

Presentation to the SRS Citizens Advisory Board

Summary of SREL Technical Review In Response to CAB Recommendation 317

September 23, 2014

Review Team

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Charge to SREL

- ◎ **Provide the DOE-SR with a recommendation on whether there is fact-based evidence to support the request for conducting additional radiological environmental monitoring in Georgia by the State of Georgia or SRS, and based on the results of this recommendation:**
- ◎ **Provide the DOE-SR with a recommendation on the potential options that could be undertaken by the DOE-SR to address the concerns of the CAB and the citizens of Georgia in regard to this issue.**

Why SREL ?

- ☐ SREL researchers have been working on the SRS since 1954 and are highly familiar with the subject matter required for the requested technical review
- ☐ SREL personnel work for the University of Georgia and thus represent an independent third party for such technical reviews
- ☐ SREL's mission on the SRS is and always has been "To provide the public with an independent evaluation of the ecological effects of SRS operations on the environment" which is well suited to the type of review requested by DOE

Approach

- ❑ **Assign** a team of subject matter experts to conduct the assessment and review
- ❑ **Identify** monitoring program elements to be evaluated
- ❑ **Develop** a structured framework for evaluation of program elements
- ❑ **Review** elements of the monitoring program with rigorous, iterative, internal assessment by team members
- ❑ **Produce** a final report with summary conclusions and recommendations

Resource Materials

- ☐ **Savannah River Site Environmental Reports for 2010-2012**
- ☐ **South Carolina Department of Health and Environmental Control Environmental Data Reports, Bureau of Environmental Sciences, Environmental Surveillance and Oversight Program 2011-2012**
- ☐ **A variety of other federal, state, and peer-reviewed literature**

Program Elements Evaluated

- ❑ Monitoring conducted for each **environmental media** (pathway) and results of these activities
- ❑ **Regulatory standards** use to set exposure limits for various media monitored on or adjacent to the SRS
- ❑ **Dose Risk Calculations** stemming from the SRS Environmental Monitoring Program
- ❑ DOE's current **communications pathways** to the public for monitoring results

Environmental Media Evaluated

- ☐ Air and Rain Water**
- ☐ Surface Water**
- ☐ Drinking Water**
- ☐ Ground Water**
- ☐ Sediments**
- ☐ Soils**
- ☐ Biota**

These are potential pathways for radionuclides to interact with humans and thus the environmental media are used to measure the risk of humans being exposed to radionuclides in their daily lives

For Each Media Type We Evaluated:

- ❑ **Potential sources** of contaminants from the SRS into each pathway
- ❑ **Spatial and temporal extent** of sampling conducted by DOE-SR on and surrounding the SRS and which radionuclides were evaluated
- ❑ The **extent** of the SRS Environmental Surveillance Program as **compared** to that of the SC Department of Health and Environmental Control and the **concordance** of the results between programs, AND

Drafted **overall conclusions** regarding the effectiveness of the monitoring program for protecting the citizens of Georgia and **recommendations** for improvement

Overall Conclusions

Based on our examination of the current monitoring programs conducted by DOE-SR and the SCDHEC, **we did not find evidence that the establishment of another independent environmental surveillance program for radionuclides in GA was warranted.** With few caveats the spatial and temporal extent of monitoring programs currently conducted or funded by DOE-SR for air, rainwater, ground water, drinking water, surface water, sediments, soil, and biota are spatially and temporally **adequate to provide the citizens of Georgia and South Carolina with both the extent and distribution of radionuclides in the environments within which these citizens reside** as well as the anticipated dosages that they could be maximally expected to receive from the presence of these radionuclides in the environment.

Overall Conclusions

In the case of Georgia specifically, the most likely pathways for movement of radionuclides into local communities, air, rainwater and surface water, are well monitored both spatially and temporally and coverage of these pathways into GA by existing monitoring programs is considered to be adequate at this time.

Movement of radionuclides into GA via groundwater is not considered to be a likely scenario unless changes in water management occur in the Central Savannah River Area which significantly alter the hydrology of the region.

Movement of radionuclides into GA via accumulation in biota is not considered a likely scenario without significant changes in contaminant transfer via other pathways air, rainwater, surface water, or ground water.

Overall Conclusions

Based on our evaluation of the existing monitoring programs currently funded by the DOE-SR, the manner in which dose limits are calculated, the potential pathways for radionuclides into the state of Georgia and the likelihood of radionuclide transfer via such pathways, we do not see that any substantial benefit to the citizens of Georgia, the Department of Energy, or the US taxpayers would be served by the creation of a new Environmental Surveillance Program for radionuclides, as per recommendation 317 of the SRS CAB.

Recommendations

➤ General

Establishment of consistent protocols in processing and statistical analyses would enhance comparisons between DOE-SR and SCDHEC data sets and provide better utility of SCDHEC data for validation purposes. For example, determinations of detection limits and how non-detects are handled in the data analysis should be consistent as possible, recognizing there may be disagreements by experts how to best address some of these issues.

Recommendations

➤ Air and Rain Water

We recommend that consideration be given to co-locating additional sampling locations when possible for the DOE-SR and SCDHEC monitoring networks since an important goal of the SCDHEC program is to provide independent validation of the DOE-SR monitoring results.

Recommendations

➤ **Surface Water**

Additional sampling warranted only if significant increases in atmospheric deposition or, groundwater or surface water transport of radionuclides detected.

Recommendations

➤ Drinking Water

Additional sampling warranted only if significant increases in atmospheric deposition or, groundwater or surface water transport of radionuclides detected.

Recommendations

➤ Ground Water

Additional sampling warranted only if significant increases in atmospheric deposition or, groundwater or surface water transport of radionuclides detected.

Additional sampling also may be warranted if there are significant changes in hydrologic conditions on and near the Savannah River Floodplain – USGS models indicate that this would be particularly relevant for the Flowery Gap Landing area of the Georgia side of the Savannah River. Consider co-locating a subset of wells that are sampled by DOE-SR and SCDHEC each year to allow for direct comparison and validation of radionuclide data.

Recommendations

➤ Sediments

Sampling locations in the Savannah River are adequate but we recommend that additional sites in the floodplain wetlands or river cutoffs on the Georgia side be considered to expand the spatial coverage of sampling into important sediment depositional zones. We also suggest that due to the dynamic nature of floodplain sediments and the potential transfer of radionuclides into food webs via bioaccumulation in aquatic organisms associated with floodplain sediments, that a modified sampling strategy for sediments be utilized in the Savannah River Floodplain. Robust sampling designs for each media type should take into account both the temporal and spatial variability associated with the movement of contaminants through the media.

Recommendations

➤ Soils

Additional sampling warranted only if significant increases in atmospheric deposition of radionuclides detected.

Recommendations

➤ Biota

Additional sampling warranted only if significant increases in atmospheric, surface, or groundwater deposition of radionuclides detected. Adding wild edible vegetation sampling to the DOE-SR program would complement the SCDHEC program for comparison and validation of results. Both the DOE-SR and SCDHEC monitoring programs should sample both grassy vegetation and woody vegetation to be able to directly compare and validate results. Restricting non-edible vegetation sampling to locations along the Savannah River leaves most of the neighboring GA communities out of the vegetation monitoring network. A limited number of additional locations in GA would complete the network.

Recommendations

☐ Regulatory Standards

Our evaluation of the regulatory standards used by DOE-SR for determination of risk indicate that these standards are widely accepted and practical given the current state of understanding of radiation dose risk from various pathways in the US and globally.

Recommendations

➤ Dose Calculations

Our assessment of the DOE-SR and SCDHEC methodologies for dose calculations indicate that both monitoring programs are consistent despite differences in methodologies. Both programs indicate that expected doses to a representative individual (conservative) or a maximally exposed individual (highly conservative) are well below the 100 mrem/yr total effective dose limits set by the Department of Energy, which we view as a highly conservative and reasonable standard based on conventional interpretations regarding the health effects of radiation dose.

Recommendations

☐ Communications

While the DOE-SR disseminates information to a wide diversity of stakeholders in both South Carolina and Georgia, the information provided is largely technical in nature and assumes that the individuals receiving the information have the ability to interpret the data and draw conclusions regarding risk. Thus, it is likely that the monitoring results provided to stakeholders is more useful to regulatory agencies and technically trained audiences than would be the case for general public audiences. For those lacking a scientific background or technical training in the interpretation of environmental surveillance data, much of the material that is presented regarding the outcomes of radiological surveillance programs conducted by DOE is difficult to understand. For this reason, and considering the concerns of local community members about radiological health risks, we recommend that the following actions be taken by DOE-SR :

Recommendations

- 1. Consider developing a strategy of communication with local community audiences that incorporates limited monitoring data collected from those communities as a basis for providing outreach and education on radiological monitoring and data interpretation that can help local residents draw their own conclusions concerning health risks.**
- 2. Utilize local community leaders to assist in the development of such education and outreach programs and work with them to reach community members for delivery of educational programs and materials.**

Recommendations

- 3. Limit the collection of additional monitoring data within local communities to only that needed to provide relevant, real world data for use in educational programs within those communities.**
- 4. Guide the strategic development of these outreach and education programs so that they can be used within targeted communities as desired throughout South Carolina, Georgia or anywhere throughout the DOE complex.**



SAVANNAH RIVER ECOLOGY LABORATORY

