

**U.S. Environmental Protection Agency**  
**Science Advisory Board**  
**Radiation Advisory Committee (RAC)**  
**Augmented for Uranium In-Situ ISL/ISR Advisory**  
Summary Minutes of Public Conference Call Meeting  
September 6, 2011

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**Committee:** U.S. Environmental Protection Agency's (EPA's) Science Advisory Board (SAB) Radiation Advisory Committee (RAC ) augmented for advisory review of EPA's draft report "*Considerations Related to Post-Closure Monitoring of Uranium In-Situ Leach/In-Situ Recovery (ISL/ISR) Sites,*" June 2011. (See Roster. Please note that the superscript numbers here and elsewhere in the text refer to the Materials Cited on the last page of these minutes)<sup>1</sup>.

**Date and Time:** Tuesday, September 6, 2011 from 1:00 p.m. to 4:00 p.m. Eastern Daylight Time (See Federal Register Notice)<sup>2</sup>.

**Location:** This is a conference call with no location announced. All participants were connected via the conference lines.

**Purpose:** The purpose of this public conference call meeting<sup>1</sup> is for the Augmented Radiation Advisory Committee (RAC. See Roster)<sup>1</sup> to discuss the augmented RAC's working draft advisory dated August 25, 2011 related to uranium and thorium in-situ leach recovery and post-closure stability monitoring<sup>3</sup>. The request for the advisory and the charge questions is contained in the June 2, 2011 memorandum request<sup>4</sup> from Michael P. Flynn, Director, EPA's Office of Radiation and Indoor Air (ORIA) to Dr. Vanessa Vu, Director of the Science Advisory Board (SAB) Staff Office. As the discussion summary below indicates, the RAC focused on review of their August 25, 2011 public draft advisory.

**Participating RAC Augmented Members:** Dr. Bernd Kahn, RAC Chair, Dr. Thomas B. Borak, Dr. Thomas Borch, Dr. Shih-Yew Chen, Dr. June T. Fabryka-Martin, Dr. Thomas E. Johnson, Dr. Jonathan M. Links, Mr. Bruce A. Napier, Dr. Brian A. Powell, Dr. Dale L. Preston, Dr. Daniel O. Stram. Not Present (due to travel or scheduling conflicts): Dr. Susan M. Bailey, Dr. Douglas B. Chambers, Dr. Faith G. Davis, Dr. R. William Field, and Dr. William F. Morgan.

**SAB Staff Office:** Dr. K. Jack Kooyoomjian, Designated Federal Officer (DFO) for the RAC Augmented for this activity participated.

**EPA Staff Attendees:** Members of the EPA Office of Radiation and Indoor Air (ORIA)

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<sup>1</sup> See the July 12, 2011 conference call meeting minutes where the Augmented RAC discussed the planning for the July 18 & 19, 2011 meeting, discussed the charge questions, determined if the review and background materials provided by the Agency were adequate to respond to the charge questions, requested specific items to be presented or clarified during their presentation of July 18, 2011, heard from the public regarding this review topic, and formally began this review activity. Please see also the minutes to the July 18 & 19, 2011 meeting.

Washington, DC Staff Office included Dr. Mary E. Clark, Mr. Kenneth S. Czyscinski, Ms. Andrea K. Cherepy, Mr. Thomas Peake, and Ms. Cassandra Strande.

**Other Public Attendees:** The members of the public who identified themselves as being on the line included the following: Mr. John Cash, Vice President Regulatory Affairs, Exploration & Geology, Ur-Energy (USA), Inc, Casper, Wyoming; Mr. Steve Cohen, Team Leader Licensing, U.S. NRC, Rockville, MD, Mr. Douglas P. Guarino, Associate Editor, Inside EPA; Mr. John L. Saxton, Hydrogeologist, Uranium Recovery Licensing Branch, US NRC, Rockville, MD; Dr. Elise A. Striz, Hydrogeologist, Uranium Recovery Licensing Branch, US NRC, Rockville, MD, and Bill Thiber, SC&A (EPA Contractor).

**Meeting Summary:** The meeting followed the issues and general timing as presented in the meeting agenda<sup>5</sup>, except as noted in these minutes with modest time adjustments. Written public comments were not provided to the augmented RAC for this meeting. Written comments were provided for the July 12 and July 18 and 19, 2011 meetings on this topic, and were posted onto the SAB Website (<http://www.epa.gov/sab>).<sup>7</sup> Verbal comments were provided by the public at this and the previous meetings (see text below for a summary of the verbal comments and discussion).

**Welcome and Introductions:** Dr. K. Jack Kooyoomjian opened the meeting at 1:00 p.m. with identification of the participants logging into the call, with opening remarks, and an introduction of himself as the Designated Federal Officer (DFO) for the Radiation Advisory Committee (RAC) augmented for the advisory review of EPA's draft technical document entitled "*Considerations Related to Post-Closure Monitoring of Uranium In-Situ Leach/In-Situ Recovery (ISL/ISR) Sites.*" June 2011. He explained the purpose of this conference call is to discuss and seek clarification of draft text of the RAC's advisory, dated August 25, 2011, as well as to receive public commentary. The committee discussed changes and needed additions to the current draft text of the advisory without specific reference to page and line number edits at this stage of the process.

Dr. Kooyoomjian advised the participants that the SAB operates under the requirements of the Federal Advisory Committee Act (FACA) and conducts business under the auspices of the chartered SAB. Consistent with FACA and with EPA policy, the deliberations of the augmented RAC are conducted in public meetings, for which advance notice is given, and where he is present as DFO to ensure that the requirements of FACA are met, including the requirements for open meetings, for maintaining records of deliberations of the augmented RAC, and making available the public summaries of meetings, as well as providing opportunities for public comment.

Dr. Kooyoomjian also noted that the members of the augmented RAC were in compliance with Federal ethics and conflict-of-interest laws that apply to them. Dr. Kooyoomjian further noted that Ethics Training was completed by the RAC and all augmented participants and is on file at the SAB, that there is no need for disclosure at this time, other than the individual participants to briefly introduce themselves as present at this public conference call

meeting. He advised that there is no particular matter that may pose a potential conflict of interest, that each participant had disclosed relations and experiences to the issues pertaining to the advisory discussions that have thus far taken place and will occur today. Prior to the discussions, each RAC participant identified themselves as present as the DFO announced the roster. Other participants, including the Agency staff and the public identified themselves as present, and their affiliation.

In preparation for this meeting, the SAB/RAC participants who provided written comments, which were posted onto the SAB Website are Dr, Brian Powell<sup>6</sup>, Dr. Daniel Stram<sup>7</sup>, Dr. Thomas Borch<sup>8</sup> and Dr, Douglas Chambers<sup>9</sup>. (Please note that Dr. Chambers was unable to attend the September 6, 2011 public conference call, but provided his written comments for consideration by the RAC).

Dr. Bernd Kahn, Chair of the augmented RAC, provided some brief introductory remarks at 1:18 p.m. and thanked everyone for their inputs into the August 25, 2011 working draft advisory<sup>3</sup>. He asked if the committee members had any additional suggestions or ideas pertaining to content, format or broad issues that they might wish to highlight up front to the entire RAC and the public participants. Dr. Jonathan Links identified a broad issue pertaining to spatial and temporal models (the 30,000 foot view). The issue he presented is that the spatial and temporal models have not been sufficiently articulated in the Agency's draft technical report, and his concern is with the deeper issue whether such articulation may not yet have been developed. Dr. Bernd Kahn reassured him and the participants that some of these models do, in fact, exist and can be applied to answer the specific charge question (CQ) whether ground water is reaching or not reaching equilibrium.

Dr. S.Y. Chen observed that the nature of the question being asked needs to be "sprinkled" with some specifics, such as bright line compliance, or whether the models distinguish comparison to background.

Dr. Kahn believed that it is necessary to determine the original ground water state and not to contravene regulatory compliance as per the Resource Conservation and Recovery Act (RCRA) requirements.

At 1:28 p.m., Dr. Kahn invited Agency comments on the committee's working review draft advisory. Dr. Mary Clark informed Dr. Kahn and the RAC participants that the Agency staff appreciates the current (August 25, 2011) public working review draft advisory that has been posted onto the SAB Website. She offered brief remarks regarding Dr. Links' 30,000 foot comments, and advised that the Agency is comfortable with where the current (August 25, 2011) working draft advisory appears to be going. She further advised that the Agency wishes to listen in on the discussion regarding the issues, and to engage in the discussion where it is appropriate. She remarked that the Agency is looking forward to the refined advisory.

Dr. Brian Powell assured everyone that he does a lot of this exact modeling referred to by Drs. Links, Kahn, Clark and others. He offered his assurances that these models can get as complex as you want to make them, as long as you have a way to calibrate and validate the

model. He advised that while baseline modeling capability to address background issues is reasonably achievable, he cautioned that, in the request for data, it needs a relatively “data rich” system to establish baseline conditions with a high degree of certainty. He felt that comments pertaining to kinetics is where the models are the weakest, and referred to Dr. Thomas Borch’s discussion of participation and dissolution analysis of uranium ions. Dr. Bernd Kahn thought that Sub-Group #1 which is working on CQ #1 relating to designing and implementing a monitoring network, could write a paragraph or two pertaining to this discussion for inserting into the revised working draft advisory.

Dr. June Fabryka-Martin offered an observation that another weak area of modeling is Redox & microbial actions within ground water (GW). She offered that it is important to recognize that microbial activity in GW can throw equilibrium modeling literally “out the window” particularly for the ISL modeling case.

Dr. Brian Powell (Chemist) offered the question of ...”How active are the microbial cultures going to be at those low levels?” Dr. June Fabryka-Martin responded that the microbial system’s native population can be literally “wiped out,” and that reducing conditions may not be re-introduced in a sustainable manner. Dr. Jonathan Links offered to draft something to add to the current working draft advisory on this topic.

Dr. Daniel Stram observed that monitoring requirements are all essentially empirical requirements. He drew the analogy to global warming, stressing that the real bottom line comes from the actual field measurements that are obtained. He also offered that the actual modeling that is selected will be incredibly important for evaluation of the site, and yet these are secondary to the overall evaluation.

Dr. Jonathan Links acknowledged what Dr. Stram is saying, and he understands that he is looking for a validated model to tell the observer what is actually going on. He remarked that what is needed is a spatial and temporal model which measures compound “x” every other 3 weeks, but can also measure and track the compound of concern via the model projections every other day.

Dr. S.Y. Chen remarked that modeling is an iterative process. Dr. Links thought it would be informative for us to address and answer the question of ...”What we would be measuring by these models and how we would get there?”

Dr. June Fabryka-Martin looked to Dr. Elise Striz, hydrogeologist with the U.S. NRC, to comment further on the practical aspects of the CQ and of the role of models, as well as the need for data to answer the licensing questions. Dr. Striz acknowledged that the applicants actually do the modeling with many years of field measurement data. Dr. June Fabryka-Martin asked Dr. Striz how she would rate the reliability and utility of the current models that are actually used. Dr. Striz offered that the models which have been developed and used thus far appear to be helpful and realistic, but the key to validate models on a longer-term basis is the amount of useful data that is available to establish stability or migration patterns. She observed that while the licensee must meet the GW standard for post-restoration and establish background conditions,

they must also demonstrate stability.

Dr. Stram remarked that in most instances, it is an empirical model that is used by the licensee. Dr. Links chimed in that if the licensee hasn't done spatial and temporal modeling, then they do not know what "stability" really means or whether it has truly occurred. Dr. Bernd Kahn remarked that establishing background before mining activity begins is needed and essential to the modeling exercise. Dr. Stram remarked that the site details such as confining clay layers and site geology, as well as actual chemistry conditions within the geological confines are important and essential site-specific details.

Dr. June Fabryka-Martin's impression is that the applicant and the NRC reviewers, once they embark on the licensing process, end up knowing quite a bit about a site when the review with the licensee is taking place. Her impression is that the applicant will not invest in an exercise that is inherently risky.

### **Public Comments:**

Previously supplied written public comments were received from Mr. Donovan Porterfield as well as Dr. Richard J. Abitz, Geochemist and Technology Program Manager at the Savannah River National Laboratory in Aiken, SC. These written comments may be found on the SAB Website for the July 18 and 19, 2011 meeting. Mr. Porterfield's written comments are also posted with the initial July 12, 2011 conference call on this advisory topic. Verbal public comments were made at the previous meetings and are summarized in the minutes. For the September 6, 2011 public conference call, there were no written public comments. The public commenters for this teleconference provided verbal comments, which are briefly summarized below.

At 1:50 pm, Dr. Kooyoomjian, the RAC DFO called for those who might be interested in offering public comments. Dr. Steve Cohen, Team Leader in Licensing with the U.S. NRC asked to provide verbal comments. Also, Mr. John Cash, Vice President Regulatory Affairs, Exploration and Geology with Ur-Energy USA, Inc. in Casper Wyoming asked to provide verbal comments.

Mr. John Cash of Ur-Energy USA, Inc. offered at least four points relating to the industry practices. He remarked that In-Situ recovery has been around since 1960 (over 50 years). He also observed that there are lots of data for hydraulic and chemical modeling, and that the NRC and the mining industry have these data available for site evaluation and decision-making purposes. He also offered that aquifers where mining is to take place are statutorily "exempted" within these zones reserved for the mining activity. Within each unit being evaluated, one or two pumping tests are performed. Also, there are additional required regional pumping tests. He also remarked that information on site chemistry as well as to establish baseline data, is also required and collected in the baseline determinations, as well as during mining operations and in restoration activities.

Mr. Cash advised that modeling that is not done to calibrate to reality with field

monitoring is dangerous. To illustrate, he offered that oxidation/reduction reactions and changes in GW chemistry that are occurring in real time could be happening within the space of just a few inches, or in a space of 10 feet, or in a more expansive space of 100 feet wide. He illustrated this to make the point that the regulator and license grantor (the U.S. NRC) needs to be especially clear and to have an understanding of what scale you are modeling, as well as what you are protecting.

At 1:55 p.m., Dr. Steve Cohen, Team Leader in Licensing with the U.S. NRC remarked that In-Situ Recovery (ISR) is an iterative process. He further observed that the amount of data gathered in compliance after a license is issued is enormous. He thought it would be beneficial for the SAB/RAC to know how much data is collected to be in compliance with a license, and that models are used to address site geology and basic chemistry. He asserted that there are certain parameters that have been helpful in detecting excursions. He ended his remarks at 1:58 p.m..

### **Continued Discussion of August Draft Report:**

Dr. Bernd Kahn asked the question regarding how many mines exist that have suitable geology for the ISL/ISR activity to take place in the U.S. The answer to this question seems to indicate that there are 20 plus sites in Texas and 1 in Nebraska, which are very large facilities. There are also approximately 12 sites in Wyoming. There are approx. 4 to 5 licensed facilities in the NRC and a few with the five Agreement States (Colorado, Illinois, Texas, Utah, and Washington) that address In-Situ activities. Mr. John Cash volunteered to provide a list of the facilities in the United States that appear to have the site geology that might be suitable for the ISL/ISR Activity. (POSTSCRIPT: Mr. Cash provided this information on September 7, 2011 to Dr. Kooyoomjian, the RAC DFO. They are a part of the FACA record of the October 5, 2011 public teleconference meeting minutes and were posted onto the SAB Website for that public meeting).

Dr. Bernd Kahn asked how many ISL/ISR sites are older. It was discussed that some sites are in Texas, and it was noted that the Smith Ranch Highlands has approximately 20 well fields and that there is an enormous amount of data in each of the well fields. It would appear that one would have to look through individual reports to examine the data.

Dr. S.Y. Chen referred to the U.S. NRC as granting the license, and issues relating specifically to the committee's concern with time and space; that is, the temporal and spatial modeling needs. Dr. Striz advised that she had provided data to EPA, such as the Smith Ranch Highlands data. Usually when we accept the finding of "stability," this determination is supported with the GW modeling, and typically the monitoring time period for "stability" determinations is around 4 quarters (one year), but may be as long as 5 years.

Dr. S.Y. Chen thought there were questions remaining pertaining to monitoring which he thought needed to be further discussed. Dr. Striz of the U.S. NRC advised that when the NRC sees a trend, they usually require longer term monitoring than 3 or 4 quarters, and may require monitoring for up to 3 or 4 years, instead, depending what they see in the data.

Dr. Brian Powell observed that the Agency's draft report being reviewed listed a monitoring time for restoration ranging from 1 to 5 years. Dr. Elise Striz further offered that the NRC also considers economic decisions to the licensee, and there are also several additional factors involved which may pertain to economic considerations. Dr. Steve Cohen of the NRC offered that those additional pieces of information the NRC considers, such as specifics with economic considerations of Company A or Company C may also modify their specific monitoring and quality assurance requirements.

Dr. Brian Powell remarked that while the performance-based license and field monitoring data is a model, in his view it is not a robust one. While it may be helpful to the licensee that they have a performance-based license, it is still up to them to propose the compliance methods in some fashion to the NRC. Some of the RAC members expressed a clear desire to see more specifics as what to measure, how often it should be measured and other specific requirements to be suggested to the EPA which may be implemented in the future by the NRC.

Dr. Links observed the paradox of the EPA document and revisions to the 40 CFR Part 192 rule that will be forthcoming, and that the NRC is currently saying to the licensee to do this or do that. Dr. June Fabryka-Martin chimed in to observe the impression that is left on these reviewers (the RAC) that the regulations and license provisions are behind the necessities of implementation, since the NRC has present responsibilities to issue or re-issue licenses. Dr. Steve Cohen observed that the current regulations are based on conventional milling, and that various guidance documents are currently being used by the NRC as resources to regulate ISRs.

Dr. Kahn observed that the EPA has received numerous suggestions from the RAC thus far to look at the statistical aspects, to reexamine the baseline issue, to evaluate the role of water quality monitoring, to utilize modeling, as well as to establish the appropriate monitoring period to assure stability.

Dr. Striz observed that GW standards allow for the use of a concentration limit to ensure that the applicant, through the licensing process with the NRC, has met the GW protection standard. A discussion followed on specific standards in the tables as part of those considerations related to post-closure monitoring<sup>3</sup>. These included consideration of standards, such as for molybdenum, radioactive and non-radioactive constituents (e.g., sulfate) as by-products to uranium milling activity, whether the regulations apply to filtered or unfiltered samples, use of approved methods, Standard Methods practices for measurement, etc. Dr. Steve Cohen of the NRC observed that currently there are approximately 30 constituents that they (the NRC) look at.

Dr. Daniel Stram commented on the issue of seasonality. Dr. June Fabryka-Martin also offered that she would like to comment on seasonality, as well as the contribution of anthropogenic sources. Dr. Stram observed that it is much more difficult to focus on seasonality if we also have to focus on temporal and spatial variability.

Dr. Thomas Johnson offered that temporal and spatial variability are not affected by

seasonality. Dr. June Fabryka-Martin reaffirmed that seasonality can be treated separately from temporal and spatial variability. Dr. Striz clarified that, in their (the U.S. NRC) experience GW movement is extraordinarily slow (e.g., 5 feet/year movement); so in reality there is usually not any temporal variation to be concerned with. Dr. June Fabryka-Martin cautioned that there is, however, a concern for a change in the hydraulic gradient off-site.

Dr. Striz noted that typically, the uranium has slow motion in GW. How the GW will respond to mining operations is the concern. Dr. June Fabryka-Martin offered that initially, there is a “settling in” period, and she would expect to see this in the wells. She asked ...”Do you see this, such as a change in iron content?” A discussion followed with Dr. Striz on this point.

Dr. Kahn asked the committee if they have any additional problems or issues to raise in this first public draft advisory, dated August 25, 2011.

Dr. Jonathan Links responded to Dr. Kahn, that, having heard the discussion, especially on the temporal and spatial modeling, he is convinced that the appropriate data exist out there for some sites. He also offered the observation that there seems to be a disconnect between the EPA and the NRC. In his view, it sounds like the “control is ahead of the command.” He feels that perhaps the issue could be solved with better communication, coordination and discussions between the respective parties.

Dr. June Fabryka-Martin suggested that the EPA might consider talking to the Multi-Agency MARSSIM Working Group to look at unified Data Quality Objectives (DQO’s), and that dialogue might be helpful to get you are where you want to be. She suggested that the EPA needs to bring in DOE, as well. She posited that they (DOE) have background data and modeling information (e.g., SPEAR) that would be helpful. The Agency needs to find the “Lessons learned” from DOE, as well as the ISL area.

Dr. Bernd Kahn thanked Dr. Mary Clark and asked if some of the EPA staff are aware of the information discussed thus far, such as the data that might be out there, or whether they consider the advice provided thus far as a “given.” He sees more discussion to be forthcoming on the pre and post data by the committee in revisions to the current draft.

Dr. Mary Clark commented that while the issue has been raised regarding useful data being out there, there is not an extensive analysis of where those data might exist or exactly what they may contain, or in what form the data may be available, or whether the data are in fact available, or whether they are in useable form. That being said, she acknowledged that the discussion has been very useful.

Dr. Kahn offered the thought that the robustness of any data is a question to be asked and answered, and it is his sense that it may primarily be in the middle of the spectrum. He believes that a lot of data may relate to operational aspects, and when you put all that aside, the pre- and post data may not be all that much.

Dr. Brian Powell observed that Dr. Thomas Borch (Sub-Group #2) and Dr. Stram (Sub-Group #3) have suggested specific anions to be monitored. He offered that the priority analytes could be refined. Drs. Thomas Borch, June Fabryka-Martin, and Brian Powell are volunteering to work on this.

Dr. June Fabryka-Martin reconfirmed that she will work with Drs. Borch & Powell on this. She thought that they should also comment on those things that are required and to add more rationale on their relative importance. She further volunteered to address the DQOs, and for instance, the spatial variability DQOs in particular. She observed that the seasonality issue needs to be restated in CQ #1, and the committee might want to consider to throw all data issues into one pot. A discussion followed on some of these points.

Dr. Striz thought that an option to determine baseline water quality by well field average versus by well-to-well should be a discussion point. Dr. S.Y. Chen reaffirmed this to be important and observed that this was his original question that he thought should be answered.

Dr. Steve Cohen commented on heterogeneity and observed that some wells might be solidly located within the ore body, and other wells might not be in the ore body, and that we have to be careful in this area. Dr. June Fabryka-Martin noted her concern for up-stream or in-process (i.e., in well-field) wells.

Dr. Dan Stram remarked that the basic idea is if more variability is observed, then there needs to be more wells used in monitoring. One could use the coefficient of variation, so that you could estimate how the well will behave.

Dr. Striz observed that she has seen two types of operational data that get confused. The first is baseline water quality, and that usually takes 3 or 4 quarters of sampling to establish what this might be. The second is the baseline water quality inside the zones within the units, and they tend to be a log-normal distribution. Dr. Steve Cohen offered the observation that the sampling depends on site geology, as well as the economics of the site.

### **Summary and Action Items:**

The discussion seemed to be winding down, so Dr. Kahn asked to go “round-the-table” for 1 or 2 comments by each member. He informed the participants that he plans to send out a list to the committee on what needs to be added to the August 25, 2011 draft document, and he will send this information to the Sub-Groups through the RAC DFO, Dr. Kooyoomjian. Dr. June Fabryka-Martin suggested that we ask each of the four Sub-Groups to also think of and recommend 1 or 2 points to place in the Executive Summary as well as in the Letter to the Administrator.

Dr. Kooyoomjian was asked to provide a brief update on the MARSSIM consultation activity. Dr. Mary Clark remarked that she thought the MARSSIM consultation activity that took place on July 26 and 27, 2011 and the resulting commentary that was provided covered a broad range of very helpful ideas (This brief update took place from 3:03 p.m. to 3:08 p.m.)

Mr. Bruce Napier advised that he will be in Siberia for the next 5 weeks and will not have the opportunity to add additional materials until his return. However, he thought that the current draft advisory at this stage is taking shape very well.

Dr. Thomas Borak observed that in the statistical response within the draft advisory, we may need to have more discussion on hypothesis testing, as well as detection methods. He observed that detection methods obviously need to be sensitive enough to detect those items of importance that you wish to monitor. He suggested that we have some discussion on individual detection methods as well as on detection systems.

Dr. Mary Clark commented on DQOs and the DQO process. She thought that DQOs can be set up either based on the methods available, or can be based on individual performance-based measures.

Drs. Chen and Links were okay for now and passed on making further comments.

Dr. Stram intended to look more closely at seasonality and modeling. He also observed that in some places there is appears to be a disconnect with the monitoring that is taking place.

Dr. Thomas Borch commented on the disconnect between scientists and the regulations. He observed that data are not available in some cases from the regulators to the scientists for pre-mining or pre-restoration data-based decision-making. He further observed that much of the data that are available is operational in nature, which in his opinion, may not be useful for before and after comparisons. He thinks he may be able to provide some clarifying text via email for the next round of edits on this topic. Drs June Fabryka-Martin, Thomas Johnson and Brian Powell agreed that they might also provide clarifying comments via email, as well.

**Action Items from the September 6, 2011 Public Conference Call:**

This brief summary captures those items of interest to the augmented RAC as follows:

- 1) The augmented RAC members are encouraged to provide individual written comments and observations to the Sub-Groups leads and scribes and who will forward the revisions to Dr. Kahn. See details in summary above;
- 2) While the RAC augmented for this exercise has been assigned to four Sub-Groups with lead discussants to manage the responses for each of the four charge questions, Dr. Kahn again reminded everyone to please do not forget to comment on each of the four charge questions as you see appropriate;
- 3) Dr. Kooyoomjian, DFO to the augmented RAC, reminded everyone to please copy him on all communications so that he can maintain the record of this activity, share it with the committee and the public as appropriate; and
- 4) The Committee will prepare a September public draft for review at the scheduled and

publically announced October 5, 2011 public conference call meeting.

**ADJOURN:** After having summarized the action items, there being no additional items to discuss, Dr. Kahn thanked the participants and adjourned the meeting at 3:20 pm.

Respectfully Submitted:

Certified as Accurate:

\_\_\_\_\_/S/  
K. Jack Kooyoomjian, Ph.D.  
Designated Federal Official  
Radiation Advisory Committee (RAC)  
Augmented for Uranium In-Situ ISL/ISR  
Advisory

\_\_\_\_\_/S/  
Dr. Bernd Kahn, Chair  
Radiation Advisory Committee (RAC)  
Augmented for Uranium In-Situ ISL/ISR  
Advisory

**NOTE AND DISCLAIMER:** The minutes of this public meeting reflect diverse ideas and suggestions offered by Panel members during the course of deliberations within the meeting. Such ideas, suggestions and deliberations do not necessarily reflect consensus advice from Panel members. The reader is cautioned not to rely on the minutes to represent final, approved, consensus advice and recommendations offered to the Agency. Such advice and recommendations may be found in the final advisories, commentaries, letters or reports prepared and transmitted to the EPA Administrator following the public meetings.

## MATERIALS CITED

The following materials can be accessed through the SAB Website at ([www.epa.gov/sab](http://www.epa.gov/sab)) at the following hotlink:

<http://yosemite.epa.gov/sab/sabproduct.nsf/MeetingCal/6679846B82896F82852578E70041C90F?OpenDocument>

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<sup>1</sup> Roster of Radiation Advisory Committee (RAC) Augmented for Uranium In-Situ ISL/ISR Advisory;

<sup>2</sup> Federal Register Notice Announcing the Meeting (FR Vol 76, No. 158,P.50728, Tuesday, August 16, 2011);

<sup>3</sup> Working Review Draft Advisory Pertaining to Agency's Technical Draft Document entitled "***Considerations Related to Post-Closure Monitoring of Uranium In-Situ leach/In-Situ Recovery (ISL/ISR) Sites,***" August 25, 2011

<sup>4</sup> Request for "Advisory Review of the Draft Technical Report: *Considerations Related to Post-Closure Monitoring of Uranium In-Situ Leach/In-Situ Recovery (IS/ISR) Sites;*" June 2, 2011 memo from Michael P. Flynn, Director Office of Radiation and Indoor Air to Vanessa Vu, Director, Science Advisory Board;

<sup>5</sup> Meeting Agenda, Radiation Advisory Committee, Tuesday, September 6, 2011;

<sup>6</sup> Dr. Brian Powell Pre-Meeting Comments on August 2011 Working Draft Advisory

<sup>7</sup> Dr. Daniel Stram Pre-Meeting Comments on August 2011 Working Draft Advisory

<sup>8</sup> Dr. Thomas Borch Pre-Meeting Comments on August 2011 Working Draft Advisory

<sup>9</sup> Dr. Douglas Chambers Pre-Meeting Comments on August 2011 Working Draft Advisory