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DISCLAIMER

Key Words:
LLW Disposal Limits

Retention:
#Permanent#

Protocol for the E-Area Low Level Waste Facility Disposal Limits Database

R. F. Swingle
L. B. Collard

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ADC & Reviewing Official:_____
(, Manager)

Date:_____

JANUARY 31, 2006

Savannah River National Laboratory
Washington Savannah River Company
Savannah River Site
Aiken, SC 29808

Prepared for the U.S. Department of Energy Under Contract Number DE-AC09-96SR18500

SRNL

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REVIEWS AND APPROVALS

Authors

R. F. Swingle, Chemical Science & Technology — Date: 3/2/06

L. B. Collard, Chemical Science & Technology — Date: 3/2/06

Design Check
(per Manual E7, Procedure 2.60)

M. E. Stallings, Chemical Science & Technology (per telecon by R. F. Swingle II) — Date: 3/6/06

Approvals

B. T. Butcher, Level 4, Chemical Science & Technology — Date: 3/7/06

J. C. Griffin, Level 3, Chemical Science & Technology — Date: 3/21/06

W.T. Goldston, Waste Management Area Project — Date: 3/21/06

LIST OF ACRONYMS

DOE	Department of Energy
ELLWF	E-Area Low Level Waste Facility
GW1	Groundwater 1 Limit
GW2	Groundwater 2 Limit
GW3	Groundwater 3 Limit
IL	Intermediate Level Waste
LAW	Low Activity Waste
PA	Performance Assessment
SA	Special Analysis
SRNL	Savannah River National Laboratory

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1 EXECUTIVE SUMMARY

A database has been developed to contain the disposal limits for the E-Area Low Level Waste Facility (ELLWF). This database originates in the form of an EXCEL© workbook. The pertinent sheets are translated to PDF format using Adobe ACROBAT©. The PDF version of the database is accessable from the Solid Waste Division web page on SHRINE. In addition to containing the various disposal unit limits, the database also contains hyperlinks to the original references for all limits. It is anticipated that database will be revised each time there is an addition, deletion or revision of any of the ELLWF radionuclide disposal limits.

2 INTRODUCTION

During 2004 and 2005, a database was developed to collect all E-Area Low Level Waste Facility disposal limits into one place to reduce the confusion of having limits in a number of different references. In order to make the database available to a wide audience and facilitate its use, the database has been translated into a PDF format and linked to the Solid Waste Division's web page. Additionally, hyperlinks to PDF versions of the original references for all limit are provided.

3 DISCUSSION

3.1 Background

In late 2004, it was recognized that the proliferation of different reports containing disposal limits for the various ELLWF disposal units was leading to confusion over which limits were valid at any given time. At that time it was decided that a database containing all the valid disposal limits for the ELLWF was desirable. L. B. Collard initially developed the database as an EXCEL workbook. The workbook contains separate spreadsheets for each type of disposal unit (LAW Vault, IL Vault, Slit Trenches, Engineered Trenches, etc.). There were two spreadsheets for each type of disposal unit: a hidden spreadsheet containing limits exactly as given by SRNL in the report, and a public sheet which cleans up the limits as necessary (e.g., removes limits >1E20 Ci). Otherwise the two spreadsheets for each facility were identical. Each sheet contains all the limits (i.e., GW1, GW2, GW3, Air, Radon, Intruder-Agriculture, Intruder-Resident, Intruder-Post Drilling) as necessary for all species (including isotopes with different matrices as needed). For each limit there is an associated reference. This reference is a report, or even a single table in a report when more than one report is used. There are hyperlinks to the specific tables from the referenced reports.

After discussions with the Solid Waste webmaster, L. C. McCollum, it became apparent that an EXCEL workbook was not the optimum platform for presenting the database on the web. Therefore, the pertinent spreadsheets of the EXCEL workbook have been converted to a PDF format using Adobe ACROBAT.

3.2 Structure

The limits are presented in PDF format in tabular form with a separate table for each type of disposal unit. PDF bookmarks will be provided to each of the tables (e.g., IL Vault, Naval Reactor Pad, etc.) to aid in

navigating the database. The various limits (GW1, GW2, GW3, Air, Radon, Intruder – Agriculture, Intruder – Residential, Intruder – Post Drilling) are given in each table for all the pertinent radionuclides. Multiple sets of limits are presented for some radionuclides. This is done when limits have been calculated for multiple waste forms within a disposal unit. Only limits pertinent to Solid Waste (e.g., no limits over 1E20 Ci) are presented. On the right side of each table, a series of numbers is given representing the source reference for each limit. At the top of each table, there is a hyperlink to each of the sources referenced in the table. Colors may be used to additionally distinguish between limits from different references within the same table. At the end of the database, a complete list of references is given. In addition to the sources for all of the limits, this list includes the appropriate revision of this protocol report and as needed for future revisions, the transmission memo. All of these references will be hyperlinked to copies of the original documents. An example ELLWF Limits database is given as Attachment 1.

3.3 Database Revisions

The database will be updated as Special Analysis (SA) reports and/or Performance Assessment (PA) revisions or other reports which give new updated limits are issued and approved for use by DOE. An updated computer file container the PDF files for the database and all pertinent references will be transmitted to the Solid Waste Division's webmaster by the SRNL custodian. The PDF file will be named with the date applicable (e.g., ELLWF_Limits-12-12-05.PDF) to reduce the confusion between different versions. The applicable version should always be the one with the latest date. To increase ease of use, current changes in any given revision of the ELLWF Disposal Limits database will be marked using bold italicized formatting.

The SRNL custodian will keep all versions (past and present) on his or her computer in case there is a need to reference back to earlier versions. This library of ELLWF Limits files should always reside on a computer that is covered by the site computer backup system.

A cover letter (numbered memo) will be transmitted along with each updated version indicating that this is the latest set of limits, explaining any changes, and documenting a review of the database. Review of the updated database will be conducted per Manual E7, Procedure 2.60. The review shall include verification of the valid references with the manager of the Environmental Assessment and Performance Modeling Group of SRNL as well as verification of proper transcription of all limits. The cover letter will be signed by the database custodian, the design reviewer and the manager of the Environmental Assessment and Performance Modeling Group. A revision to the database will be linked to the Solid Waste website only after approval of the cover letter.

To increase ease of use, current changes in any given revision of the ELLWF Disposal Limits database will be marked using bold italicized formatting.

4 CONCLUSIONS

The ELLWF Disposal Limits database is now approved for use. This report gives the protocols for the update of the database. Approval of this report also signifies review and approval of the initial version of the database. Review and approval of future revisions to the ELLWF Disposal Limits database will be accomplished by issuance of an accompanying numbered memo.

5 FUTURE WORK

The ELLWF Disposal Limits database will be updated periodically as new disposal limits are approved. Additionally, we have been asked to include assumptions and caveats for all the limits. The current plan in dealing with this is to include a section in the SAs that gives assumptions and then insert a hyperlink to this section in the database. Currently, our SAs are not formatted in such a way to allow us to link to the assumptions (there is no discrete assumptions section). However, as this section is built into the SAs, we will begin providing hyperlinks to it from the database.

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6 ATTACHMENT

Example of ELLWF Limits Database

CIG Trenches	Updated on 9/8/2004																	
References	Rev.	Date	ID															
WSRC-TR-2003-00438:CIG Trench limits	0	9/15/2003	1															
WSRC-TR-2004-00428:Unanalyzed radionuclide limits	0	8/26/2004	6															
WSRC-RP-2004-00636:1000 Year Time of Compliance	0	9/30/2004	7															
	WITS	Limits (Ci)									References							
Nuclide	Nuclide	Ag	Res	PD	Air	Radon	GW1	GW2	GW3		Ag	Res	PD	Air	Radon	GW1	GW2	GW3
Am-241	AM241	2.7E+02	8.6E+10	1.5E+03				7.0E+03			1	1	1	1	1	1	1	7
Am-242m	AM242M	2.1E+03	1.6E+05	3.8E+03							1	6	1	1	1	1	1	7
Am-243	AM243	2.1E+01	1.2E+08	9.2E+02				3.9E+11			1	1	1	1	1	1	1	7
Ba-133	BA133		4.3E+09	8.2E+06							6	6	6	6	6	6	6	7
Bk-249	BK249	1.6E+04	2.2E+09	7.3E+05				5.7E+15			1	1	1	1	1	1	1	7
C-14	C14	4.3E+02		2.0E+03	7.0E+01		1.7E+18	5.7E+01			1	1	1	1	1	1	1	7
C-14 K&L Basin	C14K	3.9E+02		2.0E+03	7.0E+01			6.2E+01			1	1	1	1	1	1	1	7
Cd-113m	CD113M	1.0E+16		3.5E+08							1	1	1	1	1	1	1	7
Cf-249	CF249	4.0E+01	5.6E+06	1.8E+03				1.4E+06			1	1	1	1	1	1	1	7
Cf-250	CF250	6.8E+05		1.5E+07							1	1	1	1	1	1	1	7
Cf-251	CF251	5.2E+01		1.4E+03							1	1	1	1	1	1	1	7
Cf-252	CF252	4.7E+06		4.5E+07							1	1	1	1	1	1	1	7
Cl-36	CL36			2.5E+01			4.7E-02	1.6E+01			6	6	6	6	6	6	6	7
Cm-242	CM242	6.6E+06	2.7E+09	2.8E+06				4.9E+10			1	6	1	1	1	1	1	7
Cm-243	CM243	7.8E+08	2.7E+09	2.5E+06							1	1	1	1	1	1	1	7
Cm-244	CM244	4.8E+04		4.4E+05							1	1	1	1	1	1	1	7
Cm-245	CM245	3.3E+01	1.0E+13	8.0E+02				2.1E+04			1	1	1	1	1	1	1	7
Cm-246	CM246	1.3E+02		1.2E+03							1	1	1	1	1	1	1	7
Cm-247	CM247	1.1E+01	3.8E+06	1.1E+03				2.1E+13			1	1	1	1	1	1	1	7
Cm-248	CM248	3.4E+01	1.4E+11	3.3E+02				1.3E+15			1	1	1	1	1	1	1	7
Co-60	CO60		2.1E+09								1	1	1	1	1	1	1	7
Cs-135	CS135	7.9E+03		2.4E+04				7.2E+18			1	1	1	1	1	1	1	7
Cs-137	CS137	6.0E+07	2.2E+06	2.3E+06							1	1	1	1	1	1	1	7
Eu-152	EU152	1.6E+16	2.4E+06	2.0E+10							1	1	1	1	1	1	1	7
Eu-154	EU154		3.6E+07	6.2E+13							1	1	1	1	1	1	1	7
H-3	H3			2.3E+13	4.1E+05		2.3E+10	8.6E+07			1	1	1	1	1	1	1	7
I-129 ETF Carbon	I-129C	5.7E+01		3.6E+02			1.8E-02	1.7E-02			1	1	1	1	1	1	1	7
I-129 ETF GT-73	I-129I	5.7E+01		3.6E+02			3.4E+11	9.4E-02			1	1	1	1	1	1	1	7
I-129 F-Area Carbon	I-129B	5.7E+01		3.6E+02			9.6E+10	2.5E-02			1	1	1	1	1	1	1	7
I-129 F-Area CG-8	I-129G	5.7E+01		3.6E+02			3.6E+08	6.2E-04			1	1	1	1	1	1	1	7
I-129 F-Area Dowex 21K	I-129D	5.7E+01		3.6E+02			3.1E+11	8.5E-02			1	1	1	1	1	1	1	7
I-129 F-Area Filtercake	I-129J	5.7E+01		3.6E+02			1.4E+09	7.4E-04			1	1	1	1	1	1	1	7
I-129 Generic	I129			4.5E+02			1.8E+08	6.1E-04			1	1	1	1	1	1	1	7
I-129 H-Area Carbon	I-129A	5.7E+01		3.6E+02			3.5E+10	9.2E-03			1	1	1	1	1	1	1	7
I-129 H-Area CG-8	I-129H	5.7E+01		3.6E+02			1.1E+10	2.9E-03			1	1	1	1	1	1	1	7
I-129 H-Area Dowex 21K	I-129E	5.7E+01		3.6E+02			2.2E+11	5.9E-02			1	1	1	1	1	1	1	7
I-129 H-Area Filtercake	I-129F	5.7E+01		3.6E+02			6.9E+10	1.8E-02			1	1	1	1	1	1	1	7
I-129 K&L Basin	I-129K	6.0E+01		3.6E+02			7.6E+11	1.1E-01			1	1	1	1	1	1	1	7
I-129 SIR 1200	I129S	5.7E+01		3.6E+02			1.7E-01	1.7E-01			1	1	1	1	1	1	1	7
K-40	K40		6.8E+01	5.2E+02			5.5E+01	5.4E-01			6	6	6	6	6	6	6	7
Kr-85	KR85		9.7E+10	1.1E+09							6	6	6	6	6	6	6	7

Example of ELLWF Limits Database Cont.

	WITS	Limits (Ci)								References								
Nuclide	Nuclide	Ag	Res	PD	Air	Radon	GW1	GW2	GW3	Ag	Res	PD	Air	Radon	GW1	GW2	GW3
Mo-93	MO93	6.3E-06		4.0E-08			2.3E-03	9.7E-00		1	1	1	1	1	6	6	7
Nb-93m	NB93M			1.3E-06						0	0	0	0	0	6	6	7
Nb-94	NB94	2.3E-00		2.7E-03				1.2E-12		1	1	1	1	1	6	6	7
Ni-59	NI59	8.1E-04	3.4E-04	4.3E-05						1	1	1	1	1	6	6	7
Ni-63	NI63	3.3E-06		1.3E-06						1	1	1	1	1	6	6	7
Np-237	NP237	9.9E-00	1.7E-07	1.2E-02				1.4E-00		1	1	1	1	1	6	6	7
Pb-210	PB210		1.4E-11	2.1E-03						0	0	0	0	0	6	6	7
Pd-107	PD107	7.8E-08		9.2E-05				4.1E-06		1	1	1	1	1	6	6	7
Pu-238	PU238	3.4E-04		1.4E-04				2.5E-08		1	1	1	1	1	6	6	7
Pu-239	PU239	1.3E-03		1.2E-03						1	1	1	1	1	6	6	7
Pu-240	PU240	1.3E-03		1.2E-03				2.4E-09		1	1	1	1	1	6	6	7
Pu-241	PU241	8.0E-03	2.6E-12	4.5E-04				2.1E-05		1	1	1	1	1	6	6	7
Pu-242	PU242	1.3E-03		1.2E-03				3.9E-09		1	1	1	1	1	6	6	7
Pu-244	PU244	9.8E-00	9.8E-04	1.2E-03				4.3E-09		1	1	1	1	1	6	6	7
Ra-226	RA226		9.2E-00	7.2E-01		2.8E-00	1.0E-19	9.0E-00		0	0	0	0	0	6	6	7
Ra-228	RA228		1.3E-08	2.5E-07						0	0	0	0	0	6	6	7
Rb-87	RB87	4.5E-10		1.2E-04				2.2E-04		1	1	1	1	1	6	6	7
Sb-125	SB125		5.0E-16	7.4E-14						0	0	0	0	0	6	6	7
Se-79	SE79	3.7E-04		2.4E-04				6.8E-11		1	1	1	1	1	6	6	7
Sm-151	SM151	1.0E-08		3.1E-07						1	1	1	1	1	6	6	7
Sn-121m	SN121M	6.0E-06		8.4E-06						1	1	1	1	1	6	6	7
Sn-126	SN126	4.6E-00	5.7E-04	2.0E-03				7.5E-10		1	1	1	1	1	6	6	7
Sr-90	SR90	2.8E-19		2.5E-05				1.6E-05		1	1	1	1	1	6	6	7
Tc-99	TC99			4.6E-05			1.2E-10	3.8E-01		1	1	1	1	1	6	6	7
Tc-99 K&L Basin	TC99K	5.6E-03		2.7E-03			1.5E-13	2.1E-01		1	1	1	1	1	6	6	7
Th-228	TH228	4.6E-00	6.7E-18	3.5E-18						1	0	0	1	1	6	6	7
Th-229	TH229		9.1E-01	5.0E-02				9.5E-03		0	0	0	0	0	6	6	7
Th-230	TH230		1.9E-01	1.9E-02		7.5E-00		1.9E-01		0	0	0	0	0	6	6	7
Th-232	TH232	1.4E-00	1.3E-03	4.8E-03						1	1	1	1	1	6	6	7
U-232	U232	1.7E-03	3.3E-03	9.3E-03				2.9E-08		1	1	1	1	1	6	6	7
U-233	U233	1.3E-00	1.3E-07	3.5E-03				1.2E-05		1	1	1	1	1	6	6	7
U-234	U234	4.2E-00	1.5E-08	4.0E-03		4.9E-01		1.6E-05		1	1	1	1	1	6	6	7
U-235	U235	2.7E-01	6.4E-08	3.7E-03				8.5E-04		1	1	1	1	1	6	6	7
U-236	U236	4.6E-00		4.2E-03				9.9E-04		1	1	1	1	1	6	6	7
U-238	U238	1.2E-00	1.5E-06	4.4E-03						1	1	1	1	1	6	6	7
Zr-93	ZR93	1.2E-05		9.2E-05						1	1	1	1	1	6	6	7
***NOTES																	
Groundwater segment		Start	End														
GW1		0	100														
GW2		100	1000														
GW3		1000	10000														

Some radionuclides have some limits derived from a disposal unit SA and others from the Previously Unanalyzed Radionuclides SA. A limit from the latter SA was imported when the former limit was shown as a blank (indicating a limit of >1E20 Ci; i.e., no limit was needed). However, the former limit should have prevailed. The net result is a lower limit, which is conservative. The lower limit will be removed by the next disposal unit SA.

Example of ELLWF Limits Database Cont.

Engineered Trenches	Updated on 9/1/2004																	
References	Rev.	Date	ID															
WSRC-TR-2004-00300 Slit/Engineered Trench limits	0	6/14/2004	5															
	WITS		Limits (Ci)									References						
Nuclide	Nuclide	Ag	Res	PD	Air	Radon	GW1	GW2	GW3		Ag	Res	PD	Air	Radon	GW1	GW2	GW3
Ag-108m	AG108M		3.9E+01	2.3E+03							5	5	5	5	5	5	5	5
Al-26	AL26		4.0E+00	1.6E+03			7.8E+03	3.5E+01	4.7E+00		5	5	5	5	5	5	5	5
Am-241	AM241		6.3E+05	1.4E+03			8.2E+13	1.8E+05	8.9E+01		5	5	5	5	5	5	5	5
Am-242m	AM242M		1.6E+05	1.4E+03							5	5	5	5	5	5	5	5
Am-243	AM243		4.0E+02	1.2E+03			1.3E+06	1.4E+05	5.4E+02		5	5	5	5	5	5	5	5
Ba-133	BA133		4.3E+09	8.2E+06							5	5	5	5	5	5	5	5
Bi-207	BI207		1.1E+05	2.6E+04							5	5	5	5	5	5	5	5
Bk-249	BK249		1.4E+05	4.9E+05			2.4E+10	2.8E+08	2.5E+05		5	5	5	5	5	5	5	5
C-14	C14			2.0E+03	7.0E+01		2.9E+08	4.5E+01	4.7E+00		5	5	5	5	5	5	5	5
Cd-113m	CD113M			3.0E+04							5	5	5	5	5	5	5	5
Cf-249	CF249		3.7E+02	1.3E+03			6.0E+07	7.0E+05	6.3E+02		5	5	5	5	5	5	5	5
Cf-250	CF250		3.8E+13	2.6E+05					8.7E+07		5	5	5	5	5	5	5	5
Cf-251	CF251		1.4E+03	1.2E+03							5	5	5	5	5	5	5	5
Cf-252	CF252		7.6E+11	5.4E+07			5.8E+14	6.5E+13	7.4E+09		5	5	5	5	5	5	5	5
Cl-36	CL36			2.5E+01			4.7E-02	2.3E-01	1.6E+01		5	5	5	5	5	5	5	5
Cm-242	CM242		2.7E+09	7.1E+05			8.7E+04	9.6E+04	1.9E+05		5	5	5	5	5	5	5	5
Cm-243	CM243		4.1E+07	2.2E+04							5	5	5	5	5	5	5	5
Cm-244	CM244		4.4E+11	1.0E+05			1.5E+05	1.5E+05	1.5E+05		5	5	5	5	5	5	5	5
Cm-245	CM245		2.4E+03	7.7E+02			2.6E+04	2.7E+03	2.7E+02		5	5	5	5	5	5	5	5
Cm-246	CM246		1.0E+11	1.5E+03					2.4E+05		5	5	5	5	5	5	5	5
Cm-247	CM247		7.9E+01	1.3E+03			2.5E+09	3.0E+07	8.2E+03		5	5	5	5	5	5	5	5
Cm-248	CM248		5.6E+06	4.0E+02			4.5E+09	5.0E+08	5.8E+04		5	5	5	5	5	5	5	5
Co-60	CO60		2.0E+09	8.4E+08							5	5	5	5	5	5	5	5
Cs-135	CS135			2.5E+04				1.3E+12	5.3E+00		5	5	5	5	5	5	5	5
Cs-137	CS137		2.1E+06	2.4E+04							5	5	5	5	5	5	5	5
Eu-152	EU152		2.3E+06	6.5E+05							5	5	5	5	5	5	5	5
Eu-154	EU154		4.1E+07	1.1E+07							5	5	5	5	5	5	5	5
Eu-155	EU155		4.0E+18	2.3E+11							5	5	5	5	5	5	5	5
H-3	H3			2.1E+06	4.1E+05		2.0E+00	1.3E+01	1.2E+05		5	5	5	5	5	5	5	5
H-3_ETF-Carbon	H3C			2.1E+06	4.1E+05			4.6E+04	2.9E+03		5	5	5	5	5	5	5	5
I-129	I129		7.4E+09	3.8E+02			1.9E-02	2.8E-04	9.2E-03		5	5	5	5	5	5	5	5
I-129_10	--------		7.4E+09	3.8E+02			6.4E-01	9.2E-04	2.5E-03		5	5	5	5	5	5	5	5
I-129_ETF-Carbon	I-129C		7.4E+09	3.8E+02				4.9E+08	9.0E-02		5	5	5	5	5	5	5	5
I-129_ETF-GT-73	I-129I		7.4E+09	3.8E+02			6.2E+02	9.0E-01	1.2E-01		5	5	5	5	5	5	5	5
I-129_F-Carbon	I-129B		7.4E+09	3.8E+02			8.3E+03	1.2E+01	1.6E+00		5	5	5	5	5	5	5	5
I-129_F-CG-8	I-129G		7.4E+09	3.8E+02			3.1E+00	4.5E-03	2.8E-03		5	5	5	5	5	5	5	5
I-129_F-Dowex-21K	I-129D		7.4E+09	3.8E+02			4.2E+02	6.1E-01	8.3E-02		5	5	5	5	5	5	5	5
I-129_F-Filtercake	I-129J		7.4E+09	3.8E+02			3.5E+00	5.1E-03	2.7E-03		5	5	5	5	5	5	5	5
I-129_H-Carbon	I-129A		7.4E+09	3.8E+02			3.6E+03	5.2E+00	7.0E-01		5	5	5	5	5	5	5	5
I-129_H-CG-8	I-129H		7.4E+09	3.8E+02			2.4E+01	3.4E-02	6.8E-03		5	5	5	5	5	5	5	5
I-129_H-Dowex-21K	I-129E		7.4E+09	3.8E+02			9.7E+02	1.4E+00	1.9E-01		5	5	5	5	5	5	5	5
I-129_H-Filtercake	I-129F		7.4E+09	3.8E+02			4.1E+01	5.8E-02	9.2E-03		5	5	5	5	5	5	5	5
K-40	K40		6.8E+01	5.2E+02			7.4E+09	8.3E+01	8.1E-01		5	5	5	5	5	5	5	5
Kr-85	KR85		9.7E+10	1.1E+09							5	5	5	5	5	5	5	5
Mo-93	MO93			4.8E+05			3.8E+11	2.3E+03	9.7E+00		5	5	5	5	5	5	5	5
Na-22	NA22		2.8E+15	6.0E+14							5	5	5	5	5	5	5	5
Nb-93m	NB93M			1.3E+08							5	5	5	5	5	5	5	5
Nb-94	NB94		9.7E+00	2.8E+03					1.2E+12		5	5	5	5	5	5	5	5

Example of ELLWF Limits Database Cont.

	WITS		Limits (Ci)							References								
Nuclide	Nuclide	Ag	Res	PD	Air	Radon	GW1	GW2	GW3	Ag	Res	PD	Air	Radon	GW1	GW2	GW3
Ni-59	N759			4.2E-05					1.9E-03	S	S	S	S	S	S	S	S
Ni-63	N763			3.0E-05						S	S	S	S	S	S	S	S
Np-237	NP237		1.7E-02	1.1E-02			1.7E-10	3.7E-01	1.8E-02	S	S	S	S	S	S	S	S
Pb-210	PB210		1.4E-11	2.1E-03						S	S	S	S	S	S	S	S
Pd-107	PD107			8.8E-05				8.4E-18	6.3E-02	S	S	S	S	S	S	S	S
Pu-238	PU238		1.4E-07	3.6E-03		4.6E-06	4.4E-02	4.9E-02	9.8E-02	S	S	S	S	S	S	S	S
Pu-239	PU239		3.8E-06	1.5E-03			4.0E-02	4.0E-02	4.1E-02	S	S	S	S	S	S	S	S
Pu-240	PU240		1.2E-09	1.5E-03			4.0E-02	4.0E-02	4.1E-02	S	S	S	S	S	S	S	S
Pu-241	PU241		1.9E-07	4.1E-04			1.3E-04	1.2E-04	4.0E-03	S	S	S	S	S	S	S	S
Pu-242	PU242		7.0E-08	1.6E-03			4.1E-02	4.1E-02	4.1E-02	S	S	S	S	S	S	S	S
Pu-244	PU244		4.4E-01	1.3E-03			4.3E-02	4.3E-02	4.3E-02	S	S	S	S	S	S	S	S
Ra-226	RA226		9.2E-09	7.2E-01		2.8E-00			9.0E-01	S	S	S	S	S	S	S	S
Ra-228	RA228		1.3E-08	2.5E-07						S	S	S	S	S	S	S	S
Rb-87	RB87			1.5E-04				1.2E-17	4.7E-00	S	S	S	S	S	S	S	S
Sb-125	SB125		5.0E-16	7.4E-14						S	S	S	S	S	S	S	S
Se-79	SE79			2.4E-04					1.8E-02	S	S	S	S	S	S	S	S
Sm-151	SM151			6.0E-06						S	S	S	S	S	S	S	S
Sn-121m	SN121M			1.2E-06						S	S	S	S	S	S	S	S
Sn-126	SN126		8.8E-00	2.1E-03					3.9E-01	S	S	S	S	S	S	S	S
Sr-90	SR90			1.7E-03			1.9E-13	1.9E-05	3.9E-02	S	S	S	S	S	S	S	S
Tc-99	TC99		1.0E-09	2.4E-03			6.9E-01	1.7E-01	4.8E-01	S	S	S	S	S	S	S	S
Th-228	TH228		6.7E-18	3.5E-10						S	S	S	S	S	S	S	S
Th-229	TH229		9.1E-01	5.0E-02					9.5E-03	S	S	S	S	S	S	S	S
Th-230	TH230		1.9E-01	1.9E-02		7.5E-00			1.9E-01	S	S	S	S	S	S	S	S
Th-232	TH232		4.5E-00	1.5E-02					3.1E-03	S	S	S	S	S	S	S	S
U-232	U232		3.2E-03	9.5E-02					3.2E-06	S	S	S	S	S	S	S	S
U-233	U233		9.4E-02	2.2E-03					4.8E-03	S	S	S	S	S	S	S	S
U-234	U234		3.8E-03	3.4E-03		1.3E-03			2.7E-03	S	S	S	S	S	S	S	S
U-234_MGlass	U234G		3.8E-03	3.4E-03		1.3E-03			2.3E-06	S	S	S	S	S	S	S	S
U-235	U235		5.1E-02	2.2E-03					4.1E-02	S	S	S	S	S	S	S	S
U-235_MGlass	U235G		5.1E-02	2.2E-03					3.9E-05	S	S	S	S	S	S	S	S
U-236	U236		2.8E-07	4.0E-03					6.5E-03	S	S	S	S	S	S	S	S
U-236_MGlass	U236G		2.8E-07	4.0E-03					2.7E-06	S	S	S	S	S	S	S	S
U-238	U238		9.8E-02	4.0E-03		1.2E-06			4.6E-02	S	S	S	S	S	S	S	S
U-238_MGlass	U238G		9.8E-02	4.0E-03		1.2E-06			2.9E-05	S	S	S	S	S	S	S	S
Zr-93	ZR93			9.6E-05					3.6E-03	S	S	S	S	S	S	S	S
***NOTES																	
Groundwater segment		Start	End														
GW1		0	12														
GW2		12	100														
GW3		100	1000														

Example of ELLWF Limits Database Cont.

ILV			Updated on 8/12/2005																				
References			Rev.	Date	ID																		
WSRC-TR-2004-00346 ILV limits			0	7/20/2004	2																		
WSRC-TR-2005-00331 ILV C-14.lnp			0	8/12/2005	8																		
	WITS	Limits (Ci)								References													
Nuclide	Nuclide	Ag	Res	PD	Air	Radon	GW1	GW2	GW3	Ag	Res	PD	Air	Radon	GW1	GW2	GW3						
Ac-227	AC227		1.2E-07							2	2	2	2	2	2	2	2						
Ag-108m	AG108M		3.9E-04							2	2	2	2	2	2	2	2						
Al-26	AL26		6.6E-02							2	2	2	2	2	2	2	2						
Am-241	AM241		4.1E-10					7.6E-09		2	2	2	2	2	2	2	2						
Am-242m	AM242M		5.7E-06							2	2	2	2	2	2	2	2						
Am-243	AM243		4.4E-07							2	2	2	2	2	2	2	2						
Ba-133	BA133		1.7E-09							2	2	2	2	2	2	2	2						
Bi-207	BI207		4.3E-04							2	2	2	2	2	2	2	2						
Bk-249	BK249		8.1E-08							2	2	2	2	2	2	2	2						
C-14	C14							9.1E-07		2	2	2	8	2	2	2	2						
C-14_KB	C14K							2.6E-06		2	2	2	8	2	2	2	2						
Cf-249	CF249		2.1E-06					1.9E-11		2	2	2	2	2	2	2	2						
Cf-250	CF250		2.1E-18							2	2	2	2	2	2	2	2						
Cf-251	CF251		3.7E-08							2	2	2	2	2	2	2	2						
Cf-252	CF252		6.3E-14							2	2	2	2	2	2	2	2						
Cm-242	CM242		5.5E-11							2	2	2	2	2	2	2	2						
Cm-243	CM243		9.7E-08							2	2	2	2	2	2	2	2						
Cm-244	CM244		2.5E-17							2	2	2	2	2	2	2	2						
Cm-245	CM245		8.2E-09					4.8E-09		2	2	2	2	2	2	2	2						
Cm-246	CM246		5.7E-15							2	2	2	2	2	2	2	2						
Cm-247	CM247		1.4E-06					6.8E-18		2	2	2	2	2	2	2	2						
Cm-248	CM248		4.6E-09							2	2	2	2	2	2	2	2						
Co-60	CO60		8.0E-08							2	2	2	2	2	2	2	2						
Cs-137	CS137		8.3E-05							2	2	2	2	2	2	2	2						
Eu-152	EU152		8.9E-05							2	2	2	2	2	2	2	2						
Eu-154	EU154		1.6E-07							2	2	2	2	2	2	2	2						
Eu-155	EU155		1.6E-18							2	2	2	2	2	2	2	2						
H-3	H3				1.3E-09		5.3E-09	5.5E-09		2	2	2	2	2	2	2	2						
I-129	I129						4.3E-10	4.6E-04		2	2	2	2	2	2	2	2						
I-129_ETF-Carbon	I-129C						1.2E-13	9.7E-02		2	2	2	2	2	2	2	2						
I-129_KB	I-129K							6.2E-03		2	2	2	2	2	2	2	2						
K-40	K40		1.5E-04				2.3E-19	2.0E-01		2	2	2	2	2	2	2	2						
Kr-85	KR85		3.8E-10							2	2	2	2	2	2	2	2						
Na-22	NA22		1.1E-15							2	2	2	2	2	2	2	2						

Example of ELLWF Limits Database Cont.

	WITS	Limits (Ci)								References								
Nuclide	Nuclide	Ag	Res	PD Air	Radon	GW1	GW2	GW3	Ag	Res	PD	Air	Radon	GW1	GW2	GW3		
Nb-94	NB94		1.3E-04						2	2	2	2		2	2	2		
Np-237	NP237		6.4E-06				1.5E-06		2	2	2	2		2	2	2		
Pa-231	PA231		5.1E-05						2	2	2	2		2	2	2		
Pb-210	PB210		5.5E-10						2	2	2	2		2	2	2		
Pu-238	PU238		2.8E-09		4.2E-06				2	2	2	2		2	2	2		
Pu-239	PU239		3.3E-13						2	2	2	2		2	2	2		
Pu-240	PU240		6.4E-14						2	2	2	2		2	2	2		
Pu-241	PU241		1.2E-12				2.3E-11		2	2	2	2		2	2	2		
Pu-242	PU242		5.0E-12						2	2	2	2		2	2	2		
Pu-244	PU244		3.7E-04						2	2	2	2		2	2	2		
Ra-226	RA226		1.4E-03		2.6E-00				2	2	2	2		2	2	2		
Ra-228	RA228		5.2E-07						2	2	2	2		2	2	2		
Sb-125	SB125		2.0E-16						2	2	2	2		2	2	2		
Se-79	SE79						1.2E-06		2	2	2	2		2	2	2		
Sn-126	SN126		2.1E-04						2	2	2	2		2	2	2		
Sr-90	SR90						6.1E-11		2	2	2	2		2	2	2		
Tc-99	TC99		7.7E-17			4.0E-19	1.3E-02		2	2	2	2		2	2	2		
Tc-99 KB	TC99K		7.7E-17				2.4E-04		2	2	2	2		2	2	2		
Th-228	TH228		2.6E-18						2	2	2	2		2	2	2		
Th-229	TH229		5.3E-04						2	2	2	2		2	2	2		
Th-230	TH230		3.9E-03		6.8E-00				2	2	2	2		2	2	2		
Th-232	TH232		4.4E-02						2	2	2	2		2	2	2		
U-232	U232		1.3E-03						2	2	2	2		2	2	2		
U-233	U233		5.8E-05						2	2	2	2		2	2	2		
U-234	U234		7.9E-05		1.2E-03				2	2	2	2		2	2	2		
U-235	U235		2.4E-07						2	2	2	2		2	2	2		
U-236	U236		9.1E-09						2	2	2	2		2	2	2		
U-238	U238		7.7E-05		1.1E-06				2	2	2	2		2	2	2		
***NOTES																		
Groundwater segment	Start	End																
GW1	0	100																
GW2	100	1000																
GW3	1000	10000																

Example of ELLWF Limits Database Cont.

LAW vault	Updated on 9/1/2004																	
References	Rev.	Date	ID															
WSRC-TR-2003-00438:LAW vault limits	0	9/15/2003	3															
WSRC-TR-2004-00428:Unanalyzed radionuclide limits	0	8/26/2004	6															
WSRC-RP-2004-00636:1000 Year Time of Compliance	0	9/30/2004	7															
	WITS	Limits (Ci)									References							
Nuclide	Nuclide	Ag	Res	PD	Air	Radon	GW1	GW2	GW3		Ag	Res	PD	Air	Radon	GW1	GW2	GW3
Am-241	AM241	8.8E+04	6.5E+07	1.6E+05			2.9E+10	2.9E+10			3	3	3	3	3	3	3	7
Am-242m	AM242M		1.6E+05	1.4E+03							6	6	6	6	6	6	6	7
Am-243	AM243	3.8E+01	5.4E+04	1.9E+03			2.4E+00	2.4E+00			3	3	3	3	3	3	3	7
Ba-133	BA133		4.3E+09	8.2E+06							6	6	6	6	6	6	6	7
C-14	C14	1.5E+03		4.6E+03	2.7E+00		7.3E+04	7.3E+04			3	3	3	3	3	3	3	7
Cd-113m	CD113M			3.0E+04							6	6	6	6	6	6	6	7
Cf-249	CF249	9.2E+02	6.2E+03	2.4E+04			8.5E+02	8.5E+02			3	3	3	3	3	3	3	7
Cf-250	CF250	1.2E+05		1.1E+06							3	3	3	3	3	3	3	7
Cf-251	CF251	1.8E+03	2.1E+05	1.9E+04							3	3	3	3	3	3	3	7
Cf-252	CF252	5.9E+06		7.3E+07			5.0E+08	5.0E+08			3	3	3	3	3	3	3	7
Cl-36	CL36			2.5E+01			4.7E-02	1.6E+01			6	6	6	6	6	6	6	7
Cm-242	CM242		2.7E+09	7.1E+05			8.7E+04	1.9E+05			6	6	6	6	6	6	6	7
Cm-243	CM243		4.1E+07	2.2E+04							6	6	6	6	6	6	6	7
Cm-244	CM244	9.4E+04		9.8E+05			1.6E+12	1.6E+12			3	3	3	3	3	3	3	7
Cm-245	CM245	3.9E+01	1.2E+06	1.1E+03			3.6E+01	3.6E+01			3	3	3	3	3	3	3	7
Cm-246	CM246	3.2E+02		3.0E+03			9.7E+11	9.7E+11			3	3	3	3	3	3	3	7
Cm-247	CM247	1.1E+01	4.7E+03	1.5E+03			1.7E+00	1.7E+00			3	3	3	3	3	3	3	7
Cm-248	CM248	4.4E+01	1.5E+09	5.5E+02			3.9E+03	3.9E+03			3	3	3	3	3	3	3	7
Co-60	CO60		3.5E+07								3	3	3	3	3	3	3	7
Cs-135	CD135	6.7E+05		4.5E+04			3.5E+00	3.5E+00			3	3	3	3	3	3	3	7
Cs-137	CS137		9.0E+03								3	3	3	3	3	3	3	7
Eu-152	EU152		3.7E+04								3	3	3	3	3	3	3	7
Eu-154	EU154		5.0E+05								3	3	3	3	3	3	3	7
H-3	H3				6.4E+07		1.5E+11	1.1E+11			3	3	3	3	3	3	3	7
I-129 Generic	I129			9.0E+10			8.4E-02	8.4E-02			3	3	3	3	3	3	3	7
K-40	K40		6.8E+01	5.2E+02			5.5E+01	5.4E-01			6	6	6	6	6	6	6	7
Kr-85	KR85		9.7E+10	1.1E+09							6	6	6	6	6	6	6	7
Mo-93	MO93			4.8E+05			2.3E+03	9.7E+00			6	6	6	6	6	6	6	7
Nb-93m	NB93M			1.3E+08							6	6	6	6	6	6	6	7
Nb-94	NB94	4.8E+02	2.3E+02	5.1E+03			2.2E+00	2.2E+00			3	3	3	3	3	3	3	7
Ni-59	NI59	2.5E+06		7.4E+05			6.0E+04	6.0E+04			3	3	3	3	3	3	3	7
Ni-63	NI63	3.5E+19		2.7E+14							3	3	3	3	3	3	3	7
Np-237	NP237	2.4E+01	1.3E+04	2.0E+02			5.9E+06	5.9E+06			3	3	3	3	3	3	3	7
Pb-210	PB210		1.4E+11	2.1E+03							6	6	6	6	6	6	6	7
Pd-107	PD107	2.9E+09		2.8E+06			2.5E+01	2.5E+01			3	3	3	3	3	3	3	7
Pu-238	PU238	1.5E+06		1.9E+07			2.8E+09	2.8E+09			3	3	3	3	3	3	3	7
Pu-239	PU239	1.8E+02		2.2E+03			1.3E+10	1.3E+10			3	3	3	3	3	3	3	7
Pu-240	PU240	2.6E+02		2.7E+03			4.4E+09	4.4E+09			3	3	3	3	3	3	3	7

Example of ELLWF Limits Database Cont.

	WITS	Limits (Ci)								References								
Nuclide	Nuclide	Ag	Res	PD	Air	Radon	GW1	GW2	GW3	Ag	Res	PD	Air	Radon	GW1	GW2	GW3
Pu-241	PU241	2.6E-06		4.8E-06			8.8E-11	8.8E-11		3	3	3	3	3	3	3	7
Pu-242	PU242	1.6E-02		2.1E-03			1.9E-11	1.9E-11		3	3	3	3	3	3	3	7
Pu-244	PU244	1.2E-01	1.1E-03	1.9E-03			4.1E-13	4.1E-13		3	3	3	3	3	3	3	7
Ra-226	RA226		9.2E-00	7.2E-01		2.8E-00	1.0E-19	9.0E-00		6	6	6	6	6	6	6	7
Ra-228	RA228		1.3E-08	2.5E-07						6	6	6	6	6	6	6	7
Rb-87	RB87	1.5E-09		7.9E-04			1.9E-01	1.9E-01		3	3	3	3	3	3	3	7
Sb-125	SB125		5.0E-16	7.4E-14						6	6	6	6	6	6	6	7
Se-79	SE79	3.3E-06		5.5E-04			1.1E-02	1.1E-02		3	3	3	3	3	3	3	7
Sm-151	SM151			5.6E-16						3	3	3	3	3	3	3	7
Sn-121m	SN121M			1.2E-04						6	6	6	6	6	6	6	7
Sn-126	SN126	1.6E-02	2.8E-02	3.6E-03			2.4E-01	2.4E-01		3	3	3	3	3	3	3	7
Sr-90	SR90						4.6E-18	4.6E-18		3	3	3	3	3	3	3	7
Tc-99	TC99			4.6E-03			6.0E-00	6.0E-00		3	3	3	3	3	3	3	7
Th-228	TH228		6.7E-13	3.5E-13						6	6	6	6	6	6	6	7
Th-229	TH229		9.1E-01	5.0E-02				9.5E-03		6	6	6	6	6	6	6	7
Th-230	TH230		1.9E-01	1.9E-02		7.5E-00		1.9E-01		6	6	6	6	6	6	6	7
Th-232	TH232	4.8E-00	5.3E-01	8.1E-02			3.8E-08	3.8E-08		3	3	3	3	3	3	3	7
U-232	U232	1.9E-16	1.7E-02	8.1E-11						3	3	3	3	3	3	3	7
U-233	U233	4.5E-01	2.5E-05	3.4E-03			1.8E-09	1.8E-09		3	3	3	3	3	3	3	7
U-234	U234	3.6E-02	5.2E-06	4.8E-03		1.2E-03	9.0E-04	9.0E-04		3	3	3	3	3	3	3	7
U-235	U235	2.6E-01	1.5E-05	2.4E-03			5.8E-04	5.8E-04		3	3	3	3	3	3	3	7
U-236	U236	5.8E-02		7.0E-03			2.9E-11	2.9E-11		3	3	3	3	3	3	3	7
U-238	U238	1.3E-02	2.0E-04	7.2E-03			1.9E-09	1.9E-09		3	3	3	3	3	3	3	7
Zr-93	ZR93	1.2E-05		1.5E-06			3.9E-02	3.9E-02		3	3	3	3	3	3	3	7
***NOTES																	
Groundwater segment		Start	End														
GW1		0	100														
GW2		100	1000														
GW3		1000	10000														

Some radionuclides have some limit derived from a disposal unit SA and others from the "Previously Unanalyzed Radionuclides SA." A limit from the latter SA was imposed when the former limit was shown as a blank (indicating a limit of >1E20 Ci; i.e., no limit was needed). However, the former limit should have prevailed. The net result is a lower limit, which is conservative. The lower limit will be removed by the next disposal unit SA.

Example of ELLWF Limits Database Cont.

Naval Reactor Pads	Updated on 9/1/2004											
References:	Rev.	Date	ID									
WSRC-TR-2003-00438 Naval Reactor limits	0	9/15/2003	4									
WSRC-TR-2004-00430 Unanalyzed radionuclide limits	0	8/26/2004	6									
WSRC-RP-2004-00636 1000 Year Time of Compliance	0	9/30/2004	7									
	WITS	Limits (Ci)						References				
Nuclide	Nuclide	Air	Radon	GW1	GW2	GW3		Air	Radon	GW1	GW2	GW3
Am-241	AM241			6.6E+04	6.6E+04			4	4	4	4	7
Am-243	AM243			7.5E+02	7.5E+02			4	4	4	4	7
C-14	C14	6.3E+04		7.7E+02	7.7E+02			4	4	4	4	7
Cf-249	CF249			1.4E+05	1.4E+05			4	4	4	4	7
Cl-36	CL36			4.7E-02	1.4E-01			6	6	6	6	7
Cm-242	CM242			8.7E-04	1.9E-05			6	6	6	6	7
Cm-244	CM244			7.6E+16	7.6E+16			4	4	4	4	7
Cm-245	CM245			5.7E+03	5.7E+03			4	4	4	4	7
Cm-246	CM246							4	4	4	4	7
Cm-247	CM247			2.7E+03	2.7E+03			4	4	4	4	7
Cm-248	CM248			1.7E+06	1.7E+06			4	4	4	4	7
Cs-135	CS135			2.8E+07	2.8E+07			4	4	4	4	7
H-3	H3	2.9E+05						4	4	4	4	7
I-129 Generic	I129			9.0E-04	9.0E-04			4	4	4	4	7
K-40	K40			8.3E-01	8.1E-01			6	6	6	6	7
Mo-93	MO93			1.7E+09	1.7E+09			4	4	4	4	7
Nb-94	NB94			8.7E+03	8.7E+03			4	4	4	4	7
Ni-59	NI59			1.2E+09	1.2E+09			4	4	4	4	7
Np-237	NP237			6.8E+03	6.8E+03			4	4	4	4	7
Pu-238	PU238			2.4E+07	2.4E+07			4	4	4	4	7
Pu-239	PU239			5.9E+02	5.9E+02			4	4	4	4	7
Pu-240	PU240			1.3E+03	1.3E+03			4	4	4	4	7
Pu-241	PU241			1.1E+10	1.1E+10			4	4	4	4	7
Pu-242	PU242			4.6E+02	4.6E+02			4	4	4	4	7
Pu-244	PU244			4.5E+02	4.5E+02			4	4	4	4	7
Ra-226	RA226		2.8E+00		9.0E-01			6	6	6	6	7
Se-79	SE79			3.5E+05	3.5E+05			4	4	4	4	7
Sn-126	SN126			3.2E+02	3.2E+02			4	4	4	4	7
Sr-90	SR90			3.0E+15	3.0E+15			4	4	4	4	7
Tc-99	TC99			8.8E-01	8.8E-01			4	4	4	4	7
Th-229	TH229				9.5E-03			6	6	6	6	7
Th-230	TH230		7.5E+00		1.9E-01			6	6	6	6	7
Th-232	TH232							4	4	4	4	7
U-232	U232			2.5E+12	2.5E+12			4	4	4	4	7
U-233	U233				4.8E-03			6	6	6	6	7
U-234	U234			1.7E+03	1.7E+03			4	4	4	4	7
U-235	U235			8.1E+02	8.1E+02			4	4	4	4	7
U-236	U236			1.8E+03	1.8E+03			4	4	4	4	7
U-238	U238			1.2E+02	1.2E+02			4	4	4	4	7
Zr-93	ZR93			8.8E+12	8.8E+12			4	4	4	4	7
***NOTES												
Groundwater segment	Start	End										
GW1	0	100										

Example of ELLWF Limits Database Cont.

	WITS	Limits (Ci)						References										
Nuclide	Nuclide	Air	Radon	GW1	GW2	GW3		Air	Radon	GW1	GW2	GW3						
GW2	100	1000																
GW3	1000	10000																

Some radionuclides have some limits derived from a disposal unit SA and others from the "Previously Unanalyzed Radionuclides SA." A limit from the latter SA was imposed when the former limit was shown as a blank (indicating a limit of >1E20 Ci; i.e., no limit was needed). However, the former limit should have prevailed. The net result is a lower limit, which is conservative. The lower limit will be removed by the next disposal unit SA.

Example of ELLWF Limits Database Cont.

Slit Trenches		Updated on 9/1/2004																					
References		Rev.	Date	ID																			
WSRC-TR-2004-00190 Slit Engineered Trench Inputs		0	6/14/2004	5																			
	WITS				Limits (Ci)							References											
Nuclide	Nuclide	Ag	Res.	PD	Air	Radon	GW1	GW2	GW3	Ag	Res.	PD	Air	Radon	GW1	GW2	GW3						
Ag-108m	AG108M		3.9E-01	2.3E-03						S	S	S	S	S	S	S	S						
Al-26	AL26		4.0E-00	1.6E-03			7.8E-03	3.5E-01	4.7E-00	S	S	S	S	S	S	S	S						
Am-241	AM241		6.3E-05	1.4E-03			8.2E-11	1.8E-05	8.9E-01	S	S	S	S	S	S	S	S						
Am-242m	AM242M		1.6E-05	1.4E-03						S	S	S	S	S	S	S	S						
Am-243	AM243		4.0E-02	1.2E-03			1.3E-06	1.4E-05	5.4E-02	S	S	S	S	S	S	S	S						
Ba-133	BA133		4.3E+06	8.2E+06						S	S	S	S	S	S	S	S						
Bi-207	BI207		1.1E-05	2.6E-04						S	S	S	S	S	S	S	S						
Bk-249	BK249		1.4E-05	4.9E-05			2.4E-10	2.8E-08	2.5E-05	S	S	S	S	S	S	S	S						
C-14	C14			2.0E+03	7.0E-01		2.9E-08	4.5E-01	4.7E+00	S	S	S	S	S	S	S	S						
Cd-113m	CD113M			3.0E+04						S	S	S	S	S	S	S	S						
Cf-249	CF249		3.7E-02	1.3E-03			6.0E-07	7.0E-05	6.3E-02	S	S	S	S	S	S	S	S						
Cf-250	CF250		3.8E-13	2.6E-05					8.7E-07	S	S	S	S	S	S	S	S						
Cf-251	CF251		1.4E+03	1.2E+03						S	S	S	S	S	S	S	S						
Cf-252	CF252		7.6E-11	5.4E+07			5.8E-14	6.5E-13	7.4E-06	S	S	S	S	S	S	S	S						
Cl-36	CL36			2.5E+01			4.7E-03	2.3E-01	1.6E+01	S	S	S	S	S	S	S	S						
Cm-242	CM242		2.7E-09	7.1E+05			8.7E-04	9.6E-04	1.9E+05	S	S	S	S	S	S	S	S						
Cm-243	CM243		4.1E-07	2.2E+04						S	S	S	S	S	S	S	S						
Cm-244	CM244		4.4E+11	1.0E+05			1.5E-05	1.5E+05	1.5E+05	S	S	S	S	S	S	S	S						
Cm-245	CM245		2.4E+03	7.7E+03			2.6E-04	2.7E+03	2.7E+02	S	S	S	S	S	S	S	S						
Cm-246	CM246		1.0E+11	1.5E+03					2.4E+05	S	S	S	S	S	S	S	S						
Cm-247	CM247		7.9E+01	1.3E+03			2.5E+09	3.0E+07	8.2E+03	S	S	S	S	S	S	S	S						
Cm-248	CM248		5.6E+06	4.0E+02			4.5E+09	3.0E+08	5.8E+04	S	S	S	S	S	S	S	S						
Co-60	CO60		2.0E+09	8.4E+06						S	S	S	S	S	S	S	S						
Cs-135	CS135			2.5E+04				1.3E+11	5.3E+06	S	S	S	S	S	S	S	S						
Cs-137	CS137		2.1E+06	2.4E+04						S	S	S	S	S	S	S	S						
Eu-152	EU152		2.3E+06	6.5E+05						S	S	S	S	S	S	S	S						
Eu-154	EU154		4.1E+07	1.1E+07						S	S	S	S	S	S	S	S						
Eu-155	EU155		4.0E+18	2.3E+11						S	S	S	S	S	S	S	S						
H-3	H3			2.1E+06	4.1E+05		2.0E+00	1.3E+01	1.2E+05	S	S	S	S	S	S	S	S						
H-3 ETF-Carbon	H3C			2.1E+06	4.1E+05			4.6E+04	2.9E+03	S	S	S	S	S	S	S	S						
I-129	I129		7.4E+09	3.8E+02			1.9E-07	2.8E-04	9.2E-03	S	S	S	S	S	S	S	S						
I-129_10	----------		7.4E+09	3.8E+02			6.4E-01	9.2E-04	2.5E-03	S	S	S	S	S	S	S	S						
I-129_ETF-Carbon	I129C		7.4E+09	3.8E+02				4.9E-08	9.0E-02	S	S	S	S	S	S	S	S						
I-129_ETF-CT-73	I129I		7.4E+09	3.8E+02			6.2E-02	9.0E-01	1.2E-01	S	S	S	S	S	S	S	S						
I-129_F-Carbon	I129B		7.4E+09	3.8E+02			8.3E-01	1.2E-01	1.6E+00	S	S	S	S	S	S	S	S						
I-129_F-CG-8	I129G		7.4E+09	3.8E+02			3.1E+00	4.5E-03	2.8E-03	S	S	S	S	S	S	S	S						
I-129_F-Dower-21K	I129D		7.4E+09	3.8E+02			4.2E-01	6.1E-01	8.3E-02	S	S	S	S	S	S	S	S						
I-129_F-Filtercake	I129F		7.4E+09	3.8E+02			3.5E+00	5.1E-03	2.7E-03	S	S	S	S	S	S	S	S						
I-129_H-Carbon	I129A		7.4E+09	3.8E+02			3.6E+00	5.2E-03	7.0E-01	S	S	S	S	S	S	S	S						
I-129_H-CG-8	I129H		7.4E+09	3.8E+02			2.4E+01	3.4E-02	6.8E-03	S	S	S	S	S	S	S	S						
I-129_H-Dower-21K	I129E		7.4E+09	3.8E+02			9.7E+01	1.4E+00	1.9E-01	S	S	S	S	S	S	S	S						
I-129_H-Filtercake	I129F		7.4E+09	3.8E+02			4.1E+01	5.8E-02	9.2E-03	S	S	S	S	S	S	S	S						
K-40	K40		6.8E+01	5.7E+02			7.4E+09	8.3E+01	8.1E+01	S	S	S	S	S	S	S	S						
Kr-85	KR85		9.7E+10	1.1E+09						S	S	S	S	S	S	S	S						
Mo-93	MO93			4.8E+05			3.8E+11	2.3E+03	9.7E+00	S	S	S	S	S	S	S	S						
Na-22	NA22									S	S	S	S	S	S	S	S						
Nb-93m	NB93M		2.8E+15	6.0E+14						S	S	S	S	S	S	S	S						
				1.3E+06						S	S	S	S	S	S	S	S						

Example of ELLWF Limits Database Cont.

	WITS		Limits (Ci)						References							
Nuclide	Nuclide	Ag	Res	PD	Air	Radon	GW1	GW2	GW3	Ag	Res	PD	Air	Radon	GW1	GW2	GW3
Nb-94	NB94		9.7E-00	2.8E-03					1.2E-12	S	S	S	S	S	S	S	S
Ni-59	NI59			4.2E-05					1.9E-03	S	S	S	S	S	S	S	S
Ni-63	NI63			3.0E-05						S	S	S	S	S	S	S	S
Np-237	NP237		1.7E-02	1.1E-03			1.7E-10	3.7E-01	1.8E-02	S	S	S	S	S	S	S	S
Pb-210	PB210		1.4E-11	2.1E-03						S	S	S	S	S	S	S	S
Pd-107	PD107			8.8E-05			8.4E-18	6.3E-02		S	S	S	S	S	S	S	S
Pu-238	PU238		1.4E-07	3.6E-03		4.6E-06	4.5E-02	4.9E-02	9.8E-02	S	S	S	S	S	S	S	S
Pu-239	PU239		3.8E-06	1.5E-03			4.0E-02	4.0E-02	4.0E-02	S	S	S	S	S	S	S	S
Pu-240	PU240		1.2E-09	1.5E-03			4.0E-02	4.0E-02	4.1E-02	S	S	S	S	S	S	S	S
Pu-241	PU241		1.9E-07	4.1E-04			1.3E-04	1.2E-04	4.0E-03	S	S	S	S	S	S	S	S
Pu-242	PU242		7.0E-06	1.6E-03			4.1E-02	4.1E-02	4.1E-02	S	S	S	S	S	S	S	S
Pu-244	PU244		4.4E-01	1.3E-03			4.3E-02	4.3E-02	4.3E-02	S	S	S	S	S	S	S	S
Ra-226	RA226		9.2E-00	7.2E-01		2.8E-00			9.0E-01	S	S	S	S	S	S	S	S
Ra-228	RA228		1.3E-08	2.5E-07						S	S	S	S	S	S	S	S
Rb-87	RB87			1.5E-04				1.2E-17	4.7E-00	S	S	S	S	S	S	S	S
Sb-125	SB125		5.0E-16	7.4E-14						S	S	S	S	S	S	S	S
Se-79	SE79			2.4E-04					1.8E-02	S	S	S	S	S	S	S	S
Sm-151	SM151			6.0E-06						S	S	S	S	S	S	S	S
Sn-121m	SN121M			1.2E-06						S	S	S	S	S	S	S	S
Sn-126	SN126		8.8E-00	2.1E-03					3.9E-01	S	S	S	S	S	S	S	S
Sr-90	SR90			1.7E-03			1.9E-13	1.9E-05	8.9E-02	S	S	S	S	S	S	S	S
Tc-99	TC99		1.0E-00	2.4E-03			6.9E-01	1.7E-01	4.8E-01	S	S	S	S	S	S	S	S
Th-228	TH228		6.7E-18	3.5E-18						S	S	S	S	S	S	S	S
Th-229	TH229		9.1E-01	5.0E-02					9.5E-03	S	S	S	S	S	S	S	S
Th-230	TH230		1.9E-01	1.9E-02		7.5E-00			1.9E-01	S	S	S	S	S	S	S	S
Th-232	TH232		4.4E-00	1.5E-02					3.1E-03	S	S	S	S	S	S	S	S
U-232	U232		3.2E-03	9.5E-02					3.2E-06	S	S	S	S	S	S	S	S
U-233	U233		9.4E-02	2.2E-03					4.8E-03	S	S	S	S	S	S	S	S
U-234	U234		3.8E-03	3.4E-03		1.3E-03			2.7E-03	S	S	S	S	S	S	S	S
U-234_MGlass	U234G		3.8E-03	3.4E-03		1.3E-03			2.3E-06	S	S	S	S	S	S	S	S
U-235	U235		5.1E-02	2.2E-03					4.1E-02	S	S	S	S	S	S	S	S
U-235_MGlass	U235G		5.1E-02	2.2E-03					3.9E-05	S	S	S	S	S	S	S	S
U-236	U236		2.8E-07	4.0E-03					6.5E-03	S	S	S	S	S	S	S	S
U-236_MGlass	U236G		2.8E-07	4.0E-03					2.7E-06	S	S	S	S	S	S	S	S
U-238	U238		9.8E-02	4.0E-03		1.2E-06			4.6E-03	S	S	S	S	S	S	S	S
U-238_MGlass	U238G		9.8E-02	4.0E-03		1.2E-06			2.9E-05	S	S	S	S	S	S	S	S
Zr-93	ZR93			9.6E-05					3.6E-03	S	S	S	S	S	S	S	S
***NOTES																	
Groundwater segment	Start	End															
GW1	0	12															
GW2	12	100															
GW3	100	1000															

References	Rev.	Date	ID
WSRC-TR-2003-00438:CIG Trench limits	0	9/15/2003	1
WSRC-TR-2004-00346: ILV limits	0	7/20/2004	2
WSRC-TR-2003-00438:LAW vault limits	0	9/15/2003	3
WSRC-TR-2003-00438:Naval Reactor limits	0	9/15/2003	4
WSRC-TR-2004-00300:Slit/Engineered Trench limits	0	6/14/2004	5
WSRC-TR-2004-00428:Unanalyzed radionuclide limits	0	8/26/2004	6
WSRC-RP-2004-00636:1000 Year Time of Compliance	0	9/30/2004	7
WSRC-TR-2005-00331: ILV C-14 limits	0	8/12/2005	8
Protocol			
WSRC-RP-2006-xxxxx:ELLWF Limits Database Protocol	0	1/31/2006	9

Distribution

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R. A. Hiergesell,	773-43A
G. A. Taylor,	773-43A
J. C. Griffin,	773-A
M. A. Phifer	773-42A
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