Blue Ridge Environmental Defense League

www.BREDL.org PO Box 88 Glendale Springs, North Carolina 28629 BREDL@skybest.com (336) 982-2691

August 12, 2013

Carol Connell, Health Assessor
Agency for Toxic Substances and Disease Registry
ATTN: Records Center
1600 Clifton Road, NE (Mail Stop F-09)
Atlanta, GA 30333

RE: ATSDR Evaluation of Off-Site Air Contamination from the Savannah River Site (USDOE), EPA Facility ID No. SC1890008989, July 1, 2013

Dear Ms. Connell:

On behalf of the Blue Ridge Environmental Defense League, I write to provide comments on the ATSDR Public Health Assessment of air contamination for the Savannah River Site (PHA).

The ATSDRõs public health assessment falls short of an acceptable analysis of offsite health impacts from the pollutants analyzed. In support of these remarks please find attached our report entitled: *Sow the Wind–Toxic Air Pollution from the Savannah River Site*, also accessible via the Internet.[1]

Our *Sow the Wind* report indicates that operations at SRS have had and will continue to have a negative impact on the health of residents in the Central Savannah River Area. Our investigation centered on the air toxics which are emitted from large and small smokestacks at SRS and how they interact to raise downwind pollution levels in Jackson, New Ellenton, Williston and other communities.

<u>ATSDR Conclusion 1: Radioactive Emissions and Criteria Pollutants</u>

The ATSDRõs PHA concludes that radioactive and criteria pollutants are ñunlikely to cause adverse health effects.ò We submit that this conclusion is either premature or incorrect.

Radioactive Emissions

Between 2000 and 2002, the Georgia Environmental Protection Department found radioactive tritium, hydrogen-3, many times above background levels within a 400 square mile area around the SRS reservation. The agency concluded that most of this pollution was the result of airborne radionuclides. For example, milk had up to 3 times the tritium expected; air, soil and water pollution was detected up to 5 times above background

---

[1] Sow the Windï Toxic Air Pollution from the Savannah River Site, available at http://www.bredl.org/pdf2/SOW_THE_WIND_2008.pdf
This research project and report were supported by a grant from the Citizenõs Monitoring and Technical Assessment Fund (see endnote).

level; and vegetation was found to contain as much as 13 times the background level.[2]

In *Sow the Wind*, we compiled annual emissions of radionuclides to the atmosphere from Westinghouse Savannah River Company reports:

Annual Airborne Radionuclide Emissions (Gases and vapors)[3]

YEAR	Total Curies	H3 (Ci)
1992 [a]		156,000
1993 [a]		191,000
1994 [a]		160,000
1995 [a]		97,000
1996 [a]		55,300
1997 [a]		58,000
1998 [a]	99,700	82,700
1999 [a]		51,600
2000 [a]		44,800
2001 [b]	112,100	47,400
2002 [b]	78,800	47,300
2003 [b]	113,800	50,800
2004 [b]	61,300	61,300
2005 [b]	40,800	40,800
Total		1,144,000

a. Environmental Report for 2001, WSRC-TR-2001-00474
b. Environmental Report for 2005, WSRC-TR-2006-00007

Emissions of radionuclides include primarily H-3, C-14, K-85, and I-129/131/133. Additional radionuclide particulate emissions include Cs-137, Sr-89/90, Pu-241, and Tc-99. Hydrogen-3 (tritium) is typically the major radionuclide quantity emitted and is also considered to have the principal impact on human health.

In 2012, a research report authored by Joseph J. Mangano found major air pollution sources presented a threat to human health both onsite and offsite. The three main findings were that during the ATSDRös PHA ñcurrent exposuresò period: radioactivity increased, radiosensitive disease rates increased and excess deaths occurred. According to Manganoös assessment:[4]

1. From the late 1990s to the 2000s (when EM activities reached full capacity), emissions and environmental concentrations of radioactivity in or near SRS increased for 71% (45 of 63 types) of measures with complete data. With nuclear weapons manufacturing at an end and environmental remediation attempting to reduce radioactivity, this finding differs from the expectation

[2] *Georgia Environmental Radiation Surveillance Report 2000 – 2002,* Section D, available at: http://www.gaepd.org/Documents/radrpt2002.html
[3] *Id*. *Sow The Wind*, Table 5
[4] *Assessing Changes in Environmental Radioactivity and Health Near the Savannah River Site*, Mangano, JJ, 2/22/12, available at http://www.bredl.org/pdf3/FINAL_CIF_Report.pdf

that levels would steadily decrease over time.

2. In the five counties within 25 miles of SRS, with a current population of 417,000, rate increases in 96% (46 of 48) of radiosensitive diseases or causes of death exceeded that of the U.S. In 20, the increase was statistically significant. The categories included were those affecting the fetus (infant deaths, fetal deaths, low weight births); cancer among children and the very elderly; radiosensitive cancers (thyroid, female breast, and leukemia); and those conditions in which previous articles had detected a risk among SRS workers (leukemia, lymphoma, lung cancer, myeloma, and non-cancerous lung diseases).
3. Approximately 2,000 ñexcessò deaths and cases of disease occurred in the five counties during the latest nine year period.

Criteria Pollutants

A category of large volume air pollutants listed in the federal Clean Air Act as ñcriteria pollutantsò are typically emitted by the burning of fossil fuels: coal, oil and gas. The following table lists criteria pollutants emitted annually from SRS as reported by the Westinghouse Savannah River Company:

Criteria Air Pollutant Annual Emissions (pounds)[5]

Air Pollutant	2002	2003	2004
Sulfur dioxide	1,116,000	1,072,000	4,300,000
Total suspended particulates	430,000	604,000	964,000
PM10	197,200	236,000	378,000
Carbon monoxide	2,440,000	4,580,000	1,964,000
Volatile organic compounds	159,800	186,600	1,088,000
Nitrogen dioxide	612,000	532,000	8,480,000
Lead	694	1,116	316
Hydrogen fluoride	252	228	278

This is a large amount of actual air pollution which has had negative effects on air quality and public health in the region.

ATSDR Conclusions 2 and 3: Trichloroethylene and other Toxic Air Pollutants

The PHA states that no health impact conclusions could be made regarding trichloroethylene and other toxic air pollutants because of limited information and that the Department of Energy should conduct air dispersion modeling. We agree that DOE should do such an analysis and question why one has not been done already.

Toxic air pollutants are non-radioactive compounds which are noxious, poisonous or carcinogenic. They include a variety of chlorinated compounds, heavy metals and reduced sulfur gases. The following table lists the toxic emissions reported by Westinghouse Savannah River Company in 2002, 2003 and 2004.

[5] *Id., Sow the Wind*, Table 7

Annual Emissions of TCE and other Toxic Air Pollutants (Pounds) (n/d = no data)[6]

Pollutant	2002	2003	2004
Acetaldehyde	538	268	10,580
Benzene	9,720	1,798	5,980
1,3 Butadiene	149	74	3,000
Carbon disulfide	3	9	328
Carbon tetrachloride	14	144	12,320
Chloroform	5,040	23,000	3,080
Chromium	<1	<1	3,700
Formaldehyde	1,336	742	24,400
Hexane	1,494	1,502	4,840
Hydrochloric acid	568	442	3,340
Hydrogen sulfide	12,100	12,420	n/d
Methanol	1,766	2,120	1,974
Methylene chloride	1,800	1,790	109,600
Nickel	132	137	2,560
Nitric acid	14,100	12,100	39,400
Ozone	n/d	n/d	10,160
Phosphoric acid	199	7,420	61
Sodium hydroxide	2,540	2,540	2,860
Styrene	5	4	4
Tetrachloroethylene	31,400	21,200	1,110,000
Toluene	8,420	8,260	15,780
1,1,1 Trichloroethane	22,000	19,300	9,880
Trichloroethylene (TCE)	**11,840**	**9,300**	**312,000**
Xylene	6,220	5,860	5,480

Our Findings

Ambient Air Modeling

We calculated the impact on ambient air concentrations of air pollutants emitted from SRS in the nearby towns of Jackson, New Ellenton, Williston, Aiken and at the SRS property line. We based our computer modeling on Westinghouse Savannah River Company air permit application stack data, South Carolina DHEC emissions data, and SCREEN3 gaussian dispersion formulas. *Sow the Wind* Appendix A details our methodology and formulas and Appendix B contains our modeling calculations.

The emissions of toxic air pollution from the exhaust stacks at SRS include nitrogen oxides (NOx), nitric acid (HNO3), volatile organic compounds (VOC), total suspended particulates (TSP), Sulfur oxides (SOx), fine particulates (PM-10), mercury (Hg), hydrogen fluoride (HF) and many other pollutants.

The results of individual and combined pollutant levels indicate harmful levels of pollution outside the boundary of the SRS. The SCREEN3 results are compiled in Appendix B of *Sow the Wind* and are condensed below.[7]

---

[6] *Id., Sow the Wind*, Table 6
[7] *Id., Sow the Wind*, Tables 10 through 14

SRS Property Line

Cm	Facility	Distance (m)	Pollutants
458.6372226	F-SP0023	9388	NOx, HNO3, VOC, TSP, SOx, PM-10
0.0001357	F-SP0256	9242	HNO3
20.9824962	H-SP0002	11523	NOx, HNO3, VOC, TSP, PM-10, Hg, Ni
0.4229316	H-TP0001	11393	TSP, PM-10, VOC, Ni
315.951165	K-PF0002	9036	TSP, SOx, NOx, CO, PM-10,VOC, Pb
85.0646	K-PF0003	9038	SOx, NOx, CO, PM-10, VOC
8.57049937	S-DP0007	10929	NOx, CH2O2, HNO3, SOX, Hg, HF
889.6290505	Total		

Jackson

Cm	Facility	Distance (m)	Pollutants
0.00000865	F-SP0256	11120	HNO3
2.46652209	K-PF0002	17680	TSP, SOx, NOx, CO, PM-10,VOC, Pb
0.65988696	K-PF0003	17680	SOx, NOx, CO, PM-10, VOC
1.69749	M-MP0411	4550	HCN
4.8239077	Total		

Williston

Cm	Facility	Distance (m)	Pollutants
138.9198188	F-SP0023	27110	NOx, HNO3, VOC, TSP, SOx, PM-10
0.00003706	F-SP0256	27250	HNO3
7.33038344	H-SP0002	24030	NOx, HNO3, VOC, TSP, PM-10, Hg, Ni
0.2359812	H-TP0001	24450	TSP, PM-10, VOC, Ni
146.4862204	Total	24360	

New Ellenton

Cm	Facility	Distance (m)	Pollutants
0.00003567	F-SP0256	15550	HNO3
0.5107284	H-TP0001	15880	TSP, PM-10, VOC, Ni
16.42072304	H-SP0002	16090	NOx, HNO3, VOC, TSP, PM-10, Hg, Ni
0.67797	M-MP0411	10720	HCN
4.89201691	S-DP0007	12940	NOx, CH2O2, HNO3, SOX, Hg, HF
22.50147402	Total		

Aiken

Cm	Facility	Distance (m)	Pollutants
0.000001192	F-SP0256	30660	HNO3
4.17989588	H-SP0002	31090	NOx, HNO3, VOC, TSP, PM-10, Hg, Ni
0.1205568	H-TP0001	31000	TSP, PM-10, VOC, Ni
4.300453872	Total		

C_m = modeled pollutant concentration in micrograms per cubic meter ($\mu g/m^3$)
Pollutants are listed in descending order of ambient concentration

Pollutants Detected By Sampling of Air Outside SRS

In addition to air dispersion modeling, the Blue Ridge Environmental Defense League gathered a series of samples at various locations around SRS. We utilized the grab-sample technique and equipment developed by Communities for a Better Environment and Contra Costa (CA) Health Services and certified by the US EPA. *Sow the Wind* Appendix C contains a 2001 US EPA Region 9 quality assurance memo on the program. We had the samples analyzed for volatile organic compounds and sulfur compounds at a certified air quality laboratory which detected a variety of toxic air pollutants outside the boundaries of SRS.

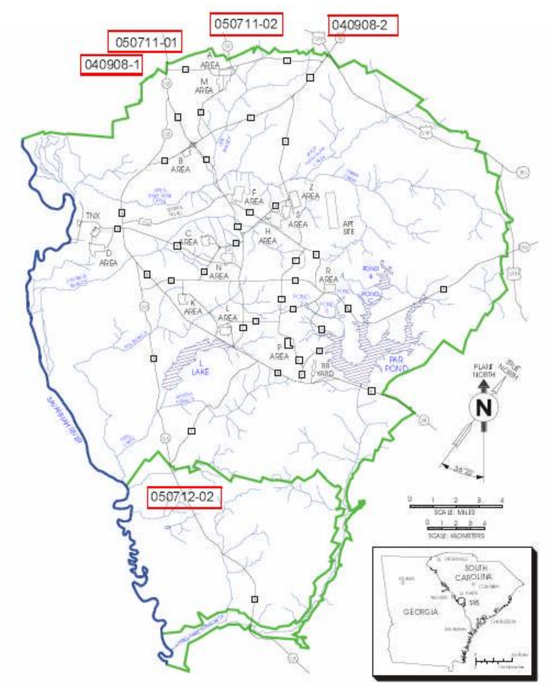
We had five grab-samples analyzed for twenty sulfur compounds per modified methods SCAQMD Method 307-91 and ATSM D 5504-01 using a gas chromatograph equipped with a sulfur chemiluminescence detector (SCD). All compounds with the exception of hydrogen sulfide and carbonyl sulfide were quantitated against the initial calibration curve for methyl mercaptan. Also, samples were analyzed for 45 Volatile Organic Compounds by combined gas chromatograph/mass spectrometry (GCMS) and for tentatively identified compounds utilizing a direct cryogenic trapping technique. The analyses were performed according to the methodology outlined in EPA Method TO-15 modified by the use of Tedlar sample bags.

Our sample collection dates and times are listed below. The sample numbers correspond to the map locations.

Grab Sample Dates, Times, Vicinity[8]

Sample # 040908-1	September 8, 2004 11:42 AM	Jackson
Sample # 040908-2	September 8, 2004 1:49 PM	New Ellenton
Sample # 050711-01	July 11, 2005 5:43 PM	Jackson
Sample # 050711-02	July 11, 2005 6:23 PM	SSR 57
Sample # 050712-02	July 12, 2005 9:42 AM	Hattieville

Map of SRS With Air Sample Test Sites[9]



[8] *Id., Sow the Wind*, Table 15
[9] *Id., Sow the Wind*, Figure C

These tests detected actual ambient levels of a variety if volatile organic and reduced sulfur compounds in the air near SRS. Our results are listed below. All concentrations are in micrograms per cubic meter (μ/m^3).

Actual Ambient Concentrations[10]

Toxic air pollutant	μ/m^3
Sample # 040908-1	
Hydrogen sulfide	5.13
dimethyl disulfide	10.6
Toluene	8.8
Styrene	7
Sample # 040908-2	
Acetone	36
Sample # 050711-01	
Toluene	19
Styrene	5.5
Sample # 050711-02	
Carbon disulfide	8
Toluene	21
Sample # 050712-02	
carbon disulfide	6.1
Toluene	25

Tentatively Identified Compounds (Estimated results)[11]

Toxic air pollutant	μ/m^3
Sample # 040908-1	
2-Methylpentane	10
Isooctane	20
2,4-Dimethylheptane	20
Branched alkanes	10-20
n-Dodecane	30
Isothiocyanatocyclohexane	10
Sample # 050711-01	
Isoprene	50
2-methylpentane	10
$C_{14}H_{30}$ alkane	20
Sample # 050711-02	
Isoprene	20
3-Methylpentane	20

Our grab-sample tests were typically carried out during light, steady wind conditions at

[10] *Id., Sow the Wind*, Table 16
[11] *Id., Sow the Wind*, Table 17

points close to but outside of the perimeter of the Savannah River Site. Wind direction at time of each test was downwind from SRS.

Ambient Levels Traced to SRS Processes

Our air testing program detected styrene in the atmosphere near Jackson, SC (air test results listed above). Our technical experts indicated that styrene would likely have come from polymerization operations. We identified a possible source: the analysis of radioactive sludge which involves the use of polystyrene. These findings are detailed in *Sow the Wind*.

Conclusion and Recommendation

The amount of airborne radioactive pollution from SRS is massive. It is greater than the liquid releases to streams and groundwater by at least an order of magnitude. The relative impact of air pollution on surrounding communities is less well understood than water pollution impacts because actual studies of air contaminants are relatively few in number. That is why we conducted our own research. We recommend that the ATSDR use the means at its disposal to either conduct its own analysis and produce conclusive results or require the US Department of Energy to do what should have been done decades ago; i.e., determine the public health impact of air polluting radioactive and toxic air pollutants on public health in the Central Savannah River Area.

There is an overarching reason for action: the outline of environmental injustice overshadows SRS. This injustice extends to commercial nuclear plants, uranium mines, fuel enrichment and fabrication plants, and other waste sites. Most of all, this injustice affects families living near radioactive facilities. Recent studies indicate that there is nuclear power-related environmental injustice, particularly in the southeastern United States. Is this ongoing inequality deliberate? Or have the habits and patterns of the past become so much a part of the landscape that the image of a colorblind society can be maintained even while injustice persists? Government officials must take into account this pernicious, unwanted legacy whenever nuclear contamination and public health issues are concerned.

Thank you for the opportunity to present these remarks.

Respectfully,

Louis A. Zeller, Executive Director

End Note: As part of a 1998 court settlement between U.S. Department of Energy and 39 plaintiffs, DOE established a $6.25 million Citizensô Monitoring and Technical Assessment Fund to provide money to nonprofit, non-governmental organizations and federally recognized tribal governments working on issues related to the nuclear weapons complex. The Fund was established to help those groups procure technical and scientific assistance to perform technical and scientific reviews and analyses of environmental management activities at DOE sites. These grants supported research and monitoring of DOE environmental management activities at sites throughout the country and the dissemination of the technical and scientific reviews and analyses undertaken with monies from the Fund. The Fund also represented an opportunity to develop new approaches for community-based research applicable to other environmental issues and problems.