



SRS Citizen's Advisory Board

Minority Report to the Recommendation
Passed July 24, 2001 by the SRS CAB Regarding the
Old Radioactive Waste Burial Ground Focus Group's Final Report
Dated July 16, 2001

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SRS CAB Member
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Introduction and Summary

I appreciate the opportunity to issue this minority report to document why I voted against approval of the CAB's recommendation, passed on 07/24/01, supporting six of the seven recommendations issued in the Old Radioactive Waste Burial Ground (ORWBG) Focus Group's (FG) Final Report (ORWBG FG 2001). Such a minority report from any CAB member who does not agree with a CAB recommendation is permitted by Section I of the Standing Rules for the SRS CAB.

I cannot support the CAB's recommendation because I do not agree with some of the procedures used, data employed, conclusions drawn, and recommendations offered by the FG. However, I do compliment the FG in its efforts and in its dedication and zeal, and I do recognize the enormous amount of time spent that eventually produced its Final Report. But because of issues developed and explained below, I must question the viable worth of the Final Report, including its data, methodology, conclusions, and recommendations.

Following, I shall address portions of the four items that were the negating issues with me and that resulted in my voting against the ER Committee's recommendation that was passed by the CAB during its regular meeting on July 24, 2001 in Columbia, SC.

Flawed Procedures Used

1. The ORWBG FG used funds (\$35,000), furnished by the CAB, to contract with an Independent Scientific Peer Review (ISPR) Team to provide the FG with (quoting from the ISPR Team's Final Report to the FG, dated August 2000):

"(1) an estimate of surface water contamination for Constituents of Interest (COIs) from waste buried in the ORWBG; and (2) determine health risk at various locations impacted by the surface contamination originating in ORWBG and flowing to Four Mile Branch (FMB)."

However, the ISPR Team's findings were not totally independent from the FG. To generate completely unbiased information, there must be no direct contact between any person or persons who will use the generated information to form conclusions (i. e., the ORWBG FG) and those contracted to generate the information and their own conclusions

(i. e., the ISPR Team members). This process was not followed by the ORWBG FG. Although there is no evidence of impropriety, such a flawed approach raises questions concerning how much bias may be in the ISPR Team's findings produced by such direct contact between the FG and the ISPR Team. A third party should always be used to entirely eliminate any potential conflict of interest and to avoid any implied impropriety.

I cannot conclude otherwise when I read in the ISPR Team's draft report that a member of the ORWBG FG had provided the ISPR Team with at least three pieces of highly relevant data and that this same individual was also recognized in the Acknowledgments of the ISPR Team's report for this person's "interest and support". Such contact, either intentional or unintentional and no matter how slight or how extensive, clouds the veracity, at worse, or the unbiased, at best, of the information provided and any conclusions drawn therefrom.

2. I read the FG's Technical Accuracy Draft (dated May 30, 2001), including its appendices, and made 49 comments as a result. Some of these were addressed in the Final Report, most were not. One issue with the Report was that little mention was made of the current laws, permits, and other restrictions that are imposed by the South Carolina Department of Health and Environmental Control (SCDHEC) on the Savannah River Site (SRS). No mention was made of how these entities may affect the implementation of the FG's individual recommendations. No explanatory discussion was made of "point of compliance" or "point of exposure" or other limitations that the SRS must currently operate under in order to not violate the regulations, laws, permits, and other such regulatory restraints.

To not recognize such and to not adequately address same in the Report is a flawed approach because such omissions do not allow the telling of the "whole story". The FG Report needed a section explaining what SRS must do regulatorily with the ORWBG. The reader and/or end user of the FG Report needs to understand why a mixing zone, one of the FG's primary assumptions, cannot be permitted by SCDHEC now, or for sometime to come, as the regulatory point of exposure (or compliance) for the SW Seep from the ORWBG. This shall be further addressed when I discuss my issue with the FG's Recommendation #7 later.

Questionable Data Employed by the ISPR Team

1. Quoting from the Executive Summary of the ISPR Team's Final Report (contained in Appendix C of the FG's Final Report):

"A key parameter in the model is the partition coefficient, K_d . Calculated results are highly dependent on the value of K_d used for each nuclide."

But why did the Team use data (Thibault 1990) produced by Canadians for sandy soils when SRS-specific K_d information was readily available? Wouldn't the use of the latter produce more realistic and more pertinent (to SRS) results? I especially recommend the SRS-specific and more recent K_d data of (Denham 1996) as derived from (Looney 1985), (Denham and Looney 1995), and (Hoeffner 1985).

My elaboration on the use of the Canadian data by the ISPR Team follows for only two elements, plutonium and tritium, but very important ones for the consideration of long-term and short-term risks to human health and the environment from the ORWBG.

1a. The ISPR Team used a partition coefficient (or " K_d ") of 550 for movement of plutonium in the vadose zone in the ORWBG. This K_d is 5.5 times greater than the site-specific value of 100 offered by (Denham 1996). The use of a higher K_d is a much less conservative approach for Pu migration because the higher value indicates that it is less mobile in SRS soils. Dr. Ed Albenesius, now retired from SRTC where he was a pioneer in shallow land burial studies, when asked what the main hazard was in the ORWBG, replied without hesitation, "the plutonium waste" (Holcomb 1992). Therefore, when developing transport data for plutonium and concluding risk therefrom, it behooves any researcher to be as cautious and as conservative as possible. The use of inflated K_d s for plutonium in the ISPR Team's report do not reflect this practice nor will risk data generated from such be possibly protective enough to any potentially-exposed species in the future.

1b. The ISPR Team used a K_d of zero for tritium. There is no such thing as a K_d of zero, not even for highly mobile tritiated water, which migrates like ordinary water. K_d is a measure of how any species is retarded, as it moves through a medium, by its interaction with elements of that medium. Something with a K_d that's very small, viz., 0.001, moves much faster through a given medium than one with a K_d that's much larger, viz., 100. However, at equilibrium or steady state in a nonvariant pathway in the vadose zone, a constant tritium flux at constant flow will approach a K_d of zero. But such a perfect system (with no variance in the liquid's flow rate, or in its pathway through the vadose zone, or its tritium concentration, or in the available exchange sites for tritiated water in the hydrated oxides) is not a practical supposition for a such a variable system as uncontrolled aqueous flow in the vadose zone.

As evidence for the K_d not being zero for groundwater tritium in SRS soils, Gerald Blount, a geologist in the Environmental Restoration Division (ERD) at SRS, and I, as a radiochemist in ERD, found that there was exchange between liquid tritiated

water and the waters of hydration bound by the crystalline lattice in the natural minerals (i. e., clays) in SRS soils and/or exchange with the hydrated aluminum oxide coating on buried reactor components or that on other buried aluminum metal waste (Holcomb 1995). In fact, this theory was the only way we could explain retarded tritium movement in one of the contaminated sites under characterization at that time. Therefore, to assign a Kd of zero for tritium in SRS soils is unrealistic; a Kd of 0.001 (Denham 1996), used in several ERD site assessments and SRTC studies (such as those by Looney et al.), would be better.

It is recognized that the Team's use of a Kd of zero for tritium should produce data indicating a greater mobility for tritium than if a Kd of 0.001 were used for the same calculations. However, my issue here is that the ISPR Team should have used more representative, site-specific Kds in generating their data, not those from the Canadian source.

Conclusions of the ORWBG FG Study

1. Section 2.2, "Conclusions", of the FG's Final Report states:

"The main conclusion of the ORWBG FG study is that the ORWBG poses no human health impacts now or into the future under the proposed ICs (institutional controls). Thus, there is no need for remedial action at the ORWBG to protect human health."

I disagree with the FG's conclusion because there is no guarantee that the proposed ICs will be in place from 150 to 10,000 years hence, the time frame considered by the FG for both active and passive controls to be in place.

The FG even states earlier in Section 2 under "Institutional Controls Must be Maintained", "However, the ORWBG FG does not believe any government can guarantee perpetuity so the FG assumed that Active IC would exist for 150 to 300 years. During this period, the present SRS would be maintained under government control and the public would not be allowed onto the SRS."

Further in Section 2 under "Health Effects Are Unlikely From Contaminants Left Buried in the ORWBG with Institutional Controls", the FG states, "With intact ICs, the ORWBG is unlikely to cause health effects to current or future generations from the buried waste in the ORWBG."

The indisputable fact is that future ICs, either active or passive, for a time period from 150 to 10,000 years from now can be proposed but not guaranteed because there is no one alive today that will be alive then to do so! To assume otherwise is not only sophomoric but unrealistic, as well. In such an IC scenario as proposed by the FG, the conservatism necessary today to protect human health and the environment in the future is lacking.

I can make an arguably as valid an assumption that energy crises beginning 150 years from now, or even earlier, will require so much budgetary resources that no funds will remain to maintain any useful active or passive institutional control of any governmental site existing today.

Which is more realistic, the FG's assumption for continued governmental active or passive ICs at the ORWBG for 150 to 10,000 years in the future or the assumption regarding the overwhelming fiscal needs caused by very possible energy crises such as those already apparent in California? Fossil fuel sources are not limitless. Neither are institutional controls.

2. Page ES-3 of the Final Report's Executive Summary states: "The SRS has many facilities and materials that represent much larger risks to the public and the environment than the ORWBG and its contaminants."

Compared to the materials remaining in the High Level Waste tanks, this statement is true. Compared to the SRS Canyons, this statement is true. However, if the Hazard Ranking System Site Scores for SRS Environmental Restoration Projects (Wyatt 1993) are examined, the Burial Ground Complex, including the ORWBG, has the top hazard ranking of 76.88. Next are the Oil and Chemical Basin and the Caustic Basin in L-Area, which rank at 59.62. The third most hazardous is the HLW Tank 16 leak area, ranked at 58.3. Other remedial sites follow in descending

hazardous order.

This unsupported and unreferenced statement in the Final Report was apparently made to minimize, and inappropriately so, the risk from the ORWBG contaminants to the reader and/or end user of the Report. Such wide-ranging statements, usually made to assist in proving some predetermined conclusion or to further some self-serving cause, have no place in such a purportedly unbiased technical document unless those statements can be appropriately supported or referenced.

Recommendations by the ORWBG Focus Group in its Final Report

The FG developed seven recommendations for consideration. The SRS CAB in its recommendation, which I voted against, did not support the first recommendation proposed by the FG.

Since this is a minority report offered solely by me, I must address and comment on each FG recommendation.

"1. Cease the current collection of tritium-containing groundwater and irrigation of the forest as soon as possible."

Like the CAB, I disagree with this recommendation. The phytoremediation project now underway near E-Area is an excellent experiment to determine if natural sources, such as pine trees, can reduce the tritium contamination from the SW Seep that reaches Four Mile Branch and eventually the Savannah River. Agreed, this converts the liquid-borne tritium to an atmospheric contaminant. However, Ed McNamee of BSRI-ERD has stated that the risk from the latter to human health and the environment is much less, because of significantly greater dilution and dispersion, than that posed by the tritium in the downstream drinking waters sourced by the Savannah River. He also stated that tritium in the atmosphere has not been detected at the phytoremediation project site.

"2. Develop IC specific to the ORWBG and the area between the ORWBG and Fourmile Branch by April 2002."

I disagree. The uselessness of assuming the existence of workable ICs out into the future has been discussed above.

"3. Fill the solvent tanks with grout to stabilize them and then cover this portion of the ORWBG with 2 to 8 feet of low permeability soil to match the rest of the ORWBG."

I agree that some remedial action should be taken with the old solvent tanks located in the ORWBG near its entrance from Road E. However, I believe that such remedial action has already been agreed to by DOE and SCDHEC.

"4. Develop a land management strategy to minimize erosion, prevent deep-rooted plants from encroaching, and discourage burrowing animals and insects from bringing waste to the surface."

To reiterate the FG's main conclusion from Section 2 of its Final Report: "The main conclusion of the ORWBG FG study is that the ORWBG poses no human health impacts now or into the future under the proposed ICs (institutional controls). Thus, there is no need for remedial action at the ORWBG to protect human health." If this were true, then why is Recommendation 4 necessary? This recommendation is a quasi-remedial action that the FG has already concluded is not necessary. There is an apparent disconnect here because the FG's conclusion and this recommendation are not mutually supportive, which they should be.

"5. Consider refining the groundwater transport calculations for Volatile Organic Compounds (VOCs) and other Constituents of Interest (COIs) (other than tritium) in order to be consistent with measurements."

I believe that the scientists and engineers at the Savannah River Site are sufficiently capable to generate, as necessary, such information from relative, reliable, unbiased, and untainted data.

"6. Do not excavate buried plutonium from the ORWBG."

Even though Dr. Albenesius considers plutonium waste to be the worst hazard in the ORWBG, there is potentially significant greater risk in trying to remove any of it via excavation. I, and others in ERD and SCDHEC as well as Mr. Elmer Wilhite of SRTC, agree with this recommendation by the FG.

"7. Establish a mixing zone for the ORWBG groundwater plume during active and passive IC. Consider different mixing zones for active IC and for passive IC."

The issue of maintaining active or passive ICs in the future has been discussed previously.

Keith Collinsworth, the *ex officio* representative to the SRS CAB from SCDHEC, stated in the Environmental Restoration Committee meeting the night prior to the full CAB meeting on July 24th that SCDHEC will not approve a mixing zone application when contaminant concentrations are above standards in surface water (associated with the point of exposure). So if the water at the SW seepage line is above drinking water standards (DWS) then the State will not approve the mixing zone application for that contaminant. One can get mixing zones approved for contaminants that are below the standards. It is expected that it will be a relatively long time before the tritium at the seepage line is below standards, some 9 tritium half-lives, or approximately 110 years, if determined solely from decay of the tritium flux. (What Collinsworth said above and the subsequent time for tritium decay for the SW Seep to meet DWS was furnished me by Mr. Paul Sauerborn of the WSRC Public Involvement Group supporting CAB activities. Mr. Sauerborn was taking minutes during the meeting in question.)

Unless some unpredicted event occurs to greatly reduce the tritium contamination in the SW Seep, there is little-to-no chance that the point of compliance or point of exposure for the seep will be moved to a mixing zone during the next 110 years. I consider Recommendation 7 to border on wishful thinking by the FG. It is certainly not realistic according to current regulatory constraints that the SRS must abide by to demonstrate the Site's admirable philosophy of maintaining "as low as reasonably achievable" risk to human health and the environment at all times.

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Respectfully submitted,
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