



NATURAL RESOURCES DEFENSE COUNCIL

May 12, 2004

The Honorable Lindsey Graham  
290 Russell Senate Office Building  
Washington, D.C. 20510

Dear Senator Graham,

I am writing to express serious concerns about erroneous information your office has used publicly in its efforts to exempt the Department of Energy (DOE) from the Nuclear Waste Policy Act (NWPA) in South Carolina.

As you know, in a closed-door session on May 7, 2004, the Senate Armed Services Committee adopted a DOE-crafted amendment to the FY05 Defense Authorization bill sponsored by you. The provision, which is opposed by the Natural Resources Defense Council, several other conservation and environmental groups, and several states and tribes, would exempt the DOE from decades of compliance with the NWPA, would allow DOE authority to abandon potentially millions of gallons of highly radioactive waste in corroding tanks next to the Savannah River that divides South Carolina and Georgia, and partially reverses a 2003 Federal court decision that holds DOE accountable to the NWPA in South Carolina and elsewhere. This provision of the FY05 defense spending bill harms not only South Carolina but also sets a terrible precedent for nuclear waste cleanup in other states, and is certain to be the subject of a floor fight in the Senate in upcoming weeks.

In the course of lobbying for this legislative exemption, on May 5, 2004, Mr. Aleix Jarvis, your legislative director, sent an email to various congressional aides with the proposed legislation and a table entitled "Estimates of Savannah River Site Tank Residual Waste" I understand this unsigned table was provided to your staff by DOE (hereinafter referred to as the "DOE Table" and included as Attachment 1 to this letter). The DOE Table purports to demonstrate that only a small fraction of radioactive waste will be left in the corroding storage tanks adjacent to the Savannah River and the resulting drinking water dose will be negligible. In his email, Mr. Jarvis, states,

*I believe that there is some bad information out there on the impact of this language, some of which I'm afraid is intentionally misleading. Just in the last two hours or so, has there been a "Graham Amendment." I hope everyone realizes that the Senator has made it publicly clear on many occasions that we need a fix to this problem and the (sic) he believes that this is a sound environmental and budgetary decision, and that he has been working toward that end all the while trying to keep the many interested parties in the loop. (Emphasis supplied)*

(May 5, 2004 email from Senator Graham's Staff. Attachment 2).

Despite the admonition that others have provided "bad" and "intentionally misleading" information, the DOE Table that your staff has circulated contains information that goes far beyond being misleading. It is factually incorrect and is designed to convey exactly the opposite message that a correct and complete analysis would send.

On May 11, 2004, we contacted your office and requested that: (1) your staff identify the likely source at DOE of that erroneous and misleading information; (2) your staff set up a way to resolve this matter via telephone conference call or meeting; and (3) if after such a resolution you reach a conclusion that the information your office publicly used was incorrect, you publicly retract that misleading information. We are pleased to note that you and your staff are taking steps to understand the magnitude of the discrepancies in the DOE Table. With this letter we hope to assist you in this effort. We intend to use this letter to alert others, particularly those who have been sent the DOE Table, to the egregious errors in the DOE Table. As the floor vote on the FY05 defense spending bill is imminent, we feel compelled to publicly advance our concerns sooner rather than later.

One of the arguments that you and your staff have made is that DOE will leave only a small fraction of high-level waste in the tanks. We would like to explain why you are wrong and how badly the information supplied by DOE is in error. At issue here is the amount or the fraction of the existing radioactivity in the 51 tanks at the SRS that may remain in the tanks under the proposed amendment that you have offered.

The DOE Table calculates the percent of radioactivity remaining in the two tanks that have been grouted and closed (Tanks 17 and 20) and the two tanks that are claimed by DOE to have been "cleaned" but not grouted (Tanks 18 and 19). These percentages are found in the second column from the right in Attachment 1. The percentages were calculated by dividing the "Residual Radioactivity" (values in column 6) by the "Original Radioactivity" (values in column 5), and multiplying the result by 100 in order to convert the fractions into percentages. The first problem is that the "Original Radioactivity" values do not reflect the actual amount of radioactivity in the four tanks just prior to initiating the cleanup of these tanks. Rather they approximate the average amount of radioactivity in all the tanks. As a consequence the radioactivity content in each of the four tanks prior bulk waste removal has been over-estimated by a huge amount—by more than one hundred times. This makes the resulting percentages too low by the same factor.

The magnitude of these errors can be deduced from the data presented in Attachment 3, titled "Savannah River High-Level Wastes as of 2/23/99." These data are adapted from an electronic spreadsheet that represented the Savannah River Site's (SRS) best estimate (where data were available) of the volume and radioactivity content of each tank as of February 23, 1999. The electronic spreadsheet from which these data were adapted served as a source for the preparation of "Table C.3.1-1. Tank farm residual after bulk waste removal" in the DOE's *Savannah River Site High-Level Waste Tank Closure Final*

*Environmental Impact Statement*, DOE/EIS-0303, May 2002.<sup>1</sup> Tanks 17 and 20 had already been “cleaned” by February 23, 1999, so the table in Attachment 3 does not reflect the inventories in these two tanks prior to bulk waste removal. However, bulk waste removal had not been initiated at Tanks 18 and 19, so we will use the data for Tank 19 to make our case.

As seen in the columns in Attachment 3 that are labeled “Total Vol.” (gal) (Column 5) and “Total Inventory” (Ci) (Column 9), Tank 19 was estimated as of February 1999 to contain 278,952 gallons of high-level waste containing 25,044 curies of radioactivity. Thus, if there are 16,800 gallons of high-level waste remaining in Tank 19, this represents 6 % of the 1999 waste volume of 278,952 gallons. This is a better measure of DOE’s bulk waste removal and tank cleaning capability than the 1.24 % reported in the DOE Table. It is inappropriate to use as the “original volume” the historical maximum volume because it is an inappropriate measure of the *existing* waste volume just prior to initiating bulk waste removal. The maximum historical volume does not reflect subsequent transfers, if any, of liquid waste to other tanks, or the loss of liquid as a consequence of evaporation, including any evaporation due to self-boiling in the tanks.

I turn now to the question of the percentage of radioactivity left in Tank 19, which is the more important consideration. Between August 1996 and September 2001, six samples were taken from Tank 19.<sup>2</sup> These samples were used to revise the estimates of the radioactivity content in the sludge of Tank 19.<sup>3</sup> Most of the correction is due to an underestimate of the cesium-137 content in the sludge. The table in Attachment 3, which gives a sludge inventory of 1,693 curies, includes in this total only 4 curies of cesium-137. Subsequent measurements indicated that 12,000 curies of cesium-137 would be a more conservative estimate. It is unclear to me whether the 12,000 curies also reflects the radioactivity of barium-137m, a daughter product of the radioactive decay of cesium-137. If it does, and if we are also correct for radioactive decay, our best estimate is that the radioactivity content of Tank 19 as of 2/23/99 was approximately 50,700 curies, instead of 25,044 curies given in Attachment 3 (column 9). Thus, it appears there has been no appreciable reduction in the radioactivity content of Tank 19 since February 1999, despite the fact that the volume of liquid waste has been reduced more than ten fold.

Senator, in sum, the DOE Table gives the impression that DOE has removed 99.4% of the radioactivity from Tank 19, when in reality it appears that bulk waste removal and cleanout of Tank 19 has resulted in only a negligible reduction in the radioactivity content of this tank since 1999, just prior to the commencement of the bulk waste removal and cleanout processes.

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<sup>1</sup> See DOE/EIS-0303, page C-18, Table C.3.1-1, n. (a).

<sup>2</sup> P.D. d’Entremont and J.L. Thomas, “Characterization of Tank 19 Residual Waste,” Westinghouse Savannah River Company, WSRC-TR-2002-00052, Revision 0, March 15, 2002 (“d’Entremont & Thomas, Tank 19 Report”). Found on the web at <http://www.srs.gov/general/pubs/fulltext/tr2002052/tr2002052.html>.

<sup>3</sup> Ibid.

What is in store for the other tanks? Several of these tanks have sludge inventories of 10 to 20 million curies—200 to 400 times the radioactivity inventory of Tank 19. As seen from Attachment 3, there are 28 tanks at Savannah River that together contain roughly 200 million curies of radioactivity in sludge. If Tank 19 is DOE's measure of success, then DOE will leave perhaps one-third to one half of the high-level waste in shallow land burial at the Savannah River Site. If a scientist went before the Board on Radioactive Waste Management of the National Academies with such a preposterous proposal—to leave 100 to 200 million curies of radioactive sludge in corroding tanks at Savannah River—he or she would be the laughing-stock of the assembled experts.

The DOE Table has other problems as well. The last column purports to show the radiation dose from drinking water contaminated from radioactivity leaching from the tanks. These results are next to worthless without providing the underlying assumptions, or references to them. Moreover, the radiation dose numbers do not scale with the radioactivity in the tanks—the largest dose is from the tank containing the least amount of radioactivity! I do not believe these calculations are any more accurate than the radioactivity calculations in the DOE Table.

Senator, you have been badly deceived by the Department of Energy. After you have studied the information we have provided you, I earnestly hope for the sake of future generations of South Carolinians that you will move to strike the amendment that you offered in Committee. I also recommend that you seek legislation that would call for an independent review of these issues, including the accuracy of the DOE calculations, by the National Academies. You should also request that the DOE Office of Inspector General investigate this case to see if this is representative of a wider pattern of abuse of scientific data by the DOE's Offices of Environmental Management and the General Counsel. I do not believe this is an isolated incident. In the District Court proceedings, DOE attempted to deceive the Court into believing that the radioactivity remaining in the tanks was "low-activity" waste by mathematically averaging the concentration of the radioactivity in the tank residuals with that of the overlying grout even though there was no appreciable mixing of the two. If I can be of any further assistance to you or your staff in resolving these issues please do not hesitate to contact me.

Sincerely,



Thomas B. Cochran, Ph.D.  
Director, Nuclear Program  
Wade Greene Chair for Nuclear Policy

Attachment 1: DOE Table, "Estimates of Savannah River Site Tank Residual Waste"

Attachment 2: May 5, 2004 email from Senator Graham's staff.

Attachment 3: "Savannah River High-Level Wastes as of 2/23/99." This table was adapted by NRDC from data in a DOE electronic file, wctables.xls, part of the DOE Waste Characterization System for tank waste at the Savannah River Site.

**Estimates of Savannah River Site Tank Residual Wastes**

	Original Volume (Gal)****	Residual Volume (Gal)	% Volume Remaining	Original Radioactivity (Ci)****	Residual Radioactivity (Ci)	% Radioactivity Remaining	Dose from Drinking Water (mRem/Yr)***
Tank 17*	1,300,000	7,280	0.56%	8,340,000	478	0.006%	0.022
Tank 18**	1,300,000	6,730	0.52%	8,340,000	20,500	0.246%	0.0024
Tank 19**	1,355,000	16,800	1.24%	8,340,000	50,600	0.607%	0.0035
Tank 20*	1,300,000	3,500	0.27%	8,340,000	104	0.001%	0.0055

\*Tanks 17 and 20 have already been closed with stabilizing grout.

\*\*Tanks 18 and 19 have been emptied and cleaned, but no stabilizing grout has been added.

\*\*\*EPA Drinking Water Standard is 4mrem/yr

\*\*\*\* Based on maximum inventory recorded in tank history

\*\*\*\*\* Based on average curie content of 50 tanks using 9/30/2002 tank farm inventory of 417M curies (WSRC-RP-2003-00323 Rev. 1).

Only one emptied tank (Tank 19) contains more than 1% of the original tank waste by volume (1.24%)

No tanks contain more than 1% of the estimated original tank waste by radioactivity (most is 0.607%)

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Sent: Thu 5/6/2004 9:00 AM

From: [Redacted]  
To: [Redacted]  
Cc: [Redacted]  
Subject: FW:

-----Original Message-----

From: Jarvis, Aleik (L. Graham)

Sent: Wednesday, May 05, 2004 6:38 PM

To: Moseley, Meredith (L. Graham); drris.sochra@mail.house.gov; danny.cromer@mail.house.gov; David.black@mail.house.gov; Haselden, Brooks (Hollings); Joe.glebocki;lauri.n.groover@mail.house.gov; mike.lieberman@mail.house.gov

Subject:

I wanted to let each of you know where we are in the SASC on the WIR language. After consultation with many of the affected states, Senator Graham plans to offer the attached language in the Full Committee tomorrow. There are several things that I want to make clear to everyone.

1. Efforts continue to bring the other states on board and talks continue between the States and DOE
2. This language will allow us to move forward on removing the liquid from the tanks, separate out the constituent materials, and will result in less than 1% of the total curries remaining in any tank.
3. South Carolina has already closed two tanks: #17 and #20 (see attached Tank Profile)
4. We should continue our efforts to ensure that we get the \$188M for SRS EM in the Appropriations and Authorization process and should insist on a more vigorous monitoring regime at the tank farms.
5. Subsection (b) was added at the request of several states in order to prevent DOE from "reclassifying waste" and then later digging up those materials and shipping them to a low level rather than a high level repository.

I would be happy to talk to anyone interested in these issues. I believe that there is some bad information out there on the impact of this language, some of which I'm afraid is intentionally misleading. Just in the last two hours or so, has there been a "Graham Amendment." I hope everyone realizes that the Senator has made it publicly clear on many occasions that we need a fix to this problem and the he believes that this is a sound environmental and budgetary decision, and that he has been working toward that end all the while trying to keep the many interested parties in the loop.

WIR Tank  
05052004... Profile...

## Savannah River High-Level Wastes as of 2/23/1999

Data Adapted From DOE Waste Characterization System (wctables.xls)

Tank	Sludge Vol.	Salt Vol.	Free Supernate Vol.	Total Vol.	Sludge Inventory	Salt (insol) Inventory	Supernate Inventory	Total Inventory	Sludge Conc.	Salt Conc.	Supernate Conc.
	gal	gal	gal	gal	Ci	Ci	Ci	Ci	Ci/gal	Ci/gal	Ci/gal
1	7,000	480,000	18,957	505,957	1,412,605	358,689	4,994,820	6,766,113	201.80	0.75	38.58
2	4,000	536,000	374	540,374	177,234	400,536	1,732,961	2,310,730	44.31	0.75	14.31
3	4,000	536,000	645	540,645	160,772	400,536	1,736,839	2,298,146	40.19	0.75	14.31
4	127,000	34,000	349,835	510,835	9,388,288	25,407	9,202,909	18,616,604	73.92	0.75	20.62
5	28,152	15,765	0	43,917	6,652,777			6,652,777	236.32		
6	25,000	0	316,460	341,460	7,713,385		818,859	8,532,244	308.54		2.45
7	209,000	0	149,127	358,127	8,531,434		1,834,162	10,365,595	40.82		6.21
8	132,248	0	41,734	173,982	7,919,160		165,329	8,084,489	59.88		1.43
9	4,000	538,000	3,523	545,523	191,028	402,030	1,749,335	2,342,393	47.76	0.75	14.03
10	4,000	213,000	0	217,000	20,400	159,168	121,591	301,159	5.10	0.75	2.45
11	140,000	0	192,788	332,788	12,839,097		703,829	13,542,926	91.71		2.42
12	113,820	60,325	0	174,145	19,571,838			19,571,838	171.95		
13	223,000	0	661,100	884,100	17,929,936		21,612,367	39,542,303	80.40		26.45
14	27,000	156,000	0	183,000	457,559	116,574	1,730,440	2,304,572	16.95	0.75	32.51
15	213,500	102,480	0	315,980	17,438,819			17,438,819	81.68		
16	0	0	0	0							
17	0	0	0	0	2,269			2,269			
18	42,000	0	313,062	355,062	20,855		1,631	22,486	0.50		
19	7,560	13,000	258,392	278,952	1,693	9,714	13,637	25,044	0.22	0.75	0.05
20	0	0	0	0							
21	14,000	0	109,900	123,900	127,414		4,186	131,600	9.10		0.03
22	21,000	0	1,019,052	1,040,052	268,001		3,085	271,086	12.76		
23	43,000	0	849,434	892,434	950		315	1,265	0.02		
24	0	0	283,554	283,554			22,179	22,179			0.08
25	0	1,108,000	163,322	1,271,322		827,973	3,403,880	4,231,853		0.75	8.36
26	281,000	0	923,070	1,204,070	609,114		12,960,823	13,569,938	2.17		11.57
27	0	463,000	807,725	1,270,725		345,985	4,383,356	4,729,341		0.75	4.82
28	0	1,032,000	186,321	1,218,321		771,181	4,239,312	5,010,492		0.75	10.26
29	0	1,000,000	215,864	1,215,864		747,268	8,423,771	9,171,039		0.75	19.33
30	500	65,988	1,087,249	1,153,737	112,098	49,311	28,876,910	29,038,318	224.20	0.75	26.20
31	0	1,014,000	248,547	1,262,547		757,730	11,728,643	12,486,373		0.75	24.87
32	182,871	0	150,579	333,450	25,019,870		3,675,850	28,695,720	136.82		13.19
33	39,000	227,000	261,202	527,202	15,553,599	169,630	96,958	15,820,187	398.81	0.75	0.29
34	25,000	212,000	918,492	1,155,492	22,526,111	158,421	6,763,933	29,448,465	901.04	0.75	6.88
35	64,584	0	1,135,836	1,200,420	23,197,997		21,427,254	44,625,251	359.19		18.14
36	150	1,094,000	153,304	1,247,454	24,795	817,511	16,034,435	16,876,741	165.30	0.75	40.69
37	0	973,000	267,785	1,240,785		727,092	14,416,459	15,143,551		0.75	29.92
38	0	870,480	369,252	1,239,732		650,482	830,374	1,480,856		0.75	1.48
39	92,664	0	952,263	1,044,927	24,101,549		4,896,760	28,998,309	260.10		4.81
40	173,000	0	1,049,393	1,222,393	512,817		2,436,318	2,949,135	2.96		2.08
41	0	1,231,000	14,208	1,245,208	32,172	919,887	1,411,811	2,363,870		0.75	4.95
42	49,140	0	20,569	69,709	504,260		2,250	506,509	10.26		0.04
43	58,756	123,084	921,915	1,103,755	2,543,127	91,977	1,311,105	3,946,209	43.28	0.75	1.32
44	0	989,000	282,076	1,271,076		739,048	5,159,382	5,898,431		0.75	10.33
45	0	1,130,000	136,759	1,266,759		844,413	5,074,001	5,918,414		0.75	13.17
46	0	318,919	591,013	909,932		238,318	10,560,928	10,799,246		0.75	15.97
47	248,000	868,000	113,237	1,229,237	389,923	648,629	2,486,885	3,525,436	1.57	0.75	5.20
48	0	0	237,943	237,943			1,511	1,511			
49	0	0	97,297	97,297							
50	0	0	254,966	254,966			20	20			
51	567,567	0	0	567,567	3,120,369		52,405	3,172,773	5.50		
<b>Total</b>	<b>3,171,512</b>	<b>15,404,041</b>	<b>16,128,124</b>	<b>34,703,677</b>	<b>229,073,313</b>	<b>11,377,510</b>	<b>217,103,804</b>	<b>457,554,627</b>			