the invite to come before the Committee and turned the meeting over to the Scientific Chairman, Dr. Royal.

Dr. Royal provided some background information regarding the favorable decisions that VA is making before turning it over to Dr. Blake. He stated that there has been a dramatic change in the last few years and now most of the favorable decisions involve skin cancer and cataracts and part of that is change is related to the doses we are getting from DTRA. The Committee is very interested in seeing how the doses are calculated, and if it turns out that DTRA is providing the same worst-case dose for all atomic veterans and if that worst-case dose is going to cross the threshold for 50 percent probability causation, is there some way we could streamline the process for skin cancer. As for the cataract issue, it is a little less clear to some of us because we don't know if the same worst-case situation is being used for the eye as is done for the skin; and another concern is that VHA is using 25 rads as a cutoff goal for cataracts causing a less favorable decision.

Dr. Blake thanked the Committee and offered a few general comments before his presentation. He stated that the Committee has expressed interest in having Dr. Reeves, who is currently offering assistance to VA three days a week pending a replacement for Dr. Otchin (retired). Dr. Reeves is a radiation oncologist and works for DTRA. His basic focus is weapons of mass destruction effects. In the past, he wrote a lot of medical opinions for Department of Defense and Department of Veterans Affairs and provided them to the Veteran's Advisory Board on Dose Reconstruction

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Dr. Blake started his presentation with providing some background and referred to an unofficial document dated December 21, 2006, put out by VHA to VBA on the expedited dose process and the procedures used. VHA's concern at the time was that the expedited process would be overwhelming due to existing backlog, so they gave authority to VBA to do part of the process for very straightforward cases using the methodology based on a DTRA technical report. As a result the existing backlog is going down and the cases are being reviewed at the Jackson regional office. The cases that actually come up for medical opinions are the more complicated ones and all Nuclear Test Personnel Review (NTPR) cases.

After the background discussion, Dr. Blake proceeded with his slide presentation. The briefing outline included Radiogenic disease compensation; DoD's NTPR program; NTPR dose reconstruction overview; NTPR's expedited dose methodology; and The road ahead. Dr. Blake referenced his experience while he was the officer in charge in the naval dosimetry center, however, after being at DTRA, he was amazed at how much more complicated the cases were and the cost involved. The National Academy of Sciences demanded a much more rigorous approach to how we did our dose assessments.

In many cases troops were marched in and actually received radioactive fall-out, and they were literally sweeping it off them. So you have major concerns both with skin dose and internal dose. In almost all other cases, for the most part, they're much more straightforward so you do not have to do historical radiation dose assessment. The vast majority of complicated cases for radiogenic disease are from atomic veterans. This program is driven by uncertainty, and this is where the reviews get complicated. On the average, the doses were not that high with the veteran community, even though many of them [veteran community] may realize that does may not have been high, there were some cases where it could have been and therefore in their mind, they're that one out of a thousand case and that's the way it is read.

Dr. Royal asked the following: Since this program is driven by uncertainty, what are we doing for the future? Do we have better records now so that if we have to do some kind of dose reconstruction in the future there will be less uncertainty?

Dr. Blake responded by stating, DU is not a part of his program, but shared his personal opinion and mentioned a paper presented at the Health Physics Society in Pittsburgh where they reviewed the data and some of the initial work for the Navy but primarily covers Army and Marine Corps, however, all services are contributing to the registry. Dr. McDiarmid and her staff have done some excellent work along with the Department of Defense. From a scientific viewpoint, the VA, along with DoD to a lesser extent, has really taken lead and done a very good job looking at how we actually analyze samples and calculate in the doses. Concerns lie with the amount of people sampled. When you look at the bioassays based on the requirements that come out of Health Affairs, it's

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about 3,000 people with monitored results, and the only people that had any significant dose ongoing are the ones that actually had fragments, which are very few. The people that don't have fragments, the ones that had any significant dose out of all those thousand were only like two or three when calculated out. So based on science, a major health effect on the monitoring program is not shown. Another concern when looking at not only the Department of Defense, but also the other radiogenic disease compensation programs across the country, it is more than science that comes into it. Again, if you don't monitor and document zeroes across the board for many, many people, you could argue, you

didn't pick up anything, but one can argue, I'm the one person you didn't see, and then 30 years later it starts escalating.

Dr. Blake continued the discussion and focused on the DTRA program. He provided a little background on dose reconstruction, expedited dose methodology and the future of the program. There was continued detailed open discussion.

Dr. Blake pointed out that his staff continues to optimize the processes, for instance, an electronic connectivity was established between VA and his office and instead of moving cases through the mail, digital PDFs of cases are sent, and it cuts out about a week on the transfer of cases back and forth. A good working relationship with the VA has been established and one of the best things that have happened was VA deciding to centralize all radiation claims.

Due to the complexities and detail of Dr. Blake's presentation, a verbatim script (pages 6-115) is enclosed for ready reference.

The entire Committee thanked Br. Blake for his presentation.

The Committee again resumed the review of the scientific papers. A list of the papers reviewed, in the order of review, may be found in the attachment to these minutes.

Upon completing the review of articles, the meeting was turned over to Dr. Soas, general chairman.

Ms. Farber restated the action items and added the following items.

**8. ACTION ITEM:** Invite the Secretary to an upcoming meeting.

**ACTION TAKEN:** An invitation has been extended.

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**9. ACTION ITEM:** Dr. Royal will send an electronic copy of ICRP report to Ms. Farber for transmission to each Committee member for review at upcoming meeting.

**ACTION TAKEN:** Ms. Farber sent a reminder to Dr. Royal via e-mail on Friday, September 26, 2008.

The meeting was adjourned at approximately 11:30 a.m. on Friday, July 18, 2008.

## **VERBATIM TRANSCRIPT OF DR. BLAKE'S PRESENTATION**

DR. SOAS: So again, welcome. And at this point if there's no other comments or information that needs to be administered, I would like to turn it over to our scientific chair, Dr. Royal.

DR. ROYAL: Okay. I have your slides. So if you want to begin, that would be great. I guess I could give you a little bit of background. As you well know, the favorable decisions that the VA is making has really changed dramatically in the last few years. Now most favorable opinions have to do with skin cancer and cataracts and part of that change is related to the doses that we're now getting from DTRA, so I will be very interested to see how those were calculated and actually yesterday we were talking about whether or not there's any way we can make this process more efficient for veterans. If it turns out that DTRA is providing the same worst-case dose for all atomic (off mike) veterans and if that worst case does is going to cross the threshold for 50 percent probability causation, is there some way we could streamline the process. So that's skin. And then the cataract issue, I guess, is a little bit less clear to some of us because I don't know if you're using the same worst-case situation for the eye as you do for the skin, so we're interested in that. And then another reason why cataracts are not being looked upon favorably is because Neil is using 25 rads (off mike) as his cutoff goal (off mike). So that's the background in why we asked you to come.

DR. BLAKE: Well, thank you. I just have a few general comments before we get into the presentation if that's okay. I tried to come over here a while ago. I guess the first request was back in (off mike) March 2007 and that one didn't happen, and then my deputy was going to come over when I wasn't available in March 2008, so it's nice to make it finally. We have had one or two other Department of Defense individuals come over to the meeting. I think, I know Lieutenant Colonel Wrobel from the Air Force spoke on the Air Force program maybe about six months ago, maybe about a year ago. He's now retired and actually works at the same combat support agency that I do. He's also civil service now too, so he switched from the Air Force over to DTRA, and I think before that, didn't you have Colonel Jarrett?

DR. OLEINICK: Yes.

DR. BLAKE: Who is a physician from the Armed Forces Radiobiology (off mike) Research Institute. He's since stepped down as the Director of AFRRRI and he's now over in our office of Secretary of Defense doing more policy type things with Kim Whyo and other types of radiological issues. And Ersie did mention that you'd like some briefings if possible from Dr. Reeves who's a radiation oncologist that works with me over at DTRA but the difficulty of having Dr. Reeves speak formally to you is, his funding comes from the Department of Defense and there's

some concerns between the two agencies on perceptions of conflict. Right now, I can tell you he's assisting VBA. It's about three days a week. He's been going back and forth because I noticed in the past Dr. Otchin's workload was about 480 medical opinions per year and there was a back up after Dr. Otchin retired of -- when Dr. Reeves was flown in there, of about 200 cases and so he's been going over -- because he is very knowledgeable on the issues, wrote a lot of medical opinions when there were some concerns between the Department of Defense and Department of Veterans Affairs and provided them to the Advisory Board that we go to, the Veteran's Advisory Board on dose reconstruction, but of course they weren't used by the VA. But he is a radiation oncologist that's basically full time focused on weapons of mass destruction effects and therefore this type of scenario, so therefore I think the VA felt comfortable. They did credential him, and so forth, before bringing him over but he is not signing out any of the medical opinions. He's simply providing assistance to -- I think it's Dr. Dayton and company over there too. As background, I believe you've seen this document. At least I was provided a copy, an unofficial copy, that was dated December 21, 2006, that was put out by VHA to VBA on probably a while ago, but on the expedited dose process so that gives some of the background if you saw the doses and so forth that were in there and the procedures they're using. Neil Otchin's concerns at that time when we started expediting radiation doses at DTRA was it would overwhelm, because we had a backlog there and he would be overwhelmed, and so they actually gave authority for VBA to do part of this process for these very straightforward cases using the methodology they provided based on a Defense Threat Reduction Agency technical report. I believe you're probably familiar with David Kocher who's out of SENES and he's one of our contract staff too, and David had prepared a screening dose report that is online if you haven't looked at it already. And so that's really been able to simplify or keep the workload at about the same level here is my understanding at VHA. So those cases and speaking with Dr. Reeves, they're still going down and being reviewed at VARO Jackson. So once again, the cases that actually come up for medical opinions or the more complicated ones, the ones that don't fit in that criterion and certainly all the non-NTPR -- Nuclear Test Personnel Review cases. With that as a background I guess I'll jump into my presentation. Could I have the next -- do I have a slide --

DR. ROYAL: Yes, unless you want --I can --

DR. BLAKE: No, that's fine. We'll see how long it goes. I did try to give you an estimate about how long I'd be speaking, but I'd like to give you just a general -- perhaps you've already seen the slides -- but a general discussion on radiogenic disease compensation. I do try to coordinate that for the Department of Defense, and as you'll see, the atomic veteran cohort that I deal with is based on caseload, as certainly the majority of cases that come over to the VA. The other cases I was actually involved with, for instance when I was an officer in charge in the naval dosimetry center and when I would prepare those cases to send over to

the VA for compensation decisions, they were much more straight forward. Most of the dosimetry centers were simply providing -- here is our tabulated results in basically penetrating or skin dose, and we simply sent the results over. I checked them, there is no perfect databases within the department (off mike) so we'd review our paper records, but to actually send information over to VA for these cases probably cost us, when I looked at the overall cost to do that, maybe about \$100 to \$150 per case. So it was very straightforward to do. However, when I retired and came over to the Defense Threat Reduction Agency, I was amazed how much more complicated the cases were and some of our costs in those early years, we were averaging about \$12,000 per case to send over and some of the cases ran \$30,000 to \$40,000. What had happened was, and we'll talk about this but the National Academy of Sciences had come in with a study, demanded a much more rigorous approach to how we did our dose assessments and the challenge with atomic veterans that I'll be focused on as compared to the rest of the -- most of the veterans that fall off radiogenic disease compensation through the VA's. We have, I would argue, some unique circumstances for this particular cohort. The two unique circumstances are, these are troops that in many cases were marched in and actually received radioactive fallout. People were literally sweeping it off of them. And so you have concerns, major concerns, both with skin dose and internal dose, and that's almost never the case in almost all the other occupational exposure cases. In almost all other cases coming in, for the most part, they're much more straightforward and so you don't have to do all this historical radiation dose assessment. There are a few other cases outside of DoD that we try to interact with if they're more complicated but for the most part, the vast majority of complicated cases coming in to the VA for radiogenic disease are from the atomic veterans.

DR. ROYAL: Could I ask you a question? Because you mentioned internal contamination --

DR. BLAKE: Sure.

DR. ROYAL: -- due to fall out. I guess I was under the impression that as some urine samples had been collected --

DR. BLAKE: Yes.

DR. ROYAL: I guess I'm sort of surprised to hear that internal doses would have been a significant problem.

DR. BLAKE: What drives this program is uncertainty and so --

DR. ROYAL: You're doing the worst case.

DR. BLAKE: Right. And so where it gets complicated, and certainly in our reviews are the uncertainty with it, we'll talk about some of the figures. On the average, the doses were not that high. There were some exceptional cases and I'll try to outline those for you -- where the highest doses were for the veterans that we saw, but in this program where we deal with our veteran community, even though I think many of them may realize that doses may not have been high, there were some cases where it could have been and therefore in their mind, they're that one out of a thousand case and that's the way we end up reading it.

DR. ROYAL: And the other question I had is, since this program is driven so much by uncertainty, what are we doing for the future? The committee has talked a lot about DU and can imagine that DU is going to be an issue in the future. Do we have better records now so that if we have to do some kind of dose reconstruction in the future, there will be less uncertainty?

DR. BLAKE: With regards to DU, I would -- that's not in my program specifically and they haven't asked my opinion on that, but do have some, I guess, thoughts on that as someone who looks at the outside. Most of that data is published on the public website so you can take a look. And there was just a paper presented at the Health Physics Society this week in Pittsburgh where they reviewed the data and I did write some of the initial work for the Navy and so forth on that, but it's primarily, when we look at the cases, an Army and Marine Corps problem right now. But all services are contributing to the registry. The amount of work that the VA has done, and I don't know if you've had Dr. McDermott over here to speak to you on that issue, but she has done some really excellent work along with some of the Department of Defense people at CHIPM. I think from a scientific viewpoint, the VA, along with DoD to a lesser extent, has really taken lead and done a very good job looking at how we actually analyze those samples and calculate in the doses. Where I'm a little concerned though is the amount of people we've sampled. Right now when you look at the bioassays based on the requirements that come out of Health Affairs, it's about maybe 3,000 people that we've monitored results on and of those people, the only people that we found any significant dose ongoing are the ones that actually had fragments, which are very few. The people that don't have fragments, the ones that had any significant dose out of all those thousands were only like two or three when you calculate it out. So based on science, once again, we don't see a major health effect on the monitoring program. Where I get concerned though is looking at not only Department of Defense, but the other radiogenic disease compensation programs across the country. It's more than science that comes into it. Once again, if you don't monitor and document zeroes across the board for many, many, many people, you could argue, well chances are, you didn't pick anything up, but they'll argue, I'm that one person you didn't see, and then 30 years later it starts escalating. And so Health Affairs has done, along with VA, has done an excellent job from the scientific viewpoint but I'm not sure it's going to -- 30 years

from now we'll see whether we start having a lot of cases for DU. Even within communities that I deal with in the atomic veterans communities, they try to do outreach to the DU veterans. If you follow what's going on in the literature, certain states have already set up DU programs and laws for those particular veterans groups and they've organized to some extent. My concern is just the concept of what we do in radiation dosimetry where we document some of these zeroes. We're not doing that to as large an extent the DU issue, but that's being made -- the decision made in other places and the Department of Defense.

MR. ROYAL: Sure. But if you haven't heard the presentation, I think the papers and so forth that they presented are just superb on the DU side.

Dr. BLAKE: From Department of Defense and VA side, we've really tried to jump out ahead of that issue. I am going to talk about my own program, obviously.

A little background on our dose reconstruction and finally what you asked for on the expedited dose methodology, and then a brief of where I see the programs going. I like to just give a worldwide view of what's happening, and perhaps you're already familiar with these figures, but it's amazed me. My team over at the Defense Threat Reduction Agency is about -- is fairly large. It's about 40 people. Most of it's on the contract side. For instance, Dr. Reeves, we talked about, who does other issues besides NTPR. So a lot of the science and a lot of the history, a lot of the researching is done by the historical staff. The actual staff on site is only a few government people, but one of the contract staff I have, basically, who works part time, feeds me a lot of information, what's going on from a radiogenic disease viewpoint worldwide. And besides a few cases like this, there's active atomic veterans cases going on in Canada, Great Britain, New Zealand, many other places where even though, unless you're looking for it, you may not be so focused on it. What's seen to a much greater extent in this country is what's going on within the Department of Energy and the compensation costs there. In any case, Japan is still extremely sensitive on Hiroshima and Nagasaki survivors. Some of them and their dependents make up about 10 percent of the current city populations and over \$1 billion per year is going out in compensation in the yen equivalent over there still to those people.

What happened with the Chernobyl reactor, once again, was of a tremendous impact on those countries and a budget viewpoint on compensation. Within this country there are basically three federal radiogenic disease programs that you're familiar with. The two of them update their costs on a weekly basis when you go to the websites, and those figures I had given you are back from February, but you can see in the case of the Department of Justice, which my program also supports, they've spent over \$1 billion in the Department of Labor on radiogenic disease compensation which came about through the Energy Employees Occupational Illness Compensation Act of 2000 and even then it took a while for them to stand up, so it's only been really four or five years. It's already gone to

over \$3 billion. It is big compensation costs and I think there's some lessons learned from there.

The difficulty is, on the third program, the Department of Veterans Affairs that you advice, there are no figures that are no figures that are put out in public and in fact those figures are not provided even though we've requested through the Department of Defense, and so the basis for us understanding, because it is important for us to try to understand what's happening on compensation decisions as we work with VA as a partner in the Department of Defense, we're based on the data that's presented in this committee is the only data that's presented to us. This is a (off mike) committee, and it's based on the medical opinions that Dr. Otchin presented to us. I do not see the final -- it's never been presented. The one place it was discussed publically was at a previous National Academy of Science Study on the dose reconstruction program for DTRA where Brad Flohr came in and has briefed you in the past, and he presented figures to that National Academy of Science group but the figures that he presented, they disagreed with, so therefore, it's a little And it's not as straightforward obviously on the VA for compensation too, but I think it's fair to say it's significantly less on radiogenic disease compensation from the VA.

DR. ROYAL: Do those costs include medical care for the VHA and DOL? Because it's not only a lump sum payment, it's also healthcare.

DR. BLAKE: I did try to break that out and certainly on the Department of Labor, they do break that out on their website. Department of Justice, I don't think that figures as much on medical care. It's more straightforward. The Department of Justice side we talk about is basically the equivalent of a presumptive pay out and Department of Labor is a mixed bag of both presumptive and non-presumptive payoff.

DR. TAKAFUJI: Have there been any family related issues with some of this compensation?

DR. BLAKE: Yes. Just like with the VA, some of those --

DR. TAKAFUJI: Can you describe some of those examples?

DR. BLAKE: Yes. Often what happens with the VA or the Department of Labor compensation is people have passed on and their widows or dependent children are seeking compensation, in some, in fact, some of the most challenging cases that we have, it's maybe not surprising, are dealing with the widows or the children who are often lawyers or other people that just keep coming and coming and coming and often can get more emotional or even more bitter. Dealing with the veteran community even though

when I look at how many people have filed for compensation that could file for compensation, if you look at it roughly of let's say the atomic veteran community, it's about 480,000 that could file. How many are going to pick up disease that could file? It's mostly male. So it's roughly close to 50 percent who could file. When we look at the figures over the years, it's only about 3 percent that have filed which is what we have to keep in the back of our mind. It's not tremendous figures but some of those people become extremely active and the way we set up our organization, for instance, most of our veterans are very polite and respectful as we go through the situation, some have more challenges and what I feel, since we have both a contract and a government section is, the people, if they're not happy with our first responses, then a government representative, either myself or my military deputy are the ones who speak directly with them and work with them. But I guess the one thing I would point out on our NTPR team, even though a good part of it is contract, the veterans don't really see that. The stuff comes into the military organization. It's signed out by the military organization, and our contract staff supports. We do have, for instance, a toll free telephone line that we've had since 1978 when this program started, that originally was put over the Armed Forces Radiobiology Research Institute, the services (off mike) separately and then we put it in to just one organization to coordinate this, it was a predecessor to my agency, the Defense Nuclear Agency who's been doing it, but we get perhaps on that toll free line, 40 to 50 phone calls a month coming in, so -- maybe two or three a day and we're calling out helping veterans too because in a lot of approaches where we try to do web based approaches, that's not going to work with our elderly population and even though we send a lot of correspondence back and forth, we find by doing a lot of outreach and talking through and helping them, that's very useful. But I still would argue in the Department of Defense, looking at, you know, these are our veterans. We try to take care of our own. Having a person in uniform is appropriate to speak directly back to the veterans. And so even though I'm retired, sometimes it's useful to have an active duty person actually go out.

DR. TAKAFUJI: When the individual who is exposed passes away --

DR. BLAKE: I apologize. I did get off the topic a little.

DR. TAKAFUJI: -- and he dies, the widow still gets some compensation continuing.

DR. BLAKE: Yes. It's about 50 percent of what the total average would be.

DR. TAKAFUJI: But it's usually just the spouse, right? It's not the family members?

DR. BLAKE: The dependent children can get quality -- but usually an atomic veteran's -- the children are not included because it's usually 18 or less and most of these individuals are in their 70s or 80s, and so --

DR. TAKAFUJI: And have there been any well documented cases where there's been adverse effects because of -- problems with teratogenesis or any problems like that? Or (off mike). They've never had a situation --

DR. BLAKE: No. Some of our veterans feel that way though and I will tell you that there's some stories --

DR. TAKAFUJI: Have there been any actual awards on these (off mike)?

DR. BLAKE: None that I know of --

DR. TAKAFUJI: Okay.

DR. BLAKE: -- in the system, but that doesn't mean that they're -- we don't frequently get letters along that way and veterans pointing to whatever arguments they see along those lines, but no. I think you're familiar with both the concepts of presumptive and non-presumptive compensation. What I did try to show here is even while the VA has that and the total costs as of this year for if you had 100 percent disability, the figures are not that great in the payout and as you mentioned for the survivors, it's about half of that. The figures are bigger over in Department of Justice and Department of Labor, and one of the concerns that, as we go back and forth as federal agencies, is we don't have similar regulations and what we do on our side could impact the other side.

DR. ROYAL: Or vice versa.

DR. BLAKE: Right. And the concern was especially there for skin dose when we basically went to a program where it's basically being service connected. If that was applied over the Department of Labor side, that would be a straight \$150,000 payout for every one of those skin cases. That has not happened, but that was obviously a concern and so there's been, at higher levels we've gone back and forth and briefed each other and discussed while we felt like, for instance, our program, the way we were doing it was a unique approach. The Energy Employee's Occupation Illness Compensation Act, the vast majority of the people applying for that are DOE contractors that work more in an industrial setting, but some of them were involved with the Nevada test site and Pacific Proving Ground cases they have filed and there's groups that -- there were many more military than there were civilians at those facilities, but there's cohorts out there of a few hundred on the Department of Energy side that might be applicable to some of our calculations that we do here.

MR. ROYAL: I was familiar with \$150,000 payout under the Energy Employees Act in the VA but I'm a little confused about the \$75,000 (off mike).

DR. BLAKE: There's actually like three payouts in the Department of Justice Radiation Exposure Compensation Act. The one I quote there is the one that affects our veterans. Veterans can apply either for VA or Department of Justice and the two agencies talk back and forth so you don't double dip, basically, on compensation. If you got part of it from VA, you get the rest from the Department of Justice if you're qualified, but who qualifies under Department of Justice does not include, for instance, the Hiroshima, Nagasaki group that includes atomic veterans, it's only down winders that came from the Pacific Proving Ground and Nevada test site. So if you qualified there, we provide basically the verification. We do the historical research for the Department of Justice, and I'll show you some of the figures, but if you qualify there, you get a straight -- it's a presumptive compensation -- you get a straight \$75,000 in payment.

DR. ROYAL: What I'm trying to figure out is whether or not a veteran with skin cancer can get the (off mike).

DR. BLAKE: No, I don't believe so, because skin cancer is not one of the presumptive cancers that's included, that's pretty much the same between VA and the Department of Justice. So right now if you--

DR. ROYAL: So down winders are only getting compensated for presumptive disease? There's no non-presumptive (off mike) for the government (off mike)?

DR. BLAKE: Yes, I believe that's correct. And I can follow up and send you those regulations if you'd like, but I'm 98 percent certain on that statement.

Moving on to the next slide. Here's what we often call quad charts. We give briefs over there, so a lot of information, but I've mentioned what the cohort of actual veterans that we deal with. If you looked at our database though that we've provided to the VA when they've discussed outreach programs to this particular cohort, our actual database exceeds a half a million veterans and that is we have a number of veterans who come in because sometimes their memory is a little foggy or they're not quite sure on clarity, they don't actually qualify ad NTPR but we keep track of those veterans because sometimes they come back and they come back again. And they come in through their congressman occasionally too. So it's roughly a half a million.

What are our objectives over in the Department of Defense? Well, one that we couldn't do for a while but now we certainly do is, to make sure that all of the requests or information are handled in less than 6 months and in fact, when I left last week, our oldest case was only 100 days and we had a total of 140 cases, and we'll go through the statistics, but the cases now are coming in, they're

handled quickly and I hope effectively, and so we don't have a backlog over at the Department of Defense side, and that wasn't true a few years ago.

DR. ROYAL: The improved process, have you -- has that affected the interactions between the agency and the veterans? (off mike) document that in any objective way but --

DR. BLAKE: Well, we can in some ways. I haven't put that slide -- some of those slides on that would be a little more sensitive in a public forum, but one thing we look at, for instance, is the number of congressional requests that come in and that's an indicator of veteran dissatisfaction. We're going to get some no matter what we do. Because we get now maybe in our program maybe about two or three congressional inquiries per month now even though there's no backlog. Most of those veterans coming in don't even have compensation cases ongoing, they go year after year after year through their congressmen asking us information but they don't even have a disease. So you have a certain natural backlog, but in years past, federal agencies, as you know, are sensitive to congressional inquiries because that's where their funding comes from. The NTPR program had over 50 percent of the congressional inquiries for our entire agency because of the dissatisfaction that was there from the backlogs. So I was under, as the program manager, when I came over, a lot of stress to resolve that problem. And part of our solution was, and we'll talk briefly about it, was we tried throwing money at the situation until we could get the program under control and actually go through our advisory board.

Where we were being challenged was, we had published, based on many public laws I'm going to talk about, we had published in the Code of Federal Regulations, here's how we're going to do our dose reconstruction methodology, as appropriate. The difficulty was, that had not been updated. It had been published in 1985 and following that methodology, you basically treated all cases the same way. You calculated everything out to the smallest degree on millirems, there was no expedited process, and when you try to do that for cases that didn't really make any sense to do it, you're spending these, on the average, \$12,000 per case and we just, we had scientists sitting there and day after day calculations, and we weren't necessarily using our scientist and historian staffs in the most effective methods. There's places here when you look at how you run your business lines of going where do I want my scientists to do the work? Where do I want my other support people to do the work? Just similar in a medical environment too, as you were saying, so that was part of the process. And even now, we continue to optimize the processes. One of the things that we did two weeks ago, for instance, was we established electronic connectivity between the VA regional office in Jackson and my office and so now instead of moving cases through the mail, we're actually moving PDFs of cases so they're actually sent up to us digitally in the first place. It cuts out about a week on the

sending up to us. We went to an all digital operation. I know the VA wants to go that way but the way we established that connectivity was we basically -- we run an electronic network that's similar to our classified networks and they're called vpns in the business community and so we put part of our network, the Department of Defense network, into the VA office and we have them go through the same training that any of our people do when they have to go through the network. And for the people down there qualified, and so now they're a node on our network as we move data back and forth. I would just point out, we continue to optimize our business practices to make it efficient so hopefully I can drop our average figures down more than 40 -- the average is about 40 days for turnaround. One reason I did that was at our last veteran's advisory board on dose reconstruction, a number of the scientists brought up they wanted more quality assurance done, which is fair, but from a program manager's viewpoint, when they wanted a check on a check on a check, that adds a few more weeks to the case and cost and I was concerned that if we did that, I'd have a longer turnaround time for my veterans.

By optimizing these practices, we kept it at about the same level and we had originally tried to do that before and the VA hadn't gone along with it. At the last meeting, publicly, Mr. Pamperin said, yes, we'll support that, and that's when we implemented it. I would point out, we continue to optimize what we do on almost a daily basis, but we have a very good working relationship with the VA regional office in Jackson and perhaps one of the best things that from our viewpoint in DoD was VA deciding to centralize all their radiation claims in VA Jackson was a tremendous breakthrough for us. When we had to deal with like 57 separate VA regional offices that only did a few cases per year, each time they would come in, they didn't know their own policies. Even now with one office when you look at the statistics, over 20 percent of the cases that are forwarded over there are inappropriate, they get turned back by VA Jackson because the people in the other offices don't understand how to do radiogenic disease.

I mentioned the 19 public laws. They end up being amplified through Code of Federal Regulations that the federal agencies have written and we work closely on that and the one that I mentioned previously in the Department of Defense was published in 1985. That's one place where we need to revise that to take into account the changes we've made through the expedited dose process and we hope to get that done within about a year. I've also pointed out, when you look on the average, on whole body doses to our veterans, we look over the entire population, it was not a significant dose, but where were the highest doses to atomic veterans that occurred? From a whole body viewpoint, there were no doses greater than 100 rads. Where did the highest doses come? We had -- it's rather interesting what's happening, for instance, over in Iraq and Afghanistan where we have these UAVs now flying without pilots. We did those in the early years; for instance, the first atomic test was Operation Crossroads in 1946. We actually flew what we called drone bombers through, without pilots, through the

clouds to try to sample but then the Department of Defense wanted a little more flexibility so we actually started putting pilots, after those tests in the subsequent tests, we flew them through the clouds in bombers and planes and so forth, and they sampled them and when they came back, we wanted to collect the radio chemistry to understand what was going on. So some of those pilots who flew through the clouds picked up some of the highest doses in the program. Other places where they picked up some high doses were for instance in Trinity, the first test at the Nevada Test Site before the bombs were dropped at Hiroshima and Nagasaki. They detonated the weapon, they took a tank which they painted white, covered it with lead shielding and had a sergeant in there who drove into the site really quickly, took some samples and drove out three times. He picked up some doses.

And the third group that picked up the highest doses were when we tested one of our early hydrogen bombs in Operation Castle Bravo out in the Pacific Proving Ground. That particular test is rather infamous. It's the one where the Japanese fishing vessel picked up a lot of exposure. They didn't know -- because both the detonation was larger than expected and it went in directions they didn't expect and they didn't get some of the people out. There were also American servicemen who were manning a radio unit there that picked up some doses too, skin doses, so when you look at some of the largest doses -- I quoted the whole body doses, the highest ones in our entire program, I think the highest one is about 80 rads and then it drops down quickly. There's only a few people. Where some of the other doses were though, we saw both in the Marshalese and some service people actually got acute skin doses where they actually -- and there were a number of excellent military publications years ago on those cases, so those basically are some of the top doses when we're looking at trying to set some of these boundary limits too.

MR. ROYAL: (off mike) background will be.6 (off mike) so (off mike).

MR. BLAKE: Yeah, 630 is what we're quoting now. In fact there were some presentations once again at the Health Physics Society meeting out there, the head of the NCRP. I think you're familiar with what the actual uncertainties are used by the agencies. In our case, when we send a dose over to VA by Code of Federal Regulation, we're supposed to give both the mean dose, break it out by component, and the uncertainty. What's different when we do the expedited process is and how we've not followed our Code of Federal Regulations for the expedited process is, we simply give the upper bound. We're not trying to say that we're calculating that dose effectively. We aren't. We're given a very worst-case scenario and so all we simply do is give the upper bound. We haven't felt -- obviously, we need to change our Code of Federal Regulations, but the practice that Neil Otchin has used consistently over here is simply to use the upper bounds in his dose calculations in first place, so even though we provided the mean dose in a lot of our other calculations, that wasn't what he was using in

how he's done his methodology, so our change to our procedures to expedite has not impacted how the VA has processed their results, but we do need to catch up on that. When it does come over here, though, the VA does use this concept of a 99 percent credibility limit, so in both cases, what the drive is to get the benefit of the doubt to the veteran.

DR. ROYAL: Now, you said that things hadn't changed because Neil was always using the worst-case dose, but has the worst-case dose gotten higher?

DR. BLAKE: It has for the -- well, when we implemented expedited doses -- I'll talk briefly about that, but what we did is we looked at all the doses we'd provided the DA from day one and some of them we had revised, but we had this tremendous data bases we'd kept on doses, and we looked -- and we'd spent a lot of time doing some of those doses so we have a fair feeling when you resolve, and we did the peer review on -- the government prepared those -- the concepts to look at the expedited dose, but we had an advisory board of three physicists that are the dose reconstruction subpart of the Veteran's Advisory Board. Many of you may know Harold Beck, for instance, he did the fall out calculations across the U.S. for every county and radioactive iodine and there are two other scientists that are on that. We presented our analysis to them for each one of these expedited processes, and based on that, looking at all those doses, then you make a judgment call of saying, basically, here's where we truly feel the worst case analysis was on that. We then looked at -- in the back of our minds, we looked at what were the screening doses that were published, that we'd had published by Dr. Kocher for the worst case analysis for how they go to a 50 percent compensation, and knowing what happens over here, we then set these values for expedited doses.

My point would be with that is we've truly gone to, in recent years, to expedite processes, doses that are in 99 point probably -- at least 99 percent of the cases, this is higher than they would ever see, and then we've set up criterion, and we do it for every particular case. We do something called a decision summary sheet. How do we justify sending -- not doing a full radiation dose assessment, how do we justify doing an expedited dose? Because what you'll find in our program is, probably -- but about 60 percent or plus more are now going expedited. The amount that we do full calculations that take us a lot of time are fairly small now. We still do a full calculation for all Hiroshima and Nagasaki veterans, but those calculations are much, much easier than the Pacific Proving Ground and the Nevada Test Site people. It's the way we've optimized our processes, so I guess I would say in recent years it did change. The doses became higher. What seriously impacted our program, when you look back at the technical basis documents for how we've run the program, the program was really busy in the early years trying to understand it and there were a lot of publications, many of them are on our websites, that went through about 1985. The program then started to go more into an automatic phase and based on that,

science moves ahead in dose reconstruction and other methods. And what originally happened was the GAO came in and did an investigation of what we're doing and brought in some questions about the program. That led to a public law that said what they wanted the National Academy of Science to do a study on us and this is the concept of earmarking. In fact, I noticed last year National Academy of Science had about 80 earmarks of where they did studies that the federal agencies paid for the studies on themselves, and this particular study cost us a few million dollars. When it came out in 2003, it truly had a major impact on the program because they said, in most cases we felt the doses were correct, but it wasn't extremely clear in all cases if that was true and there could have been some cases where it might have been higher based on uncertainty. And it was really the uncertainty they were concerned with in most of the cases. So we basically shut down for six months, tried to put new concepts in place, and then it was a very slow start up in trying to put in methodologies that were requested through this group. What also happened after that National Academy of Science study and we were trying to get back, was congress then came in based on those results and said, geeze, we're concerned here and we're going to request an advisory board be set up and some initial reports. And that was the basis the Veteran's Advisory on Dose Reconstruction came about. And I think like any federal agency or program manager, having 16 scientists look over what I do all the time is not the most pleasant experience and I will obviously say, I do hope my advisory board goes away in a year or two. I'm planning for that. But it has also been extremely cost-effective and helpful.

When we report back to Congress and we give briefings on the Hill, why has it been effective for us? And I'll try to reign those results in, but it gave us the flexibility in a public forum with peer review to get around that stranglehold that was our Code of Federal Regulations and you really don't want to change your Code of Federal Regulations until you understand what's going on. The Advisory Board gave us that period for us to work through how do we want to change our methodologies. And the methodologies that we're using are very similar to the one other major radiation dose assessment group out there, the Health and Human Services through NIOSH does it and they use an expedited dose process too that's similar.

So we are now moving with a lot of our technical basis documents and publications and standard operating procedures that I hope to finally put on the web by the end of this calendar year. And I think by that time, by moving most of the stuff out into the public just like the other group does through NIOSH, then we're ready to go ahead and change our Code of Federal Regulations, but the more I put out there and await comments, I feel more comfortable before I actually change the CFR.

We've mentioned the two different Advisory Boards. Dr. Roy was nice enough to come over and actually brief our other Advisory Board for your group a year or

two ago -- it was about maybe a year and a half or so, but the focus has been different. Where obviously you're focused on clinical and scientific advances, the VPDR has been more focused on the interaction between the two agencies and the associated challenges. And we have four committees, for the most part, that are focused -- one is the Dose Reconstruction Committee where I'm a member of -- and that's one other thing that's different on the federal law that set this up just like your law where it specified, to some extent, what they wanted on this particular advisory committee, they also put in two of the federal people -- actually members of the Federal Advisory Board, which is kind of interesting. So Tom Pamperin sits on the VA side and sit on the Department of Defense side. But when it actually goes to a formal vote, we then are quiet during that period of time, so we're there basically to provide information and I think get grilled a little bit. But it does make for, I guess, a more collegial working atmosphere on a day-to-day basis. A lot of that board's work is done through subcommittees that meet before the public meetings. And so though we use contract staff to assist, one of the things that I have seen in comparison to, for instance, the board that oversees the energy workers, are we have a number of very technically motivated people. It's fortunate to have one or two retired people on there too that can spend the time to prepare the reports and so forth. But our subcommittee meetings have been -- we're having one, for instance, where we've presented a lot of our dose reconstructions, once again, in some of the studies, also double-blind studies. Just at the end of this month we'll be presenting to the advisory -- subcommittee on dose reconstruction. There's another group on the VA side that hasn't met quite as much on that side and that has two of the former military surgeon generals on it. And then there's a third one that's focused both on the VA and DTRA and that's our quality assurance committee and that's one that's had to wait a little bit longer than the other ones until we get our procedures in place to do the quality. You can't really jump in if you don't have procedures, and so they're probably, of any committee that we're responding to, the one that's still going after us the strongest, probably. And then there's a fourth one, communications, which is a challenging group to be on because, especially with the VA where you've probably seen in the newspapers on the compensation things, claims have risen -- there's a lot of pressure to do that -- and we have a group here that's not directly in the war.

The other advisory board has asked for outreach and where the VA didn't have a database, we did, which we provided. The VA has had mixed feelings about going out and contacting all those veterans again to have them all come in with more claims. So it may be the right thing to do, but you also have to look at your workload and how can you handle it too. So they are taking some communications and paths to do that. When I look at it from a Department of Defense viewpoint, we've done a number of outreaches over the years. We've tried to go out to all those veteran communities. I will tell you, based on those outreaches as compared to all the rest of the radiogenic disease, it does stir up a lot more people. And some of those veterans that we reached out to 20 or 30

years ago continue to come in with letters and inquiries on almost a year-by-year basis. So it adds a lot of workload when you go out and tell people, we have a concern, especially when you're retired, you just sit there and think about it year after year after year, it does add workload. That's not an excuse for doing it, but you do have to realize the impact when we go out and bring into question in people's minds of, did the government do something to me that was inappropriate? Here's our workload. And I show that because I'm going to show you what goes out the other side too. I think it's interesting for a few things. That earlier spike -- you can see the programs when something would hit the newspaper we'd have a lot more business. But the biggest spike that's right there was based on that green book I showed, that National Society of Science came in. What happened based on that, because there was some question -- there was an agreement between the two agencies -- all the cases on dose assessment that hadn't been service connected, came back to (off mike) for a relook, and that's what really grew our backlog along with trying to do our methodologies. Eventually, we were able to bring that down and the other place you see a little bit of a dip is when the VA regional office at Jackson came online to centralize other claims, they were overwhelmed initially trying to get up to speed with all the claims coming in. In fact, what the VA, and perhaps you've heard this, it seemed like a number of their radiation claims came out of the woodwork. They weren't expecting, they had been kind of hidden in the 57 (off mike) so they were a little shocked at how many actually came in. But for the most part it's been a fairly -- with a little bounce around -- it's been -- they've added people and claims are coming in fairly consistently now. So we have a fairly level workload which from the business viewpoint is excellent.

DR. ROYAL: Your methodology has changed since 2000 and some people who weren't compensated in 2000 would presumably be compensated today. Is there any mechanism for --

DR. BLAKE: Yes. Yes. One of the things we do, is we do change that methodology. We go back and look at all previous claims that haven't been compensated, by definition, and what we did was, and I think it's probably, I would say, on the order of 98 to 99 percent correct, was -- it was very advantageous for us in that the VA went through and did this search of all claims that hadn't been service connected and compensated. So they all supposedly came back to us in 2003, 2004, 2005, so from my database viewpoint, when we make a change to methodology, and then we have to say on all historical cases, we only have to go back to about 2003 based on the VA telling us that all claims that didn't go to compensation came back to us. So from that viewpoint, we maintain a very good database. But I'm not going to claim that our database back to 1978 when some of the services are accurate.

DR. ROYAL: Sure.

DR. BLAKE: But using that 2003 figure, I can feel very comfortable if that's correct in what the VA sent back to me – and we'll still see a case or two that may pop in but for the most part I think they got almost all the cases back to us based on that then we spend a lot of time.

I'll tell you when our scientists come up with a method where we're improving our methodology. The government is very focused on rerunning all the previous cases because the one thing we don't want to do is change something and then realize there were some people that didn't get compensated that we need to get back to. So the government part of it -- I try to have my contract side too, but the government team is totally focused on looking at historical cases to see if we do a change in methodology – and there's nothing wrong with rethinking how we do things and trying to improve it, or giving more benefit of the doubt to the veteran, but we're certainly focused on those previous cases that were connected. And in fact, that's one of the things -- we're not only digitizing all our present cases, but we're trying to digitize back to 2003 and all our previous cases there too. So we can easily bring them up to look at, looking at the methodologies.

Here is the outgoing on just dose assessments, not some of the other cases, but what I point out here is we first started the expedited process. The first thing we chose, a little chunk was, looking at prostate cases that came back to us, not on new ones, but that had been basically reworks that were sent back to the VA. That was the first place based on input we gave to our Advisory Board, reviewing figures that we felt comfortable expediting. Based on feeling comfortable on that success and looking at the results, we then moved on to all the expedited -- all the cases of prostate that had come in since the rework. Once again, we presented that in public and here was our methodologies that we're going to do. Each one of those that you see as a yellow box was basically a formal presentation not only to the subcommittees where they could review all the data and Excel spreadsheets and discuss it with us, but then in a (off mike) sessions so veterans could comment on it. Then it came back to us as a formal advisory recommendation from the committee in public and then the two agencies addressed those before we actually started the expedited process.

The next one we did was on skin and there we've actually truncated that because based on those procedures, we were able to sign out over 600 cases just in one letter all together when we came up with that methodology. And then we, based on the skin methodology, we then extended that to cataracts. That was a lot of discussion from the viewpoint of, in our literature searches; we weren't using the same figures that Dr. Otchin was, leaning towards compensation. And obviously, when you're sitting on the medical opinion side, Dr. Otchin has support from the IREP program, but that doesn't include all the cases that he's doing. Some of the non-cancer cases he's spent a lot of time looking at the literature in other cases

and there are other places where he has to make medical interpretations, but knowing what he does -- and he provides that feedback to us -- then we have some idea what the impact is. And why that's truly valuable for the Department of Defense is, I then can say, do I need to spend \$30,000 for a case or can I get that case through for \$2,000? And one of the problems we had before the Veteran's Advisory Board on Dose Reconstruction was the VA did not feel that they should communicate any of that information to us. When I had no idea what the outcomes were, it was hard for us to expedite the cases. I couldn't do that in justification and they still haven't provided outcomes to us, but he did provide the information that he provided to you and based on a medical opinion that we believe led to service connection and some informal discussions, I was able to then to put in case expedited cases.

So I think there's concerns that the two agencies have to keep these separate functions, but there has to be some communication because it was just -- it was breaking the bank of our Federal Treasury, at least in our programs, it was also just inefficient use of a lot of people and it wasn't helping the veterans either. So communications, we do it carefully, but I think it has been invaluable. If you look at -- and I take some figures here -- this is an averaged workload from January to November of 2007, and so the expedited process is in there. This gives you an idea of total number of cases coming in over at DTRA and you see it averaged about 104 per month there, so it we may have 20 or 30 letters coming in per week. Most of them come from the VA. Twenty-five of them came in from veterans. They hadn't filed for compensation with VA or DTRA, they simply want to know, could I be verified if I was going to file, was I actually defined as a participant. So we're answering some of those.

Department of Justice is coming in. You can see it's a small number compared to VA. It bounces up and down depending upon how many people they hire over there to process the cases, but it averaged, at that time, about 12. Department of -- VA sent over 23 cases averaged a month for just verification. These would go for presumptive compensation, no dose associated with that. Under the Code of Federal Regulations, veterans can come in and request a dose even if they're not filing for compensation and that's relatively very straight forward for the dosimetry centers, but in our case we then have to say, to what extent are we going to do that full radiation dose assessment? Are we going to spend \$20,000 or \$30,000 doing a dose assessment when it's just someone asking, you know, so we try to come up with some methods that are reasonable for the veteran but don't soak up a lot of staff time too. Other cases, based on the presumptive cases, we came up with the Nevada Test Site, the NTS, and the Pacific Proving Grounds expedited process.

One of the big changes that we did, and I think it was certainly appropriate, that came out of the green book was an increase in our communication with the veterans. We had previously received information we get from the VA, they may

have given us some of the circumstances -- the veteran received radiation exposure -- we had our own forms if we didn't get that from the VA, on a questionnaire, and we have to go through Office of Management and Budget just like the VA does. Whenever we go out and collect information from a veteran, we have to get permission to do that and maintain it in our databases. We certainly publish in the Federal Register, here's all the information we collect. Here's who can see it, and here's how we handle it. And certainly with the scandals you've seen in the Washington Post, we're very, very sensitive about not losing any Privacy Act data or having it mishandled. But we do collect a little bit of information and we'll ask a veteran to fill questionnaire, we then spend quite a bit of time with our historian staff. We have a number of historians that are experts on past military history and we'll pull the records, for instance, from either the National Personal Records Center in St. Louis -- I actually have two part time contract staff just down there, and we funnel, even though they're our records, at the National Personal Records Center in St. Louis has two major buildings -- one is for military records and one is for civil service records down there. And it's run by the National Archives, but the records they hold are actually owned by the Department of Defense for 75 years. After 75 years, we turn them over to the National Archives, but they're holding them, and I have to pay them, even though they're our records, to pull the records for us.

It's my contract staff that sit in a little office down there, that pull the records from them. We used to FedEx them back and forth, now we digitize them, send them up through our network, and once a week they pull records for us though we normally put a request in, we have to wait two weeks for them to pull the records for us too. So what we try to do is if we're going to verify before a veteran gets compensation, not only do we normally have that information in our database but if we don't, we try to find at least two pieces of paper that say that veteran was there at that particular piece of time and we look there. We also --

MR. SOAS: Would you like some water?

MR. BLAKE: I think I'm okay with coffee. We also spend a lot of time with the archives here at College Park. Those archives are both for the Marine Corps, the Coast Guard, the Navy, Army. Our historian staffs have clearances to get into all these different facilities. We have a truly extensive library out at our facility also. We're trying to create it all -- make it all go digital but we have the library that's been around for many years. There's basically three places where most of the atomic veteran data is maintained, one is out at the Nevada Test Site in the Department of energy side, our facility, and then some of the National Archives facilities, but based on all that research, in many cases we can give a very quick answer. Where some of the most challenging cases are though is how do you prove a negative? A veteran comes in and he may think, well, I went into Japan, but there are certain time periods and where you have to be to go in and it's obviously been over 50 years and there may be a widow who remembers

what her husband said, for instance, and they're absolutely convinced that they ought to be qualified. And so we can spend months pulling data, looking elsewhere because it's those proving the negative cases that are the most difficult and we're trying to give every benefit of the doubt to the veteran.

The other challenge is, as you probably know, there was a fire down in National Personal Records Center. Once again, some of those records come to us kind of burned on the side where they tried to protect them, but we have missing records. The true plus point is, the military kept its amazing types of records they used to keep in the past and you can really find -- most things you find, here's where that service man was each day of the week based on different monitoring (off mike) reports, and so forth too, so in many cases we can do the verification for them too. But where we spend the more time is on the negative cases trying to disprove or prove a negative. And here is what you saw from a viewpoint -- this is our pending case load based on cases that needed to do radiation dose assessments. And as you see there were more cases, but Public Law 108-183 was when the Veteran's Advisory Board was established. It took a while before meetings started to occur and started to give presentations and get the recommendations back from the agency that we could then implement expedited dose processing, but you can see quickly the impact on what we're doing based on expedited dose processing. I wanted to show this slide to you because the next slide I'm going to show that you've probably seen is based on the work that I think is some of the most significant that VACEH did in years past. Certainly in my earlier days at the Naval Dosimetry Center I looked at a lot of those records, at some of the results that were produced by VACEH and when Colonel Wrobel came in, he gave me part of those figures, but I think it's of interest to look at this, looking at how many people from the Department of Defense's viewpoint, from basically World War II on, have received occupational radiation exposure and it's based on, not only when I say radiation dosimetry data, all the (off mike) data, why I say bioassay data, with atomic veterans, we did take a certain amount of urine tests even in Operation Crossroads. The trouble is, when you go back and try to -- scientifically how valid was that data? Those were the early days. You arrived in the field on the other side of the world. It's not like you had a nice laboratory. We used our hospital ships in some cases, but truly, you know, it's not -- the data is of only -- even though we got urine sample data in a few of the cases, it's only a partial help. There's a number of questions on the quality assurance on that type of data. We spent a lot of money based on some Public Laws trying to take urine assay data, 30 or 40 to 50 years later and analyze it too, and we did some, I think some very nice funded studies at Brookhaven National Laboratory where we did -- basically taking samples, looking at plutonium through some sophisticated chemistry techniques, we actually did a fission type of analysis where we tried to fission what was remaining of that plutonium in the urine but once again, based on all the reviews that we did on

that data, what we concluded for our particular veterans was, that type of bioassay data could indicate that they may have been contaminated but we couldn't quantitate the dose off of it.

The few people that have been successful on that, on some of the latest approaches on historical ones have been for the Marshalese but they have lived in a place where they continue to take stuff up where our veterans, it was one time, 50 years ago and you really were at the noise end (off mike) when you're trying to look at background. It just wasn't -- with a few cases of people that were significantly contaminated were the places that we could clearly see it, but the rest of the data just wasn't an indicator, it was not useful for dose. So bioassay data, for the most part, for atomic veterans, has not been useful. However, when you look on the occupational side, every sailor who goes into the Navy's nuclear propulsion program, the first part, they have to do what we call a radiation physical. That's still the one place of all the services where we're doing physicals based on -- and it's driven more now by compensation than a scientific basis, where years ago, there was some basis for doing physicals before and so forth too, because, for instance, we cannot use a physical to say this particular person may -- I should say we do a little bit. Based on previous cancer history and so forth we could say someone might be more radio sensitive and might not qualify as a radiation worker but there's some federal guidance on where you can't look at genetics and try to say, for instance, these people might be more radio sensitive to others and say who you should have as an occupation worker is not going to overwhelm the federal governments. So the basis for radiation physicals that are maintained in the Navy and not in the other services is primarily more for documentation purposes and part of that physical includes a bioassay where we actually do a baseline and Cobalt measurements. That's the predominant concern that develops is what we call crud in the Nuclear Navy Program and where most of the exposure comes from so we do an internal measurement when they go in the program and everyone who gets out of the program gets a bioassay also, so that's documented. In almost all cases, I would say 99.99 percent, there's no dose associated, it's below the value, but there is an ongoing documentation from a compensation viewpoint here. Once again --

DR. OLEINICK: For how many years has that been going on?

DR. BLAKE: It's been going on -- I was doing it in 1978 when I was out in the (off mike) so it's --

DR. OLEINICK: Oh, really good.

DR. BLAKE: -- the Navy's viewpoint is -- the Navy is very different from the other services because nuclear power is the basis for our warships. You've got to have a program that's extremely well documented and they realized from day one if there were concerns about people developing cancer and sensitivity, it

would impact our fleet because our ships need to pull into Liberty Ports and if our allies don't feel that we have a good program, they're not going to let us pull in. And what's been very sensitive just recently is, for the first time we've home ported a nuclear carrier out of Japan. Up until now, just about a year ago, there's always been a non-nuclear carrier because of their sensitivities from Hiroshima, Nagasaki. So for the most part even though some of our own cities don't let our nuclear power ships pull into them, our allies have let us pull in and after you've been at sea for a few months, you really do need to get off that ship.

DR. SOAS: Has New Zealand changed that as well? Or are they still the same?

DR. BLAKE: I don't think so. We had sensitivities there, for instance I'll tell you years ago, we had something called isotropic thermal generators where, for instance, like say in the Antarctic you put an indicator down there and how you powered it was with this Strontium-90 source. Now it's a concern from the terrorist viewpoint but you didn't have to provide any separate power source because as the radioactive material decayed and generated heat, you could convert that to electricity. The Russians used them extensively too in places where you couldn't run electricity or you couldn't put big batteries.

Moving those sources out to get rid of them was a concern because they had no pass zones for us so I think there are still sensitivities down there and I don't – you know, I can remember people pulling into Australia. I don't remember -- I haven't kept up to tell you the truth so I don't know what the (off mike) is but it is a great concern to us.

DR. ROYAL: The Transuranic Registry used to use autopsy data to determine levels of exposure.

DR. BLAKE: Right.

DR. ROYAL: Is there any – would that be useful in terms of the type of veterans?

DR. BLAKE: I don't believe so based on what we've done until now, but I will tell you, if you've been following the press, the first exhumations are occurring now under the Health and Human Services Department of Labor Compensation over Energy Employees Compensation program so there's concerns over there where they're actually pulling people out of their graves now to assay their bodies for contamination. Internal contamination was a greater concern in some of the labs. When we look at – even with all our calculations for the most part -- internal dose has been a small part of the actual component here. What's proving the program here has either been external dose or skin dose. We do lengthy internal dose calculations but normally they're a small part of the actual dose the veteran gets. I would like to just point out a few other things here too. So when we go

over to look at Neil Otchin's data, you'll see over like 50 percent of the cases he's seen is based on that atmospheric detonations is greater than 50 percent.

The Army, Navy, Air Force have large, ongoing programs. If you look at how many dosimeters we're issuing this year to Navy people, for instance, very few go to Marines. There are a few places where we badge them and run bioassay programs on them, but we're badging 55,000 people in the Navy right now. Most of the Navy's regulations are based on similar to the Nuclear Regulatory Commission. We look at what's done in the civilian world and we say we're going to do a little bit better than that, and so the same concept flows over from the viewpoint of, when do you require a person to wear a dosimeter and it's basically based on 10 percent of the annual exposure limit. So if your exposure limit is 5 rem per year in this country and then anyone who would exceed 500 millirem is required to wear a dosimeter. How many people are exceeding 500 millirem per year in the Navy is on the order of less than 2,000, but we're badging 55,000 people. And we look at the cost to process a dosimeter per time, it's like \$3 or \$4 and from my viewpoint, when we look at the cost and then we look at what happens in other compensation programs where you don't document zeroes, we still believe -- and we look at particular cases, for instance, we took dosimeters off of dentists in some cases because we had many years of documented results. They weren't picking up any exposure, but in most other cases, when you look at who's filing compensation programs, we're continuing to monitor zeroes and we think it's a good idea.

The Army monitors about 12,000 people per year and the Air Force, to a lesser extent, monitors 6,000. On some of the compensation decisions where we weren't monitoring around Air Force where there were people guarding weapons, they've come in for compensation and then we can come up with what we feel but we didn't actually have dosimeters on them, and so it brings into question more of the results. So from my viewpoint, I'm trying to coordinate DoD radiogenic disease by providing dosimeters to a greater number is a good way to do the program.

DR. STEVENSON: In particular if you're not sure where the 2,000 are going to come from?

DR. BLAKE: The 2,000 --

DR. STEVENSON: You said --

DR. BLAKE: Oh, yes.

DR. STEVENSON: Although you could probably project where it's going to come from.

DR. BLAKE: Well, we know. And if I could, we analyze that data every year. The highest doses in the Navy come from medical fluoroscopy procedures in our hospitals. Interventional radiology. The second highest level of procedures – our active duty don't pick up the exposures. The people that sit on submarines are basically sitting (off mike) that's shielded from cosmic radiation, but when you have to work at that Naval Nuclear Propulsion plant and tear it apart, that's done onshore and the shipyards that are doing that are primarily civil service people that work at those shipyards. There are only a few active duty there managing it, and only a few of those people actually pick up exposure and no person in the Naval Nuclear Propulsion program in many years has picked up higher than 2 rem. We control that very well. So the only people that have ever, in recent years, exceeded 2 rem have been in our medical facilities and another place that we're going to badge people and watch too is certainly with pregnant females and other concerns there. So there's a few populations that we're more sensitive to and what's happened from a badging viewpoint is, all the commercial nuclear power plants have basically moved to quarterly monitoring where we used to monitor more frequently, and dosimeters have become -- (off mike) maintain as the dosimeter of record, but what we use is electronic pocket dosimeters and in fact, what we've done in the Navy right now is we've gone to one dosimeter. We're pulling our dosimetry readers off ships now where we used to have them on board to read all the TLDs. They're actually being processed ashore, but how we get around that problem -- so the legal record is being done totally independent from ship's companies so there can't be any corruption there. In years past, you'd occasionally -- even with type QA, you would have to worry about did someone change the results and that lead to scandals over in the Department of Energy side where people would write zeroes down or something like that. But we have electric dosimeters there so you can get a real time read out if there's any question or when you make a reactor (off mike) entry so even though it may not be the record of entry, we then compare that against the legal record and so you have an independent verification and then have certain metrics to say, if they're consistent, we feel very comfortable that we're reporting the actual dose. And therefore you run a very tight program. And that information is provided constantly to the sailors, for instance, or any other people so they also have a comfortable feel. And when you do things like that, then you have very few people actually filing for compensation down the line -- if you know you're in a good program.

DR. STEVENSON: Right.

DR. BLAKE: I just would mention on the other things there, you saw 487,000 for atmospheric veterans -- after we did that program, we moved to underground testing for nuclear weapons. There's 50,000 people that were monitored for that, I have yet to see a single person file for compensation for underground testing and there are two reasons -- one, we learned our lessons from atmospheric testing, a little late, but we badged every single person there, secondly, there

was no radioactive fallout. They had to go (off mike) after the bombs were there and we waited for periods of time so there was basically no internal dose.

The highest doses that anyone received out of that 50,000 were less than 2 rem. People felt comfortable that the program was run right. They haven't filed for compensation. So the other program where we see some compensation has come in has been on the Pacific Atoll cleanup where we went in with bulldozers and other types of stuff and it was a hot, humid atmosphere. It's harder to monitor when you get on the stuff, and so that one didn't fall specifically under my agency but because those veterans seem to get moved around, I ended up taking -- I had some flexibility in my programs and I would take responsibility for them for Department of Defense, but we still see some ongoing compensation claims coming from cleaning up the Pacific Atoll and other places like Johnston Island. This then takes -- based that data -- and you skipped the previous one, if I could, that was your work from years ago, but notice some of those figures are similar to what I showed you before, but when you post that through a Public Law back in 1992, it came about, it was still based on pre-1970 data.

There were concerns about where radiogenic disease compensation was going and this committee was the one that presented those results so both the VA and DoD could then try to focus its efforts. I obviously take Neil's data. He does it in a Word document and then I covert it over to Excel and then I'll bring -- the nice thing about what Neil has presented to you over the years is he's actually broken down whether it's been service connected and the cohort. So I knew whether it was an atomic veteran or it was based on let's say fallout coming from Chernobyl for occupational exposure for a service man sitting in Germany or a required medical exam that would be considered occupational exposure, so based on that, I was able to analyze their data and look at the impact on our programs. But we still see, in recent years, the significant impact has been based on atmospheric detonation. I will tell you when Dr. Reeves is reviewing data, he's reviewing both the occupational side for VHA and NTPR data for the medical opinions.

DR. ROYAL: One of our concerns is that Neil is retired. We got a report for this meeting that went through February of 2008. Is someone --

DR. BLAKE: Oh, okay when he retired.

DR. ROYAL: -- keeping track of the cases that we would have a similar report at our next meeting? Or is there going to be a period when we don't have that report and then we have to project that?

DR. BLAKE: I don't know and I guess you'd probably want to pass that back through Ersie on that too.

DR. STEVENSON: Yes, we did.

DR. BLAKE: I mean, I could informally ask but I can't speak for --

DR. ROYAL: We were actually going to write a letter to, I guess it's not the secretary of Ersie --

DR. STEVENSON: The undersecretary.

DR. ROYAL: Undersecretary.

DR. STEVENSON: (off mike) this position.

DR. ROYAL: We're concerned that the VA's side will fall behind.

DR. BLAKE: I will tell you, one of the reasons I was greatly concerned was, at our last Veteran's Advisory Board on Dose Reconstruction, one of the veterans got up to talk. We had issued a radiation dose assessment in like June or July of 2007. His case hadn't been seen yet, so even though Neil retired in February of 2008, there's still dose assessments out there from mid-2007 that we provided that hadn't gone in or medical opinion and so I'm seeing more congressional inquiries based on what's occurring over here.

DR. STEVENSON: But you've done your work. It's backed up.

DR. BLAKE: Right. And that's one reason why I could justify -- even though my bosses didn't necessarily agree -- providing Dr. Reeves, even though I'm providing the funding for him when he's over here working, the Department of Defense is coming over to support VA and cost --

DR. ROYAL: We were going to write a letter.

DR. BLAKE: Right, we certainly appreciate that too, whatever support you can do on that, because we'd like to get out of the VA side. Anyway, you've seen those figures before and I'll go on to the next ones. When you break out Neil's data and just look at the NTPR, I could go through, since we expedited, and look at the impact in expediting and the only thing that's a little thing here is he is not capturing, in recent years, all that data that's going down to VARO Jackson so you're not seeing those cases because they're being down there so he was -- even if whoever's looking at that data, the data that's now being decided down there is not coming up in figures too, you know. But the best I could tell was the impact on pre-expedite vice (off mike), post-expedite. We moved from about 10 percent to 30 percent on service connection, so I saw this as -- talk about, as a win for the veterans, from their viewpoint. From the VA it hasn't had a major financial impact because of the cases and from our viewpoint, at least in my

program, it saved over \$16 million and reduced our backlog and it's an ongoing savings too. So there was significant dollar savings that were reprogrammed back into the war fighting. The dollars that we use in my program are unique in my group in that we color our dollars differently in the Department of Defense, but it's what we call "operations and maintenance" dollars. It's the same dollars that are being used to fight the war and so if we're not using it to do this type of processing, it's going back there. But it's also, if I could, I'm the group that's looked at the most frequently to say, are you using your dollars effectively, because some dollars could not be pulled back to fight the war. When we were talking about shutting down part of the civil service because we didn't have enough money for the Army over in Iraq and so forth, the ones that are looked at on almost a weekly basis where I have to provide RECLAMAS and discuss how I'm using my dollars effectively is in my own program. Other people are being looked at too.

The cost for my program is roughly about \$6 million per year. It's mostly labor costs. In previous years we got out of control. It ran up to about \$12 million. When you look at the total cost of the program from Department of Defense's viewpoint since 1978, in then-year dollars it's gone a little bit over \$200 million. If you put it in fiscal year, using like standard approaches, and we do this so you can convert it into fiscal year '08 dollars, we've spent on the Department of Defense dollars total since the beginning, a little over \$300 million on affecting this program because the natural question that comes into people and certainly to veterans, geeze, why did we spend all this money on the NTPR program? Why didn't we just compensate all the veterans? Well, that's a good question. One, we may not have realized it was going to cost us all this money when we started out, but there's a few other reasons too. A lot of that went into, for instance, technical, historical development. We needed to pull the records in any case so not all that was fruitlessly thrown away. Some could have been done more efficiently.

Secondly, the concern was more than just the atomic veteran program. If you're going to compensate one group then you have to say I'm going to compensate others and we looked at those cohorts there were a lot of other people that could move into cohorts. And I think through the expedited process we've done an appropriate method where we're now trying to give as much as we can towards compensation but also keep it efficient too because you would have busted the bank in other programs if we'd gone that way and then there's impacts of other federal radiogenic disease compensation programs too, so continuously, the National Academy of Science boards have come out and recommended we continue to do dose reconstruction but I think we should do it efficiently and that is, there are places where we can be effective and expediting. Veterans still say, look at all moving into the expedited process, we kind of talked a little bit about this since we've been moving on, but it was based, done in a public forum, what we made clear both in our fact sheets and every sheet that we sent over to the

VA with a copy to the veteran is, that this is not a true dose. This does is based on a theoretical maximum dose vise the veteran's actual dose and we use very strenuous criteria. We can talk about from a QA viewpoint to make sure that this is higher than the actual dose we would calculate. And if there's any question, what we do is we actually do the dose calculation, we compare the two, the expedited dose to the actual radiation dose assessment because there could be a few extenuating circumstances, and then the dose we release to the VA is the higher dose, which in almost all cases is the expedited dose. Where are some of those cases that we're not doing expedited dose processing? Well, for instance if a veteran went to multiple operations, for instance, based on our -- most of it's based on one or two operations -- if he went into seven or eight of them where he could have picked up a lot more exposure, there might be a case where he could have actually gotten more than the expedited process. That one we're going to calculate out and as you might expect, that's a much more time consuming calculation when you have to do all this.

There are other cases where we did not employ -- we'll talk about expedited processing and that was for Hiroshima and Nagasaki. Those veterans did not receive the actual fallout that the other veterans did. They didn't go in until a few months after the actual weapons tests. There was a little concern about re-suspension of radioactive material but most of it had decayed away and in our calculations what we do for Hiroshima and Nagasaki is we use a worst case analysis anyway. We try to say the veterans sitting in, to a great extent, in the hottest spot over Hiroshima and Nagasaki and was there for a certain period of time and that's what we based the doses on anyway, and in most cases, even though it is a lengthy calculation in the math CAD or worksheets that we use, it still only takes us about -- once we have all the information back on what we call the scenario of participation radiation exposure, we can knock that out in an hour or two and then release it. So even doing a full length calculation for Hiroshima and Nagasaki does not take weeks to do. With regards to the skin case, a lot of this was -- what did we use as our upper bound? We looked at acute effects we'd seen and based on the literature search, there's -- obviously, when you do literature searches, there's still some judgment here. We chose 550 rem as what we would say is if a veteran didn't actually document a health record or report any acute effects that he would have had a dose less than that, for skin dose, not whole body dose obviously. And based on what we looked at all our skin doses, that's where we showed our board that we thought we'd set up as an upper bound. We also then, when we were reporting doses, that veteran might be coming back with other diseases too. We also gave upper bound on penetrating dose for those veterans and you saw that in the records where we reported like for instance, perhaps a half a rem neutron dose. Most of those veterans didn't receive, they were far enough away that they did not receive any significant neutron dose, but we tried to look at the worst case. And also, the largest gamma dose that they could have picked up in fall out if it was penetrating was about on the order of 17 to 18 rems. So that's what we applied to these cases,

but what drives the program here in most of the skin cancer cases was 550 rem as we'll see, was sufficient to (off mike) service connector.

DR. ROYAL: Now one of the things that seems funny about the way the VA came (off mike) doses, they don't seem to distinguish between all of the skin doses, one square centimeter of skin.

DR. BLAKE: No, not that I know of.

DR. ROYAL: Because the probability of causation would be dependent on the area of skin that was exposed.

DR. BLAKE: It probably is. I don't know if that's -- in the IRA program, I don't know if that takes into account --

DR. ROYAL: It doesn't.

DR. BLAKE: Yes, I don't think it does. That's certainly true, but I guess that's a simplification that doesn't come into the process. So here are some of our bases for looking at -- you can run these figures and you get a whole range, but if you're looking at screening doses, the worst case, basically, for these scenarios, here's what we saw for skin cancer and here's what we saw for prostate cancer. And this drove a lot of the recommendations. If you're going to give a skin dose of 550 rem out there, almost all those cases are going to fall in with just a few boundary cases not falling in that we look at. In fact, Neil's guidance here takes that into account on those few exceptions (off mike).

Prostate case, most of the cases that we calculated when we looked at service people, when we actually used the IREP program and looked at the ages that we had, they varied between 60 and 120 rem, none of our prostate -- almost none of our prostate doses that we calculated for many years came close to that on penetrating doses, and so we chose -- we said, when we reported a dose, that 60 rem is probably -- the prostate does not appear based on historical data to be radiogenic. I just had a paper forwarded to me from Dr. Schauer over at NCRP that they just published in the British Cancer Journal of some new findings on prostate radiogenicity.

DR. ROYAL: It's just (off mike).

DR. BLAKE: Oh.

DR. ROYAL: Following diagnostic radiology --

DR. BLAKE: So you've seen the paper? Okay. All right. He couldn't get the PDF of it. All he could do was do the abstracts. I'm not sure why he was having problems. But in any case, the --

DR. ROYAL: Wasn't it like the British Journal of Radiology or something?

DR. BLAKE: No, it was a different journal, that's why I thought -- I'll forward the reference, but in any case, based on what we've done, you can see most of the prostate cancer, for the most part, based on the doses our veterans are receiving, would not qualify and so why spend a lot of time doing these calculations?

DR. ROYAL: I didn't think melanoma was in (off mike) so I'm a little bit confused about why for (off mike) you have a different number than basal cell.

DR. BLAKE: Well, I don't know if it's an IREP or not. What it's based on is our DTRA technical report and Dr. Coker, who did that work down there, I think most of the stuff was in IREP but I wouldn't guaranty that everything that's an IREP is necessarily in that DTRA technical report, he may have expanded it into one or two categories that aren't used in that calculation, but it was based on that same methodology where he came up with those values.

DR. ROYAL: Because it makes sense on the (off mike) it's 5.9 (off mike) then basal cell (off mike).

DR. BLAKE: From my viewpoint as a health physicist, I didn't try to understand in great detail what Dr. Coker did. Basically, we asked him to do the screening doses and then I didn't have to go through and do all the calculations and then I could use it as a value when we did our dose assessments.

We then moved on to what our board asked us to look at for an expedited process based on our (off mike) was, look at the two extremes -- and a similar board does over at the other side -- if it's clear cut that it's going to go to compensation, do that, and on the other side too, then those would be natural categories and in fact prostate was sitting on the other side. And so doing a similar analysis that we could show that in most cases, it would not lead to compensation and we expedited the process. What became a little more interesting then was after had done skin and prostate was moving on to the next category, we had about 60 outstanding cases of cataract cases that were over

there that we needed to go through and we've been calculating these out for long, lengthy periods of time. The difficulty is, is we spend a lot of time in the literature looking, was on what type of transfer factors you have. There's -- whether it's been EPA or other groups, because we're concerned with fallout and how do you actually say, if it's fallen on the body, how much actually may get

transferred into the lens of the eye and so forth too, and eventually irradiate, in our cases, posterior subcapsular cataracts, though it wasn't always clear from the VA coming over sometimes that they were PSC cataracts.

DR. STEVENSON: I was going to ask, is (off mike) compensation limited to just posterior capsule or is it defined?

DR. ROYAL: I think when we've asked O'Neill in the past, it's supposed to be posterior subcapsular cataracts but --

DR. STEVENSON: I wasn't sure how rigorously that was actually --

DR. BLAKE: We get cases that came over for us and it wasn't clear --

DR. STEVENSON: Because I mean otherwise, it's a huge potential population, obviously.

DR. BLAKE: Right. It is. But two things, and we had a lot of discussions on our side because we would send some of those cases back and then if they didn't have the claim, then if the thing just sat there for years as they were trying to -- so eventually what our policy became on discussions that if the VA forwards it to us and it's not clear to us, we have assumed that they made a determination (off mike) -- I'm not going to get into that.

We spent a lot of time in the early years between department -- since I came in having disagreements on things, between the two agencies, and eventually you realized, you know, that's not helping the veterans, and we're going to come up with a method that's going to work and so we're not longer disagreeing. If the VA forwards that over to us to process and even though we can't quite see it's defined that way, we're assuming it's posterior subcapsular and then we assign a dose. One reason we argued on some of those early cases, like the cases that came in for arthritis and other things that were truly (off mike) in many cases non radiogenic diseases, we had no idea how Neil was going to actually do the medical opinions based on that and we did a lot of -- that's where Dr. Reeves spent a lot of time on non radiogenic diseases because I was trying to look at how could I expedite things and should I be doing these cases that were never going to go to compensation, but the difficulty was, the VA sitting on the other side has to say, how do I defend not doing that calculation? So the two agencies are a little bit at loggerheads. We spend a lot of time. We try to have our advisory board come in to weigh in, but they basically put it back in our laps and said the two agencies ought to decide how to do it, so we decided just to process all the cases sent by the VA. There was some disagreements on the DoD side, but the bottom line was, if we're disagreeing we don't want to leave the veterans there, so we did something similar. Here's a judgment call though once again on,

you have these doses, what is the transfer factor? We took the best thing we could in the literature.

Based on those things we showed to our advisory board, here's what we see in the literature, here's what, based on these transfer factors, here's the 550 basically came down to 28 rem based on what we saw in the literature and that was our justification. We also said to them, well initially we thought, they're not going to get compensated but Neil came in with some interesting concepts, oh fine, and now it becomes the other extreme. They are going to go to compensation. The concerns about lots of cataracts cases, we don't see that many coming through from the VA. We did have that backlog of 60 at one time which we basically went through and now we may see maybe one or so every other month. So I don't think it's breaking the bank. I don't know what (off mike) better today what money flows out there, but I don't, based on the number of cases going through, I don't think it's been significant. Let's give some of the other things that were involved.

The uncertainties and facial contamination, skin retention factors, particle size comes into it, how much gets blown up from descending fall out, resuspended fall out -- you do the best thing you can. You do a peer review process on it, but it's still a judgment call. We presented figures and people couldn't -- might argue with them, but we've documented how we've tried to do it and I'll leave it at that what our judgments were. So in summary, certainly the expedited process has given faster responses to our veterans and the VA and I said they're almost all completed within six months. Well, in the last 6 months, the oldest case, I think, got to 140 days, but the oldest one right now is 100 days on our side, so they're moving through rapidly. Average time continues to be 40 days on our side now after expediting that, it certainly has show the significant increase in favorable atomic veteran VA medical payments. I quoted the cost savings (off mike) were certainly appreciated and our congressional inquiries dropped from greater than 50 percent for the agency down to just a percent or two. So it's become very quiet -- comparatively quiet on our side. We want to continue the concept of, obviously, expediting -- doing this processing very efficiently for our veterans. We do need to revise our Code of Federal Regulations that the VA tells me can take a significant period of time to get through the process.

I would also like to -- at our last meeting, we'd had recommendations from the VBDR Veterans Advisory Board up until the last it was the first time we did not get any recommendations. The VA has still got some recommendations. It's my hope not to receive any more recommendations from the VA because that's what the directors look very formally. The real end product is the recommendations that come from an advisory board. But, on the other hand, I think we're still a little bit on a tightrope of trying to produce results that they're looking for, that if we don't keep producing the documented data for our standard operating

procedures for quality assurance analysis that I haven't gone into a great extent here.

And the results that are there, that we may have some future recommendations and so it is my hope that the Veteran's Advisory Board -- we're having a meeting in September where I'll be once again showing what we've done on all other recommendations. We accepted all the recommendations that were given to us from Department of Defense and thought they were appropriate and have acted on all of them. VA accepted maybe about 2/3 of their recommendations and are acting on those. We do hope that the board, the Veteran's Advisory Board, will shut down by the end of fiscal year '09, but that will be based on public discussion and when I say 'shut down', since this was established by congress through a Public Law, we've gone through a general counsel what methods we could -- actually, you have to change the law but what you basically do is the board goes into a holding pattern and may not meet for a while until the laws actually get changed. There's been briefs already up on the Hill with discussions to keep the VA subcommittees informed of where we're going and we hope that the next meeting will be in Washington, D.C., that some of the staffers and elected representatives will come to see that and address any comments they might have on whether they want to keep the board going.

DR. ROYAL: Well, thank you very much. It was very informative.

DR. OLEINICK: Very helpful.

DR. BLAKE: Good. Well, it was a pleasure to come over here as a speaker, as a guest when I used to sit on the side.

## SUMMARY OF ACTION ITEMS

**1. ACTION ITEM:** Dr. Soas was tasked with preparing a letter to the Secretary addressing the need to hire a replacement for Dr. Otchin.

**ACTION TAKEN:** Dr. Soas prepared a draft letter sent a draft letter to VA and Requested

**2. ACTION ITEM:** Provide the Committee with the verbatim transcript and minutes more timely to help with the planning of the next scheduled meeting.

**ACTION TAKEN:** Vertabim transcript accomplished. Incomplete draft of minutes sent on September 9, 2008, with a promise to have them completed by September 17.

**3. ACTION ITEM:** Invite Dr. McDiarmid (previously spelled as Dr. McDormitt), Director of Depleted Uranium program at the VAMC Baltimore, she is an occupational health physician from the University of Maryland), and/or Dr. Squibb (consultant to the Capstone study). This was assigned to Ms. Farber.

**ACTION TAKEN:** Invitation accepted. Dr. Katherine Squibb and Dr. Carey Dorsey will present at the October 2008 meeting on DU.

**4. ACTION ITEM:** The Committee will prepare a letter to the Secretary requesting assistance in getting someone from the Marines to address the Committee regarding submariners. This was assigned to Dr. Soas.

**ACTION TAKEN:** None

**5. ACTION ITEM:** Contact Dr. Colton to see if he is willing to serve as a lay member on this Committee. This task was assigned to Ms. Farber.

**ACTION TAKEN:** Dr. Colton was contacted and agreed to return to the Committee as a lay member.

**6. ACTION ITEM:** All Committee members were asked to submit an updated CV to Ms Farber as soon as possible.

**ACTION TAKEN:** To date, Drs. Epp, Stevenson, and Royal have responded.

**7. ACTION ITEM:** Hold article number 03/08-24, entitled, "A short review of model selection techniques for radiation epidemiology," Radiat Environ Biophys 46(3): 205-13 by Dr. Walsh for the next meeting to be reviewed by Dr. Colton.

ACTION TAKEN: NA

**8. ACTION ITEM:** Invite the Secretary to an upcoming meeting.

ACTION TAKEN: An invitation has been extended.

**9. ACTION ITEM:** Invite the Secretary to an upcoming meeting.

ACTION TAKEN: An invitation has been extended.

### **UNASSIGNED SUGGESTION**

**UNASSIGNED SUGGESTION:** Seek a speaker to speak on cataracts, Dr. Frank Kusenada was suggested.

### **FUTURE MEETING DATES**

**FUTURE MEETING DATES:** October 27-28, 2008 and March 23-24, 2009

Review Articles, July 17-18, 2008

<b>Number</b>	<b>Reference</b>	<b>Reviewer</b>
<b>03/08-1</b>	Parker, D. D. and J. C. Parker (2007). "Estimating radiation dose from time to emesis and lymphocyte depletion." <i>Health Phys</i> 93(6): 701-4.	Takafuji
<b>03/08-2</b>	Nakashima, M., H. Kondo, et al. (2008). "Incidence of multiple primary cancers in Nagasaki atomic bomb survivors: association with radiation exposure." <i>Cancer Sci</i> 99(1): 87-92.	Stevenso
<b>03/08-3</b>	Megid, W. A., M. G. Ensenberger, et al. (2007). "A novel method for biodosimetry." <i>Radiat Environ Biophys</i> 46(2): 147-54.	Takafuji
<b>03/08-4</b>	Han, W., L. Zhu, et al. (2007). "Elevated sodium chloride concentrations enhance the bystander effects induced by low dose alpha-particle irradiation." <i>Mutat Res</i> 624(1-2): 124-31.	Oleinick
<b>03/08-5</b>	Beyan, C., K. Kaptan, et al. (2007). "The effect of radiologic imaging studies on the risk of secondary malignancy development in patients with Hodgkin lymphoma." <i>Clin Lymphoma Myeloma</i> 7(7): 467-9.	Stevenso
<b>03/08-6</b>	Lin, C. and F. R. Loberiza, Jr. (2007). "Low-dose radiation and secondary malignancy: is there a causal relationship?" <i>Clin Lymphoma Myeloma</i> 7(7): 450.	Stevenso
<b>03/08-7</b>	Anspaugh, L. R. (2007). "Doses to members of the general public and observed effects on biota: Chernobyl Forum update." <i>J Environ Radioact</i> 96(1-3): 13-9.	Royal
<b>03/08-8</b>	Balonov, M. I. (2007). "The Chernobyl Forum: major findings and recommendations." <i>J Environ Radioact</i> 96(1-3): 6-12.	Royal
<b>03/08-9</b>	Puskin, J. S. (2008). "What can epidemiology tell us about risks at low doses?" <i>Radiat Res</i> 169(1): 122-4.	Stevenso
<b>03/08-10</b>	Hung, R. J., P. Boffetta, et al. (2006). "Sequence variants in cell cycle control pathway, X-ray exposure, and lung cancer risk: a multicenter case-control study in Central Europe." <i>Cancer Res</i> 66(16): 8280-6.	Oleinick
<b>03/08-11</b>	Hodgson, D. C., E. S. Koh, et al. (2007). "Individualized estimates of second cancer risks after contemporary radiation therapy for Hodgkin lymphoma." <i>Cancer</i> 110(11): 2576-86.	Stevenso
<b>03/08-12</b>	Chang, P. Y., K. A. Bjornstad, et al. (2007). "Particle radiation alters expression of matrix metalloproteases resulting in ECM remodeling in human lens cells." <i>Radiat Environ Biophys</i> 46(2): 187-94.	Royal
<b>03/08-13</b>	Shahidi, M., H. Mozdarani, et al. (2007). "Radiation sensitivity of leukocytes from healthy individuals and breast cancer patients as measured by the alkaline and neutral comet assay." <i>Cancer Lett</i> 257(2): 263-73.	Stevenso
<b>03/08-14</b>	Sigurdson, A. J., P. Bhatti, et al. (2007). "Polymorphisms in apoptosis- and proliferation-related genes, ionizing radiation exposure, and risk of breast cancer among U.S. Radiologic Technologists." <i>Cancer Epidemiol Biomarkers Prev</i> 16(10): 2000-7.	Stevenso
<b>03/08-15</b>	Kalnina, I., T. Zvagule, et al. (2007). "Structural changes in lymphocytes membrane of Chernobyl clean-up workers from Latvia." <i>J Fluoresc</i> 17(6): 633-8.	Takafuji
<b>03/08-16</b>	Zatsepin, I., P. Verger, et al. (2007). "Down syndrome time-clustering in January 1987 in Belarus: link with the Chernobyl accident?" <i>Reprod Toxicol</i> 24(3-4): 289-95.	Soas

## Review Articles, July 17-18, 2008

Number	Reference	Reviewer
03/08-17	Rithidech, K. N., L. Honikel, et al. (2007). "mFISH analysis of chromosomal damage in bone marrow cells collected from CBA/CaJ mice following whole body exposure to heavy ions (56Fe ions)." <i>Radiat Environ Biophys</i> 46(2): 137-45.	Oleinick
03/08-18	Ueno, S., T. Kashimoto, et al. (2007). "Assessment of DNA damage in multiple organs of mice after whole body X-irradiation using the comet assay." <i>Mutat Res</i> 634(1-2): 135-45.	Oleinick
03/08-19	Anderson, J. L., H. B. Spitz, et al. (2007). "Characterization of internal exposure to enriched uranium at a former gaseous diffusion plant." <i>Health Phys</i> 93(6): 636-44.	Soas
03/08-20	Arfsten, D. P., E. R. Wilfong, et al. (2007). "Evaluation of the effect of implanted depleted uranium (DU) on adult rat behavior and toxicological endpoints." <i>J Toxicol Environ Health A</i> 70(23): 1995-2010.	Soas
03/08-21	Burger, J., M. Gochfeld, et al. (2007). "Scientific research, stakeholders, and policy: continuing dialogue during research on radionuclides on Amchitka Island, Alaska." <i>J Environ Manage</i> 85(1): 232-44.	Oleinick
03/08-22	Ibrulj, S., S. Haveric, et al. (2007). "Chromosome aberrations as bioindicators of environmental genotoxicity." <i>Bosn J Basic Med Sci</i> 7(4): 311-6.	Soas
03/08-23	Schimmack, W., U. Gerstmann, et al. (2007). "Long-term corrosion and leaching of depleted uranium (DU) in soil." <i>Radiat Environ Biophys</i> 46(3): 221-7.	Soas
03/08-24	Walsh, L. (2007). "A short review of model selection techniques for radiation epidemiology." <i>Radiat Environ Biophys</i> 46(3): 205-13.	Oleinick
03/08-25	Baker, P. J. and D. G. Hoel (2007). "Meta-analysis of standardized incidence and mortality rates of childhood leukaemia in proximity to nuclear facilities." <i>Eur J Cancer Care (Engl)</i> 16(4): 355-63.	Soas
03/08-26	Kaatsch, P., C. Spix, et al. (2008). "Leukaemia in young children living in the vicinity of German nuclear power plants." <i>Int J Cancer</i> 122(4): 721-6.	Soas
03/08-27	Ito, M., Y. Shibamoto, et al. (2007). "Low-dose whole-body irradiation induced radioadaptive response in C57BL/6 mice." <i>J Radiat Res (Tokyo)</i> 48(6): 455-60.	Oleinick
03/08-28	Liu, G., P. Gong, et al. (2007). "Apoptotic cell death induced by low-dose radiation in male germ cells: hormesis and adaptation." <i>Crit Rev Toxicol</i> 37(7): 587-605.	Oleinick
03/08-29	Le, M. H. (2007). "Polonium 210, exposed." <i>J Med Toxicol</i> 3(2): 82-4.	Royal
03/08-30	Vogel, H., P. Lotz, et al. (2007). "Ionizing radiation in secret services' conspirative actions." <i>Eur J Radiol</i> 63(2): 263-9.	Royal
03/08-31	Cardis, E. (2007). "Commentary: Low dose-rate exposures to ionizing radiation." <i>Int J Epidemiol</i> 36(5): 1046-7.	Stevenso
03/08-32	Krestinina, L. Y., F. Davis, et al. (2007). "Solid cancer incidence and low-dose-rate radiation exposures in the Techa River cohort: 1956-2002." <i>Int J Epidemiol</i> 36(5): 1038-46.	Stevenso
03/08-33	Blettner, M., B. Schlehofer, et al. (2007). "Medical exposure to ionising radiation and the risk of brain tumours: Interphone study group, Germany." <i>Eur J Cancer</i> 43(13): 1990-8.	Takafuji
03/08-34	Brenner, D. J. and E. J. Hall (2007). "Computed tomography--an increasing source of radiation exposure." <i>N Engl J Med</i> 357(22): 2277-84.	Royal

Review Articles, July 17-18, 2008

Number	Reference	Reviewer
03/08-35	Brody, A. S., D. P. Frush, et al. (2007). "Radiation risk to children from computed tomography." <i>Pediatrics</i> 120(3): 677-82.	Stevenso
03/08-36	Dendy, P. P. (2008). "Radiation risks in interventional radiology." <i>Br J Radiol</i> 81(961): 1-7.	Soas
03/08-37	Tubiana, M. (2008). "Computed tomography and radiation exposure." <i>N Engl J Med</i> 358(8): 850; author reply 852-3.	Royal
03/08-38	Little, M. P., E. J. Tawn, et al. (2008). "A systematic review of epidemiological associations between low and moderate doses of ionizing radiation and late cardiovascular effects, and their possible mechanisms." <i>Radiat Res</i> 169(1): 99-109.	Stevenso
03/08-39	Vrijheid, M., E. Cardis, et al. (2007). "Mortality from diseases other than cancer following low doses of ionizing radiation: results from the 15-Country Study of nuclear industry workers." <i>Int J Epidemiol</i> 36(5): 1126-35.	Soas
03/08-40	Karipidis, K. K., G. Benke, et al. (2007). "Occupational exposure to ionizing and non-ionizing radiation and risk of non-Hodgkin lymphoma." <i>Int Arch Occup Environ Health</i> 80(8): 663-70.	Soas
03/08-41	Chen, T., K. A. Burke, et al. (2007). "IL-12 facilitates both the recovery of endogenous hematopoiesis and the engraftment of stem cells after ionizing radiation." <i>Exp Hematol</i> 35(2): 203-13.	Takafuji
03/08-42	Harikumar, K. B. and R. Kuttan (2007). "An extract of <i>Phyllanthus amarus</i> protects mouse chromosomes and intestine from radiation induced damages." <i>J Radiat Res (Tokyo)</i> 48(6): 469-76.	Takafuji
03/08-43	Hosseinimehr, S. J. (2007). "Trends in the development of radioprotective agents." <i>Drug Discov Today</i> 12(19-20): 794-805.	Takafuji
03/08-44	Dyomina, E. A. and N. M. Ryabchenko (2007). "Increased individual chromosomal radiosensitivity of human lymphocytes as a parameter of cancer risk." <i>Exp Oncol</i> 29(3): 217-20.	Oleinick
03/08-45	Limoli, C. L., E. Giedzinski, et al. (2007). "Redox changes induced in hippocampal precursor cells by heavy ion irradiation." <i>Radiat Environ Biophys</i> 46(2): 167-72.	Takafuji
03/08-46	Sasano, N., A. Enomoto, et al. (2007). "Free radical scavenger edaravone suppresses x-ray-induced apoptosis through p53 inhibition in MOLT-4 cells." <i>J Radiat Res (Tokyo)</i> 48(6): 495-503.	Takafuji
03/08-47	Benjamin, C. L. and H. N. Ananthaswamy (2007). "p53 and the pathogenesis of skin cancer." <i>Toxicol Appl Pharmacol</i> 224(3): 241-8.	Oleinick
03/08-48	Foulkes, W. D. (2007). "p53--master and commander." <i>N Engl J Med</i> 357(25): 2539-41.	Oleinick
03/08-49	Stewart, J., Y. H. Ko, et al. (2007). "Protective effects of L-selenomethionine on space radiation induced changes in gene expression." <i>Radiat Environ Biophys</i> 46(2): 161-5.	Takafuji
03/08-50	Tawar, U., S. Bansal, et al. (2007). "Nuclear condensation and free radical scavenging: a dual mechanism of bisbenzimidazoles to modulate radiation damage to DNA." <i>Mol Cell Biochem</i> 305(1-2): 221-33.	Takafuji
03/08-51	Karagas, M. R., H. H. Nelson, et al. (2007). "Squamous cell and basal cell carcinoma of the skin in relation to radiation therapy and potential modification of risk by sun exposure." <i>Epidemiology</i> 18(6): 776-84.	Stevenso

Review Articles, July 17-18, 2008

<b>Number</b>	<b>Reference</b>	<b>Reviewer</b>
<b>03/08-52</b>	Burns, F. J., M. S. Tang, et al. (2007). "Induction and prevention of carcinogenesis in rat skin exposed to space radiation." <i>Radiat Environ Biophys</i> 46(2): 195-9.	Oleinick
<b>03/08-53</b>	Charles, M. W. (2007). "Radon exposure of the skin: I. Biological effects." <i>J Radiol Prot</i> 27(3): 231-52.	Royal
<b>03/08-54</b>	Charles, M. W. (2007). "Radon exposure of the skin: II. Estimation of the attributable risk for skin cancer incidence." <i>J Radiol Prot</i> 27(3): 253-74.	Royal
<b>03/08-55</b>	Hellweg, C. E. and C. Baumstark-Khan (2007). "Getting ready for the manned mission to Mars: the astronauts' risk from space radiation." <i>Naturwissenschaften</i> 94(7): 517-26.	Stevenson
<b>03/08-56</b>	Kennedy, A. R., J. Guan, et al. (2007). "Countermeasures against space radiation induced oxidative stress in mice." <i>Radiat Environ Biophys</i> 46(2): 201-3.	Takafuji
<b>03/08-57</b>	Chin, F. K. (2007). "Scenario of a dirty bomb in an urban environment and acute management of radiation poisoning and injuries." <i>Singapore Med J</i> 48(10): 950-7.	Royal
<b>03/08-58</b>	Orecchia, R., G. Lucignani, et al. (2008). "Prenatal irradiation and pregnancy: the effects of diagnostic imaging and radiation therapy." <i>Recent Results Cancer Res</i> 178: 3-20.	Soas
<b>03/08-59</b>	Patel, S. J., D. L. Reede, et al. (2007). "Imaging the pregnant patient for nonobstetric conditions: algorithms and radiation dose considerations." <i>Radiographics</i> 27(6): 1705-22.	Soas
<b>03/08-60</b>	Stalberg, K., B. Haglund, et al. (2007). "Prenatal X-ray exposure and childhood brain tumours: a population-based case-control study on tumour subtypes." <i>Br J Cancer</i> 97(11): 1583-7.	Stevenson
<b>03/08-61</b>	Zablotska, L. B., T. I. Bogdanova, et al. (2008). "A cohort study of thyroid cancer and other thyroid diseases after the Chernobyl accident: dose-response analysis of thyroid follicular adenomas detected during first screening in Ukraine (1998-2000)." <i>Am J Epidemiol</i> 167(3): 305-12.	Royal
<b>03/08-62</b>	Baverstock, K. (2007). "The recognition of childhood thyroid cancer as a consequence of the Chernobyl accident: an allegorical tale of our time?" <i>J R Soc Med</i> 100(9): 407-9.	Royal
<b>03/08-63</b>	Brzezianska, E., D. Pastuszak-Lewandoska, et al. (2007). "Rearrangements of NTRK1 oncogene in papillary thyroid carcinoma." <i>Neuro Endocrinol Lett</i> 28(3): 221-9.	Royal