UCRL-AR-152538

Data Supporting the Sludge Information in Lawrence Radiation Laboratory Biannual Environmental Reports 1961 — 1970

Gretchen Gallegos

U.S. Department of Energy

Lawrence
Livermore
National
Laboratory

March 11, 2003

DISCLAIMER

This document was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor the University of California nor any of their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or the University of California. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or the University of California, and shall not be used for advertising or product endorsement purposes.

This work was performed under the auspices of the U. S. Department of Energy by the University of California, Lawrence Livermore National Laboratory under Contract No. W-7405-Eng-48.

Data Supporting the Sludge Information in Lawrence Radiation Laboratory Biannual Environmental Reports 1961 — 1970

Gretchen Gallegos

March 11, 2003

Table of Contents

Data Summary 1
Current Perspective 2
Acknowledgements 2
Figure 1 3
Figure 2 3
Table 1 4
Table 2 10
References 13

Data: 1961 to 1970

Data Supporting the Sludge Information in Lawrence Radiation Laboratory Biannual Environmental Reports 1961 — 1970

Gretchen Gallegos

Data Summary

This document is a collection of data records archived by the Hazards Control Department of Lawrence Livermore National Laboratory (LLNL). The records were retrieved in response to a need for access to measurements of radioactivity in sludge samples from 1961 to 1970 from the Livermore Water Reclamation Plant (LWRP). These samples were analyzed for gross alpha and gross beta radioactivity by Lawrence Radiation Laboratory (LRL, a former name of LLNL). Samples of the digesters, the oxidation ponds, the aeration pond, and dried sludge were collected and analyzed. This document includes reproductions of original Hazards Control Department documents that have been archived in the Lawrence Livermore National Laboratory records department. These data support the summary statistics reported for Livermore Sewage Treatment Plant samples in biannual reports written by LRL from 1961 to 1970. Much of the data are summarized in documents entitled "Hazards Control Radioactivity Counting Laboratory Compilation of Environmental Radioactivity Levels." However, for some years, these summary documents could not be found, or were incomplete or incorrect, so summary sheets based on counting data, to the extent the counting data are available, were prepared. When counting data were available, the activity per sample (in pCi) was calculated according to the following formula.

$$Activity\ (pCi/sample\ \ weight\ (or\ \ volume)) = \left\{ \left[\frac{\left(\frac{Total\ \ counts}{Counting\ \ time\ (minutes)} \right) - Background\ (cpm)}{Counter\ \ efficiency} \right] / Sample\ \ weight\ (or\ \ volume) \right\} * \frac{1}{2.22}$$

In some instances, only the raw counts, i.e., counts before correction for self-absorption are available. If the correction factor is supplied, the "Total counts" in the above formula are calculated as follows (note that the background counts must be for the same duration of time as the raw counts).

$$Total\ \ counts = \left[(Raw\ \ counts - background) * correction\ \ factor \right] + correction\ \ factor$$

This implementation of the correction factor is documented on the back of the Hazards Control Radioactivity Sampling Record card for a dried sludge sample that was counted on May 12, 1966. The activity per sample calculation is confirmed by notes on some of the sampling records. Interestingly, where there is disagreement in the notes compared to the current calculations, it is often because the final divisor was 2.2 rather than 2.22. It should be remembered that these calculations were performed before the widespread availability of calculators.

The sampling dates on the original documents are written in a format indicating the year with the last digit and the day count in the year with the preceding digits, e.g., 0017 is January 1, 1967, and 2627 is September 19, 1967.

Figures 1 and 2 are graphs of the gross alpha measurements for the digesters and dried sludge, one is a plot of monthly averages, and the other is a plot of the individual measurements. The data plotted are from the Hazards Control summary sheets for 1962 to 1966, and from reconstructed summary sheets from 1967 to 1970. (The data from 1961 is not included because there were no values above the detection limits for the digesters for 1961.) These graphs clearly show the releases of plutonium to the sewer by LRL in 1964 and 1967.

Table 1 lists the data that were used to create Figures 1 and 2, and provides an overview of the data listings by year. Table 2 is a lengthy table that lists the data by year and describes the source of the data.

Current Perspective

Beginning in 1971 and continuing until the time of this report, LLNL has reported the sludge data in annual reports. These reports have generally been entitled the "Environmental Monitoring Report for XXXX" or the "Environmental Report XXXX," where "XXXX" represents the year. The reports have been consistently numbered "UCRL-50027-XX" since 1973. Consistent with their titles, these reports contain data for many environmental samples, as well as sludge samples. These reports have included isotopic-specific data for sludge since 1973. These reports are available to the public, and the more recent reports are published on the Internet.

In addition, the minimal health effects resulting from the use of sludge as a soil amendment have been documented in LLNL and Agency for Toxic Substances and Disease Registry reports (ATSDR, 2000; ATSDR, 2003, Myers et al., 1976; Gallegos et al., 1999; MacQueen et al., 2002). These reports are also available to the public, and many can be accessed on the Internet at http://www-envirinfo.llnl.gov.

Acknowledgement

The author would like to acknowledge the work of William J. Silver, a retired Health Physicist from LLNL and author of early Environmental Reports, whose diligent preliminary review of 62 boxes of archived Hazards Control data identified the documents that represented data for samples from the LWRP.

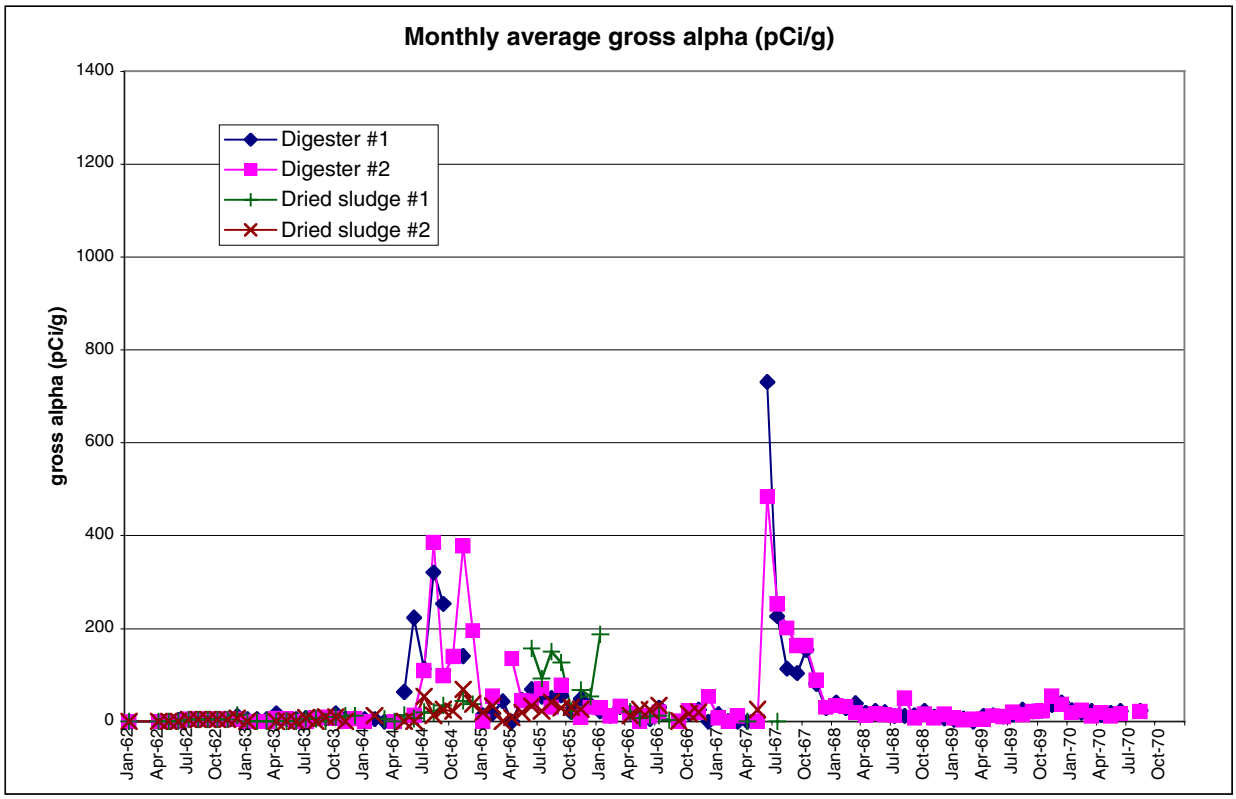

Figure 1. Monthly averages of measured gross alpha data at four process locations at the LWRP.

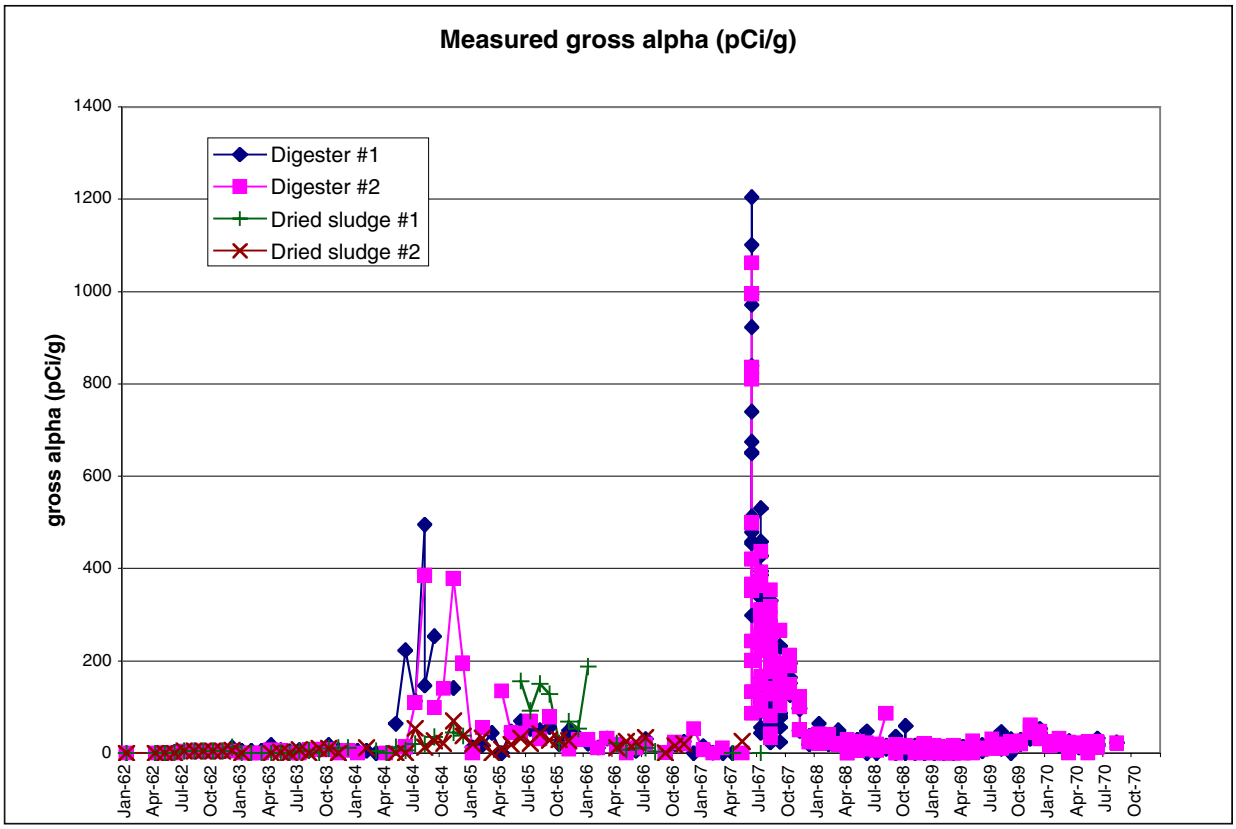

Figure 2. Gross alpha measurements at four process locations at the LWRP.

Table 1. Digester sludge and dried sludge gross alpha data (pCi/g), 1962 to 1970.

Sampling date	Digester #1	Digester #2	Dried Sludge #1	Dried Sludge #2
1/2/62	ND	ND	ND	ND
4/3/62	ND	ND	ND	ND
5/1/62	ND	ND	ND	ND
6/5/62	3.1	ND	ND	ND
7/3/62	4.95	4.95	4.95	4.95
8/7/62	4.95	4.95	4.95	4.95
9/4/62	4.95	4.95	4.95	4.95
10/2/62	4.95	4.95	4.95	4.95
11/6/62	4.95	4.95	4.95	4.95
12/4/62	12	4.95	13	6.3
1/2/63	5	ND	ND	ND
2/5/63	5	ND	ND	
3/5/63	6	ND	ND	
4/2/63	18	7.1	ND	ND
5/7/63	6.1	5.7	1.1	1.7
6/4/63	4.1	ND	ND	ND
7/2/63	7.9	ND	6	7.7
8/6/63	5.5	8.1	6.2	ND
9/3/63	6.3	8.8	ND	9.6
10/1/63	18	7.2	10	10
11/5/63	6.7	ND	12	ND
12/3/63	7.6	5.2	12.4	
1/7/64	5.1	ND		
2/4/64	5.2			12
3/3/64	ND		5.2	
4/7/64		ND	ND	
5/5/64	63.6		13	ND
6/2/64	223	13.3	6.85	ND
7/7/64	114	109	20	54
8/4/64	495	385	20	13
8/20/64	147			
9/1/64	254	98	35	26
10/6/64		140		22
11/3/64	141	378	45	69
12/1/64		195	37	38
1/5/65	13	ND		20.2
2/2/65	17.6	55.3		33
3/2/65	44.1			ND
4/6/65	ND	135.1		8.8
5/4/65	47.1	44.7		18.6
6/1/65	69.6	43.5	157.1	33.3
7/6/65	53.1	69.9	92.7	22.1
8/3/65	49.8	30.7	150.3	41.8
9/7/65	56	78.7	127.8	28.9
10/5/65	19.6		22.6	30.2
11/2/65	48.8	8.5	68.2	26.8
12/7/65	35.3	29.9	53.1	

Table 1. Digester sludge and dried sludge gross alpha data (pCi/g), 1962 to 1970 (continued).

Sampling date	Digester #1	Digester #2	Dried Sludge #1	Dried Sludge #2
1/4/66	20.6818	29.3181	187.5	
2/1/66	12	10.9		
3/1/66	31.8	32.2		
4/5/66	19.318	17.386	21.59	12.5
5/3/66	2.4	ND	7.3	25.9
6/7/66	5.8	11.4	10.8	24.4
7/5/66	30.6	20.1	11.9	34.6
8/2/66			3.2	
9/6/66		1.642		1.525
10/4/66	18.4	23.1		16.6
11/1/66	25.8	19.7		20
12/6/66	ND	53.4		
1/3/67	15.3	8.2		
2/7/67	1.2	ND		
3/7/67	ND	10.9		
4/4/67	ND		ND	
5/2/67		ND		25.6
6/6/67	652.5			
6/13/67	839.1	419.9		
6/15/67	1205.0	1062.4		
6/16/67	1100.6	995.3		
6/17/67	995.3	809.9		
6/19/67	923.0	351.7		
6/20/67	971.9	836.8		
6/21/67	513.1	499.0		
6/22/67	649.9	366.3		
6/23/67	675.5	133.3		
6/26/67	478.4	355.1		
6/27/67	459.0	201.2		
6/28/67	298.9	243.1		
6/29/67	740.1	420.3		
6/30/67	454.9	86.3		
7/3/67	530.8	148.7		
7/5/67	386.4	392.5		
7/6/67	394.3	117.2		
7/7/67	336.7	166.8	ND	
7/10/67	232.4	161.6		
7/11/67	113.6	245.7		
7/12/67	458.8	363.0		
7/13/67	427.8	367.0		
7/14/67	348.4	295.7		
7/17/67	108.3	251.9		
7/18/67	111.8	223.2		
7/19/67	111.5	221.6		
7/20/67	227.6	310.2		
7/21/67	149.4	436.5		

Table 1. Digester sludge and dried sludge gross alpha data (pCi/g), 1962 to 1970 (continued).

Sampling date	Digester #1	Digester #2	Dried Sludge #1	Dried Sludge #2
7/24/67	43.9	92.8		
7/25/67	119.0	277.8		
7/26/67	121.5	306.6		
7/27/67	56.5	311.1		
7/28/67	91.0	111.1		
7/31/67	162.9	257.7		
8/1/67	82.6	243.7		
8/2/67	152.6	293.9		
8/3/67	110.7	274.6		
8/4/67	121.9	223.0		
8/7/67	85.6	261.5		
8/8/67	70.3	354.6		
8/9/67	116.6	269.1		
8/10/67	78.9	317.3		
8/11/67	94.0	211.9		
8/14/67	191.6	271.5		
8/15/67	130.3	220.0		
8/16/67	93.6	179.7		
8/17/67	99.0	181.2		
8/18/67	90.9	195.6		
8/21/67	77.6	202.0		
8/22/67	97.0	176.3		
8/23/67	23.5	80.5		
8/24/67	30.8	41.6		
8/25/67	124.0	194.6		
8/28/67	276.7	128.3		
8/29/67	104.3	135.9		
8/30/67	330.6	140.6		
8/31/67	29.7	34.5		
9/1/67	151.6	266.4		
9/5/67	56.8	103.3		
9/6/67	87.6	171.8		
9/7/67	24.3	129.9		
9/8/67	77.5	146.0		
9/12/67	79.8	151.8		
9/19/67	121.3	139.4		
9/26/67	231.4	194.1		
10/3/67	164.7	138.3		
10/10/67	152.6	211.9		
10/17/67	194.9	188.6		
10/24/67	125.6	131.6		
10/31/67	134.3	147.8		
11/7/67	95.6	100.7		
11/14/67	98.0	121.5		
11/28/67	48.2	50.5		
12/19/67	37.8	24.8		
12/26/67	18.6	36.4		

Table 1. Digester sludge and dried sludge gross alpha data (pCi/g), 1962 to 1970 (continued).

Sampling date	Digester #1	Digester #2	Dried Sludge #1	Dried Sludge #2
1/2/68	64.0	41.9		
1/9/68		36.5		
1/23/68	27.5	22.1		
1/30/68	33.8	40.1		
2/6/68	20.3	30.6		
2/13/68		23.4		
2/20/68	36.5	40.5		
3/5/68	50.0	18.9		
3/12/68	38.3	19.8		
3/19/68	44.6	21.2		
3/26/68	25.7	17.6		
4/2/68	15.8	12.2		
4/9/68	29.7	30.2		
4/16/68	17.6	17.1		
4/23/68	19.4	0		
4/30/68	11.7	0		
5/7/68	30.2	21.6		
5/14/68	21.6	24.8		
5/21/68	27.9	14.9		
5/28/68	15.8	6.8		
6/4/68	11.3	12.2		
6/11/68	47.7	8.6		
6/18/68	0	17.1		
6/25/68	20.3	21.6		
7/2/68	0	11.7		
7/16/68	12.2	19.4		
7/23/68	18.9	5.9		
7/30/68	16.2	12.6		
8/6/68	11.7	85.6		
8/13/68	16.2			
8/20/68	9.9	14.4		
9/3/68	36.9	17.1		
9/10/68	0	13.5		
9/17/68	15.3	0		
9/24/68	0	0		
10/1/68	0			
10/22/68	59.9	13.5		
10/29/68	11.7	16.7		
11/5/68	14.4	0		
11/12/68	0			
11/19/68	16.2	11.3		
11/26/68	14.9	12.2		
12/3/68	0	0		
12/10/68	0	18.0		
12/17/68	0	21.2		
12/24/68	12.6	18.9		
12/31/68	18.9	17.6		

Table 1. Digester sludge and dried sludge gross alpha data (pCi/g), 1962 to 1970 (continued).

Sampling date	Digester #1	Digester #2	Dried Sludge #1	Dried Sludge #2
1/7/69	11.7	7.2		
1/14/69	0	0		
1/28/69	0	16.7		
2/4/69	11.8	0		
2/11/69	0	0		
2/18/69	14.0	14.9		
2/25/69	0	0		
3/4/69	0	16.2		
3/11/69	0	0		
3/18/69	0	0		
3/25/69		0		
4/8/69	14.0	9.5		
4/15/69	14.0	7.2		
4/22/69	5.9	0		
4/29/69	14.9	0		
5/6/69	10.4	12.2		
5/13/69	9.9	0		
5/20/69	17.6	27.0		
5/27/69	16.7	9.9		
6/3/69	4.1	9.0		
6/10/69	18.5	10.8		
7/22/69	12.6	10.4		
7/29/69	16.7	30.6		
8/5/69	10.4	15.8		
8/12/69	26.1	11.7		
8/19/69	19.4	20.3		
8/26/69	46.8	10.4		
9/2/69	27.9	23.0		
9/9/69	30.6	25.2		
9/16/69	26.1	21.6		
9/23/69	ND	19.4		
9/30/69		15.8		
10/7/69	19.4	26.6		
10/14/69	21.6	21.2		
10/21/69	24.3	19.4		
10/28/69	28.8	22.5		
11/4/69	32.0	45.0		
11/11/69	32.4	60.8		
11/18/69	32.9	54.1		
11/25/69	44.6	59.9		
12/2/69	37.4	36.9		
12/9/69	53.2	37.4		
12/16/69	39.2	31.1		
12/23/69	42.8	47.3		
12/30/69	34.7	33.8		

Table 1. Digester sludge and dried sludge gross alpha data (pCi/g), 1962 to 1970 (continued).

Sampling date	Digester #1	Digester #2	Dried Sludge #1	Dried Sludge #2
1/6/70	25.7	18.5		
1/13/70	23.0	19.4		
1/20/70	24.3	15.3		
1/27/70		23.9		
2/3/70	22.1	32.0		
2/10/70	16.7	24.3		
2/17/70	18.9	17.6		
3/10/70	26.6	0		
3/17/70	20.3	23.4		
3/24/70	22.5	11.3		
3/31/70	18.5			
4/7/70	12.2	22.1		
4/21/70	15.3	14.9		
5/5/70	23.4	23.9		
5/12/70	19.4	0		
5/19/70	14.4	9.9		
6/9/70	19.8	14.4		
6/16/70	15.3	12.6		
6/23/70	31.5	24.8		
8/25/70	23.4	21.6		

Note: Some of the values in this table differ from those in the compilation sheets due to the use of more significant digits when calculating the gross alpha value. Furthermore, all values were not included on the compilation sheets, and any data found on data cards or data sheets are also included in this table.

Table 2. Source of data supporting LRL biannual environmental reports.

Year	Archive Description	Document Description
1961	Hazards Control Archive Box A9, 5-inch by 8-inch index cards	Lawrence Radiation Laboratory, Livermore, Hazards Control Radioactivity Sampling Record 8 sampling record cards (Dates 3111 to 3391) From these records, a summary sheet, similar to the LRL Hazards Control Radioactivity Counting Laboratory Compilation of Environmental Radioactivity Levels, was prepared in calendar year 2003
1962	Hazards Control Archive Box A45, Binder labeled "AEC Environ. Sample Results 1962"	LRL Hazards Control Radioactivity Counting Laboratory Compilation of Environmental Radioactivity Levels Type "Sludge" Location 981 Digester #1 Type "Sludge" Location 982 Digester #2 Type "Sludge" Location 983 Dried Sludge #1 Type "Sludge" Location 984 Dried Sludge #2 Type "Sludge" Location 985 Oxidation Pond #1 Type "Sludge" Location 986 Oxidation Pond #2 For 1962, there are two of each of these documents, one for each half of the year.
	Hazards Control Archive Box A9, 5-inch by 8-inch index cards	Lawrence Radiation Laboratory, Livermore, Hazards Control Radioactivity Sampling Record 29 sampling record cards (Dates 0932 to 3382)
1963	Hazards Control Archive Box A46, Binder labeled "Liv. Surv. Air, H_2O, Soil, Veg – Site 300"	LRL Hazards Control Radioactivity Counting Laboratory Compilation of Environmental Radioactivity Levels Type "Sludge" Location 930 01 Digester #1 Type "Sludge" Location 930 02 Digester #2 Type "Sludge" Location 930 03 Dried Sludge #1 Type "Sludge" Location 930 04 Dried Sludge #2 Type "Sludge" Location 930 05 Oxidation Pond #1 Type "Sludge" Location 930 06 Oxidation Pond #2 Type "Sludge" Location 930 07 from bottom of Oxidation Pond #1 For 1963, there is one of each of these documents, covering the entire year. Note that there is an error in the second date 1883 for Digester #1; the date should be 2183.
	Hazards Control Archive Box A9, 5-inch by 8-inch index cards	Lawrence Radiation Laboratory, Livermore, Hazards Control Radioactivity Sampling Record 16 sampling record cards (Dates 0023 to 0363)
	Hazards Control Archive Box A7, 5-inch by 8-inch index cards	Lawrence Radiation Laboratory, Livermore, Hazards Control Radioactivity Sampling Record 14 sampling record cards (Dates 0643 to 1273)
	Hazards Control Archive Box A27, 5-inch by 8-inch index cards	Lawrence Radiation Laboratory, Livermore, Hazards Control Radioactivity Sampling Record 36 sampling record cards (Dates 1273 to 3373) Note that the data for date 1273 for Digester #2, Dried Sludge #1, Dried Sludge #2, and Oxidation Pond #2, and for the date 3373 for Digester #1, Digester #2, and Dried Sludge #1, are not included in the compilation.

Table 2. Source of data supporting LRL biannual environmental reports (continued).

1964	Hazards Control Archive Box A46, Binder labeled "Liv. Surv. Air, H_2O, Soil, Veg – Site 300"	LRL Hazards Control Radioactivity Counting Laboratory Compilation of Environmental Radioactivity Levels Type "Sludge" Location 930 01 Digester #1 Type "Sludge" Location 930 02 Digester #2 Type "Sludge" Location 930 03 Dried Sludge #1 Type "Sludge" Location 930 04 Dried Sludge #2 Type "Sludge" Location 930 05 Oxidation Pond #1 Type "Sludge" Location 930 06 Oxidation Pond #2 Type "Sludge" Location 930 07 (no data on sheet) For 1964, there is one of each of these documents, covering the entire year.
	Hazards Control Archive Box A18, 5-inch by 8-inch index cards	Lawrence Radiation Laboratory, Livermore, Hazards Control Radioactivity Sampling Record 2 sampling record cards (Date 0634)
	Hazards Control Archive Box A20, 5-inch by 8-inch index cards	Lawrence Radiation Laboratory, Livermore, Hazards Control Radioactivity Sampling Record 60 sampling record cards (Dates 0074 to 3364, except 0634) Note that the data for date 0074 for Dried Sludge #1, are not included in the compilation.
1965	Hazards Control Archive Box A46, Binder labeled "Surv. Air, H_2O, Sludge, Soil"	LRL Hazards Control Radioactivity Counting Laboratory Compilation of Environmental Radioactivity Levels Type "Sludge" Location 930 01 Digester #1 Type "Sludge" Location 930 02 Digester #2 Type "Sludge" Location 930 03 Dried Sludge #1 Type "Sludge" Location 930 04 Dried Sludge #2 Type "Sludge" Location 930 05 Oxidation Pond #1 Type "Sludge" Location 930 06 Oxidation Pond #2 For 1965, there is one of each of these documents, covering the entire year.
	Hazards Control Archive Box A18, 5-inch by 8-inch index cards	Lawrence Radiation Laboratory, Livermore, Hazards Control Radioactivity Sampling Record 11 sampling record cards (Dates 0615,1245, 1525,01805 to 3415)
	Hazards Control Archive Box A20, 5-inch by 8-inch index cards	Lawrence Radiation Laboratory, Livermore, Hazards Control Radioactivity Sampling Record 48 sampling record cards (Dates 0055 to 3065. except as noted from Box A18)
1966	Hazards Control Archive Box A52, Document labeled "Environmental Sample Results 1966"	LRL Hazards Control Radioactivity Counting Laboratory Compilation of Environmental Radioactivity Levels Type "Sludge" Location 930 01 Digester #1 Type "Sludge" Location 930 02 Digester #2 Type "Sludge" Location 930 03 Dried Sludge #1 Type "Sludge" Location 930 04 Dried Sludge #2 Type "Sludge" Location 930 05 Oxidation Pond #1 Type "Sludge" Location 930 06 Oxidation Pond #2 For 1966, there is one of each of these documents, covering the entire year.
	Hazards Control Archive Box A18, 5-inch by 8-inch index cards	Lawrence Radiation Laboratory, Livermore, Hazards Control Radioactivity Sampling Record 43 sampling record cards (Dates 0046 to 3406) Note, however, that the data for date 2496 for Digester #2, Dried Sludge #2, and Oxidation Pond #2, are not included in the compilation.

Table 2. Source of data supporting LRL biannual environmental reports (continued).

1967	Hazards Control Archive Box A52, Notebook labeled "Environmental Sample Results"	LRL Hazards Control Radioactivity Counting Laboratory Compilation of Environmental Radioactivity Levels Type "Sludge" Location 930 01 Digester #1 Type "Sludge" Location 930 02 Digester #2 Type "Sludge" Location 930 03 Dried Sludge #1 Type "Sludge" Location 930 04 Dried Sludge #2 Type "Sludge" Location 930 05 Oxidation Pond #1 Type "Sludge" Location 930 06 Oxidation Pond #2 For 1967, there is one of each of these documents, however, they do not include all the data collected for the year.
	Hazards Control Archive Box A18, 5-inch by 8-inch index cards	Lawrence Radiation Laboratory, Livermore, Hazards Control Radioactivity Sampling Record 4 sampling record cards (Dates 0037 to 0387) It appears that Hazards Control changed its sampling records from cards to paper sometime between 0367 and 0667.
	Hazards Control Archive Box A42, folder labeled " 930 01, 02, 14, 18, 19" "1967 093 Sewage Treatment Plant"	Hazards Control Radioactivity Sampling Record (155 sheets, including one marked "No Samples") of alpha and beta counts dated 0667 to 3607. From these data, a summary sheet, similar to the LRL Hazards Control Radioactivity Counting Laboratory Compilation of Environmental Radioactivity Levels, was prepared in calendar year 2003.
	Hazards Control Archive Box A51, Binder labeled "Sewer Monitor 1967-1968"	Handwritten summary sheets of some of the 1967 data, generally consistent with counting records, with some inconsistencies with regard to dates.
1968	Hazards Control Archive Box A51, Binder labeled "Environmental a, b Sample Results 1968"	LRL Hazards Control Radioactivity Counting Laboratory Compilation of Environmental Radioactivity Levels Type "093" Location 01 Type "093" Location 02 Type "093" Location 03 Type "093" Location 04 For 1968, there is one of each of these documents, however, they do not include all the data collected for the year.
	Hazards Control Archive Box A51, Binder labeled "Environmental a, b Sample Results 1968"	Handwritten notes entitled "1968 Sewer Treatment Plant Radioactivity Analysis," which appears to be a nearly complete summary of the 1968 data for Locations 01 and 02 (digester sludge) and location 14 (ariation [sic] pond), in pCi/L.
	Hazards Control Archive Box A51, Binder labeled "Sewer Monitor 1967-1968"	Handwritten notes entitled "1968 Sewer Monitor," which is another summary, apparently complete of the 1968 data for Locations 01, 02, and 14. (Some locations are labeled 04 rather than 14. Also label at top of pages not consistent across all pages.) Data provided in dpm/L and dpm/g, where applicable.
	Hazards Control Archive Box A43, folder labeled " 093 – 1968 file #2" (No file #1 found)	Hazards Control Radioactivity Sampling Record (8 sheets of alpha and beta counts dated 0028 to 0658.

Table 2. Source of data supporting LRL biannual environmental reports (continued).

1969	Hazards Control Archive Box A45, Binder labeled "1969 Environmental a, b Sample Results"	LRL Hazards Control Radioactivity Counting Laboratory Compilation of Environmental Radioactivity Levels Type "Sewage" Location Livermore Sewage Treatment Plant, Digester #1 093-01 Type "Sewage" Location Livermore Sewage Treatment Plant, Digester #2 093-02 Type "Sewage" Location Livermore Sewage Treatment Plant, Aieriation Tank 093-14 (04 is stricken out, and 14 written in) For 1969, there is one of each of these documents, covering most of the year. However, the compilation for Digester #2 contains many errors, and for the most part duplicates the information for Digester #1.
	Hazards Control Archive Box A47, folders labeled "093-(part 1) 1969" and "093-(part 2) 1969"	Original counting laboratory records (50 sheets) of alpha and beta counts from which a summary sheet, similar to the LRL Hazards Control Radioactivity Counting Laboratory Compilation of Environmental Radioactivity Levels, was prepared in calendar year 2003. Note that the sheet for date 3579 lost corrections that were added with correction tape, however, the results of calculations that yield µCi/L values are recorded on the back of the sheet.
1970	Hazards Control Archive Box A49, folders labeled "093"	Original counting laboratory records (49 sheets) of alpha and beta counts from which a summary sheet, similar to the LRL Hazards Control Radioactivity Counting Laboratory Compilation of Environmental Radioactivity Levels, was prepared in calendar year 2003.

References

Agency for Toxic Substances Disease Registry (2000), *Health Consultation, Lawrence Livermore National Laboratory, Big Trees Park 1998 Sampling,* Livermore, California, Federal Facilities Assessment Branch, Division of Health Assessment and Consultation, Agency for Toxic Substances and Disease Registry (CERCLIS No. CA2890012584).

Agency for Toxic Substances Disease Registry (2003), *Public Health Assessment for Lawrence Livermore National Laboratory, Main Site (USDOE), Livermore, Alameda County California, EPA Facility ID: CA2890012584*, Agency for Toxic Substances and Disease Registry, Atlanta, Georgia (Public Comment Draft: February 10, 2003).

D. Myers, W. Silver, D. Coles, K. Lamson, D. McIntyre, B. Mendoza (1976), "Evaluation of the Use of Sludge Containing Plutonium as a Soil Conditioner for Food Crops," In: *Proceedings of the Symposium on Transuranium Nuclides in the Environment*, San Francisco, CA, November 17–21, 1975, International Atomic Energy Agency, Vienna,

G. Gallegos, D. MacQueen, and K. Surano (1999), *Livermore Big Trees Park: 1998 Summary Results,* LawrenceLivermore National Laboratory, Livermore, CA (UCRL-ID-134581).

D. MacQueen, G. Gallegos, and K. Surano (2002), *Livermore Big Trees Park: January 1998 Results*, Lawrence Livermore National Laboratory, Livermore, CA (UCRL-ID-121045).

1961

Compilation of Environmental Radioactivity Levels for 1961 (Reconstructed from Hazards Control Radioactivity Sampling Records for 1961)

Sampling date	Sampling date (standard format)	ALPHA pCi/L	BETA pCi/L	ALPHA pCi/g	BETA pCi/g
Digester #1 (Location 01)					
3391	12/5/1961			ND	ND
Digester #2 (Location 02)					
3111	11/7/1961	(data card does not provide sample size)			
3391	12/5/1961			ND	ND
Dried Sludge #1 (Location 03)					
3111	11/7/1961	(data card does not provide sample size)			
3391	12/5/1961			ND	ND
Dried Sludge #2 (Location 04)					
3391	12/5/1961			ND	ND
Oxidation Pond #1 (Location 05)					
3391	12/5/1961	0.031	ND		
Oxidation Pond #2 (Location 06)					
3391	12/5/1961	0.192	0.429		

1962

LRL HAZARDS CONTROL RADIOACTIVITY COUNTING LABORATORY
COMPILATION OF ENVIRONMENTAL RADIOACTIVITY LEVELS

SAMPLE TYPE SLUDGE LOCATION 981 DIGESTER #1

SAMPLING AND/OR START DATE	TOTAL SAMPLING TIME IN HOURS	SAMPLING RATE C.F.M.	SAMPLE SIZE cc ☐ gm ☑	ALPHA NET CPM	ALPHA COUNTER EFFIC. %	ALPHA μc/cc ☐ μc/gm ☑	BETA NET CPM	BETA COUNTER EFFIC. %	BETA μc/cc ☐ μc/gm ☑	DECAY IN HOURS
0022			0.18	0	—	*	0	—	*	96
0932			0.18	0	—	*	5.9	20.0	7.4×10^{-5}	48
1212						*			4.3×10^{-4}	
1562						3.1×10^{-6}			2.9×10^{-5}	

LRL HAZARDS CONTROL RADIOACTIVITY COUNTING LABORATORY
COMPILATION OF ENVIRONMENTAL RADIOACTIVITY LEVELS

SAMPLE TYPE SLUDGE LOCATION 982 DIGESTER # 2

SAMPLING AND/OR START DATE	TOTAL SAMPLING TIME IN HOURS	SAMPLING RATE C.F.M.	SAMPLE SIZE cc ☐ gm ☑	ALPHA NET CPM	ALPHA COUNTER EFFIC. %	ALPHA μc/cc ☐ μc/gm ☑	BETA NET CPM	BETA COUNTER EFFIC. %	BETA μc/cc ☐ μc/gm ☑	DECAY IN HOURS
0022			0.18	0	—	*	0	—	*	96
0932			0.18	0	—	*	0	—	*	48
1212						*			1.3×10^{-4}	
1562				0		*	0		*	

LRL HAZARDS CONTROL RADIOACTIVITY COUNTING LABORATORY
COMPILATION OF ENVIRONMENTAL RADIOACTIVITY LEVELS

SAMPLE TYPE SLUDGE LOCATION 983 DRIED SLUDGE #1

SAMPLING AND/OR START DATE	TOTAL SAMPLING TIME IN HOURS	SAMPLING RATE C.F.M.	SAMPLE SIZE cc☐ gm☑	ALPHA NET CPM	ALPHA COUNTER EFFIC. %	ALPHA μc/cc ☐ μc/gm ☑	BETA NET CPM	BETA COUNTER EFFIC. %	BETA μc/cc ☐ μc/gm ☑	DECAY IN HOURS
0022			0.18	0	—	*	0	—	*	96
0932			0.18	0	—	*	0	—	*	48
1212						*			*	
1562				0		*			1.1×10^{-5}	

LRL HAZARDS CONTROL RADIOACTIVITY COUNTING LABORATORY
COMPILATION OF ENVIRONMENTAL RADIOACTIVITY LEVELS

SAMPLE TYPE SLUDGE LOCATION 984 DRIED SLUDGE #2

SAMPLING AND/OR START DATE	TOTAL SAMPLING TIME IN HOURS	SAMPLING RATE C.F.M.	SAMPLE SIZE cc ☐ gm ☑	ALPHA NET CPM	ALPHA COUNTER EFFIC. %	ALPHA μc/cc ☐ μc/gm ☑	BETA NET CPM	BETA COUNTER EFFIC. %	BETA μc/cc ☐ μc/gm ☑	DECAY IN HOURS
0022			0.18	0	—	*	0	—	*	96
0932			0.18	0	—	*	0	—	*	48
1212						*			*	
1562				0		*			5.1×10^{-6}	

RL-2989

LRL HAZARDS CONTROL RADIOACTIVITY COUNTING LABORATORY
COMPILATION OF ENVIRONMENTAL RADIOACTIVITY LEVELS

SAMPLE TYPE SLUDGE LOCATION 985 OXIDATION POND #1

SAMPLING AND/OR START DATE	TOTAL SAMPLING TIME IN HOURS	SAMPLING RATE C.F.M.	SAMPLE SIZE cc ☑ gm ☐	ALPHA NET CPM	ALPHA COUNTER EFFIC. %	ALPHA μc/cc ☑ μc/gm ☐	BETA NET CPM	BETA COUNTER EFFIC. %	BETA μc/cc ☑ μc/gm ☐	DECAY IN HOURS
0372			100	0	—	*	0	—	*	168
0652			100	0	—	*	0	—	*	216
0932			100	0	—	*	0	—	*	48
1212			100	0		*	0		*	48
1562						3.2×10^{-12}			4.5×10^{-13}	

RL-2980

LRL HAZARDS CONTROL RADIOACTIVITY COUNTING LABORATORY
COMPILATION OF ENVIRONMENTAL RADIOACTIVITY LEVELS

SAMPLE TYPE SLUDGE LOCATION 986 OXIDATION POND #2

SAMPLING AND/OR START DATE	TOTAL SAMPLING TIME IN HOURS	SAMPLING RATE C.F.M.	SAMPLE SIZE cc ☑ gm ☐	ALPHA NET CPM	ALPHA COUNTER EFFIC. %	ALPHA μc/cc ☐ μc/gm ☐	BETA NET CPM	BETA COUNTER EFFIC. %	BETA μc/cc ☐ μc/gm ☐	DECAY IN HOURS
0372			100	0	—	*	0	—	*	168
0652			100	0	—	*	0	—	*	216
0932			100	0	—	*	0	—	*	48
1212			100	0		*	0	—	*	48
1562				0		*	0		*	

LRL HAZARDS CONTROL RADIOACTIVITY COUNTING LABORATORY
COMPILATION OF ENVIRONMENTAL RADIOACTIVITY LEVELS 930 01

SAMPLE TYPE Sludge LOCATION Digester #1

SAMPLING OR OFF DATE	~~μc/cc~~ OR μC/GM ALPHA	BETA	SAMPLING OR OFF DATE	~~μc/cc~~ OR μC/GM ALPHA	BETA	SAMPLING OR OFF DATE	~~μc/cc~~ OR μC/GM ALPHA	BETA
1842	✓	✓						
2192	✓ ~~1.8X10⁻⁶~~	5.3×10^{-5}						
2472	✓	✓						
2752	✓	✓						
3102	✓ ~~1.4X10⁻⁹~~	2.2×10^{-5}						
→ 3382	1.2×10^{-5}	3.6×10^{-5}						
AVE	6.1×10^{-6}	3.0×10^{-5}						

PF = POWER FAILURE OF THE SAMPLING EQUIPMENT
✓* = RESULTS AT THE LIMIT OF SENSITIVITY $\left\{ \begin{array}{l} 4.95 \times 10^{-6} \pm 4.75 \times 10^{-6} \text{ μc/gram } \alpha \\ 2.28 \times 10^{-5} \pm 2.28 \times 10^{-5} \text{ μc/gram } \beta \end{array} \right.$
✓ = > PREVIOUS 3 MO Period ave

LRL HAZARDS CONTROL RADIOACTIVITY COUNTING LABORATORY
COMPILATION OF ENVIRONMENTAL RADIOACTIVITY LEVELS 930 02

SAMPLE TYPE Sludge 0.18 LOCATION Digester #2 98

SAMPLING OR OFF DATE	~~μc/cc~~ OR μc/GM ALPHA	BETA	SAMPLING OR OFF DATE	~~μc/cc~~ OR μc/GM ALPHA	BETA	SAMPLING OR OFF DATE	~~μc/cc~~ OR μc/GM ALPHA	BETA
1842	✓	✓						
2192	✓	~~1.2×10⁻⁵~~						
2472	✓	✓						
2752	✓	✓						
3102	✓*	3.6×10^{-5}						
3382	✓ ~~4.2×10⁻⁶~~	✓ 4.2×10^{-5}						
AVE	5.0 4.95×10^{-6}	2.8×10^{-5}						

PF = POWER FAILURE OF THE SAMPLING EQUIPMENT
✓* = RESULTS AT THE LIMIT OF SENSITIVITY

LRL HAZARDS CONTROL RADIOACTIVITY COUNTING LABORATORY
COMPILATION OF ENVIRONMENTAL RADIOACTIVITY LEVELS 930 03

SAMPLE TYPE Sludge 0.18gm LOCATION Dried Sludge #1 983

SAMPLING OR OFF DATE	~~μc/cc~~ OR μC/GM ALPHA	BETA	SAMPLING OR OFF DATE	~~μc/cc~~ OR μC/GM ALPHA	BETA	SAMPLING OR OFF DATE	~~μc/cc~~ OR μC/GM ALPHA	BETA
1842	✓	✓						
2192	✓	✓						
2472	✓	✓						
2752	✓	✓ 5.2×10^{-5}						
3102	*	✓ ~~1.6×10^{-5}~~						
3382	✓ 1.3×10^{-5}	✓ 1.7×10^{-4}						
AVE	6.3×10^{-6}	5.2×10^{-5}						

PF = POWER FAILURE OF THE SAMPLING EQUIPMENT
✓ * = RESULTS AT THE LIMIT OF SENSITIVITY
✓ = above ave for prev. 6 mo

LRL HAZARDS CONTROL RADIOACTIVITY COUNTING LABORATORY
COMPILATION OF ENVIRONMENTAL RADIOACTIVITY LEVELS 930 04

SAMPLE TYPE Sludge 0.18 LOCATION Dried Sludge #2 904

SAMPLING OR OFF DATE	~~μc/cc~~ OR μC/GM ALPHA	BETA	SAMPLING OR OFF DATE	~~μc/cc~~ OR μC/GM ALPHA	BETA	SAMPLING OR OFF DATE	~~μc/cc~~ OR μC/GM ALPHA	BETA
1842	✓	✓						
2192	~~1.7×10⁻⁶~~	4.0×10^{-5}						
2472	~~1.6×10⁻⁶~~	✓						
2752	✓	3.4×10^{-5}						
3102	*	✓ 1.7×10^{-4}						
3382	✓ 6.3×10^{-6}	✓ 5.1×10^{-5}						
AVE	5.2×10^{-6}	5.6×10^{-5}						

PF = POWER FAILURE OF THE SAMPLING EQUIPMENT
✓ * = RESULTS AT THE LIMIT OF SENSITIVITY
✓ above ave for prev 6 mo period

LRL HAZARDS CONTROL RADIOACTIVITY COUNTING LABORATORY
COMPILATION OF ENVIRONMENTAL RADIOACTIVITY LEVELS

930 05

SAMPLE TYPE Sludge 100 ml LOCATION Oxidation Pond #1

SAMPLING OR OFF DATE	µC/CC OR ~~µC/GM~~ ALPHA	BETA	SAMPLING OR OFF DATE	µC/CC OR ~~µC/GM~~ ALPHA	BETA	SAMPLING OR OFF DATE	µC/CC OR ~~µC/GM~~ ALPHA	BETA
1842	✓	✓						
2102	✓	✓ ~~4.97X10⁻⁸~~						
2472	✓	✓						
2752	✓ ~~3.8X10⁻¹⁰~~	✓ ~~2.6X10⁻⁸~~						
3102	*	✓ ~~1.7X10⁻⁸~~						
→ 3382	✓ ~~6.3X10⁻⁹~~	✓ ~~7.8X10⁻⁸~~						
AVE	~~5.0X10⁻⁶~~	~~2.3X10⁻⁵~~						
AVE	9.0×10^{-9}	4.1×10^{-8}						

PF = POWER FAILURE OF THE SAMPLING EQUIPMENT

✓* = RESULTS AT THE LIMIT OF SENSITIVITY $\begin{cases} 8.92 \times 10^{-9} \pm 8.55 \times 10^{-9} \ \mu c/cc \ \alpha \\ 4.11 \times 10^{-8} \pm 4.11 \times 10^{-8} \ \mu c/cc \ \beta \end{cases}$

✓ = > prev 6 mo ave & > HB69 MPC for H_2O

LRL HAZARDS CONTROL RADIOACTIVITY COUNTING LABORATORY
COMPILATION OF ENVIRONMENTAL RADIOACTIVITY LEVELS

930 06

SAMPLE TYPE 100 ml Sludge LOCATION Oxidation Pond #2

SAMPLING OR OFF DATE	µC/CC OR ~~µG/GM~~ ALPHA	BETA	SAMPLING OR OFF DATE	µC/CC OR ~~µC/GM~~ ALPHA	BETA	SAMPLING OR OFF DATE	µC/CC OR ~~µC/GM~~ ALPHA	BETA
1842	✓	✓ ~~2.73X10⁻¹⁰~~						
2102	✓	✓ ~~1.7X10⁻⁸~~						
2472	✓	✓						
2752	✓	✓ 7.8×10^{-7}						
3102	✓*	2.4×10^{-7}						
3382	✓ 1.0×10^{-8}	✓ 9.1×10^{-7}						
AVE	1.1×10^{-8}	3.4×10^{-7}						

PF = POWER FAILURE OF THE SAMPLING EQUIPMENT
✓* = RESULTS AT THE LIMIT OF SENSITIVITY
✓ = > MPC H.B. 69

1963

LRL HAZARDS CONTROL RADIOACTIVITY COUNTING LABORATORY
COMPILATION OF ENVIRONMENTAL RADIOACTIVITY LEVELS 930 01

SAMPLE TYPE Sludge LOCATION Digester #1

SAMPLING OR OFF DATE	~~μc/cc~~ OR μC/GM ALPHA	BETA	SAMPLING OR OFF DATE	~~μc/cc~~ OR μC/GM ALPHA	BETA	SAMPLING OR OFF DATE	~~μc/cc~~ OR μC/GM ALPHA	BETA
0023	*	*2.3×10^{-5}						
0363	*	*1.45×10^{-5}						
0643	6.0×10^{-6}	7.45×10^{-5}						
~~0923~~	~~1.8×10^{-4}~~	~~1.23×10^{-3}~~						
corrected clerical error 0923	1.8×10^{-5}	1.24×10^{-4}						
1553	* 4.1×10^{-6}	6.0×10^{-5}						
1273	6.1×10^{-6}	1.4×10^{-4}						
1833	7.9×10^{-6}	1.4×10^{-4}						
1833	5.5×10^{-6}	9.2×10^{-5}						
2463	6.3×10^{-6}	8.6×10^{-5}						
2743	1.8×10^{-5}	1.9×10^{-4}						
3093	6.7×10^{-6}	6.0×10^{-5}						

PF = POWER FAILURE OF THE SAMPLING EQUIPMENT

* = RESULTS AT THE LIMIT OF SENSITIVITY ~~9.0×10^{-9} μc/cc α, 1.0×10^{-8} μc/cc β~~
5.0×10^{-6} μc/gm α, 2.3×10^{-5} μc/gm β
N dpm/gm α 51.1 dpm/μc f = 1.505×10^{-7}

981

LRL HAZARDS CONTROL RADIOACTIVITY COUNTING LABORATORY
COMPILATION OF ENVIRONMENTAL RADIOACTIVITY LEVELS 930 02

SAMPLE TYPE Sludge LOCATION Digester #2

SAMPLING OR OFF DATE	~~[illegible]~~ OR μC/GM ALPHA	BETA	SAMPLING OR OFF DATE	~~[illegible]~~ OR μC/GM ALPHA	BETA	SAMPLING OR OFF DATE	~~[illegible]~~ OR μC/GM ALPHA	BETA
0023	*	2.6×10^{-5}						
0363	* ~~1.9×10^{-6}~~	* ~~3.2×10^{-5}~~						
0643	* ~~7.5×10^{-8}~~	8.3×10^{-5}						
0923	7.1×10^{-6}	1.1×10^{-4}						
1553	* 3.3×10^{-6}	6.0×10^{-5}						
1833	*	1.06×10^{-4}						
2183	8.1×10^{-6}	1.13×10^{-4}						
2463	8.8×10^{-6}	8.7×10^{-5}						
2743	7.2×10^{-6}	7.6×10^{-5}						
3093	*	7.9×10^{-5}						

PF = POWER FAILURE OF THE SAMPLING EQUIPMENT
* = RESULTS AT THE LIMIT OF SENSITIVITY

LRL HAZARDS CONTROL RADIOACTIVITY COUNTING LABORATORY
COMPILATION OF ENVIRONMENTAL RADIOACTIVITY LEVELS 930 03

SAMPLE TYPE Sludge LOCATION Dried Sludge #1

SAMPLING OR OFF DATE	μC/CC OR μC/GM ALPHA	BETA	SAMPLING OR OFF DATE	μC/CC OR μC/GM ALPHA	BETA	SAMPLING OR OFF DATE	μC/CC OR μC/GM ALPHA	BETA
0023	*	3.5×10^{-5}						
0363	* 7.2×10^{-7}	* 3.6×10^{-5}						
0643	*	5.4×10^{-5}						
0923	*	4.69×10^{-4}						
	* 25×10^{-6}	1.38×10^{-4}						
1833	6.0×10^{-6}	9.05×10^{-5}						
2183	6.2×10^{-6}	1.05×10^{-4}						
2463 RADP	*	RADP 6.9×10^{-5}						
2743	* 1.0×10^{-5}	8.1×10^{-5}						
3093	1.2×10^{-5}	7.0×10^{-5}						

PF = POWER FAILURE OF THE SAMPLING EQUIPMENT
* = RESULTS AT THE LIMIT OF SENSITIVITY

LRL HAZARDS CONTROL RADIOACTIVITY COUNTING LABORATORY
COMPILATION OF ENVIRONMENTAL RADIOACTIVITY LEVELS 930 04

SAMPLE TYPE Sludge LOCATION Dried Sludge #2

SAMPLING OR OFF DATE	µC/CC OR µC/GM ALPHA	BETA	SAMPLING OR OFF DATE	µC/CC OR µC/GM ALPHA	BETA	SAMPLING OR OFF DATE	µC/CC OR µC/GM ALPHA	BETA
0023	*	7.2×10^{-5}						
0923	*	6.23×10^{-5}						
1553	* 2.4×10^{-7}	4.25×10^{-5}						
1833	7.7×10^{-6}	1.07×10^{-4}						
2183	*	6.4×10^{-5}						
2463	9.6×10^{-6}	9.2×10^{-5}						
2743	1.0×10^{-5}	7.0×10^{-5}						
3093	*	3.9×10^{-5}						

PF = POWER FAILURE OF THE SAMPLING EQUIPMENT
* = RESULTS AT THE LIMIT OF SENSITIVITY

LRL HAZARDS CONTROL RADIOACTIVITY COUNTING LABORATORY
COMPILATION OF ENVIRONMENTAL RADIOACTIVITY LEVELS 930 05

SAMPLE TYPE Sludge LOCATION Oxidation Pond #1

SAMPLING OR OFF DATE	μC/CC OR ~~μC/GM~~ ALPHA	BETA	SAMPLING OR OFF DATE	μC/CC OR μC/GM ALPHA	BETA	SAMPLING OR OFF DATE	μC/CC OR μC/GM ALPHA	BETA
0023	1.0×10^{-8}	1.0×10^{-7}						
0363	* 10^{-8}	2.5×10^{-7}						
0223	*	* 5.3×10^{-9}						
0363 REPEAT	*	1.1×10^{-7}						
0023 REPEAT	*	*						
0643	*	6.7×10^{-7}						
2463	1.0×10^{-8}	1.0×10^{-7}						
3093	*	2.9×10^{-8}						
3373	*	6.3×10^{-8}						

neglect arical error

PF = POWER FAILURE OF THE SAMPLING EQUIPMENT
* = RESULTS AT THE LIMIT OF SENSITIVITY 2.0×10^{-9} μc/cc α, 4.0×10^{-8} μc/cc β

f = 4.505×10^{-10}

LRL HAZARDS CONTROL RADIOACTIVITY COUNTING LABORATORY
COMPILATION OF ENVIRONMENTAL RADIOACTIVITY LEVELS 930 06

SAMPLE TYPE Sludge LOCATION Oxidation Pond #2

SAMPLING OR OFF DATE	μC/CC OR ~~μC/GM~~ ALPHA	BETA	SAMPLING OR OFF DATE	μC/CC OR μC/GM ALPHA	BETA	SAMPLING OR OFF DATE	μC/CC OR μC/GM ALPHA	BETA
0223	1.6×10^{-8}	* ~~1.4×10^{-8}~~						
corrected actual error RADD 0223	1.37×10^{-8}	* ~~1.37×10^{-8}~~						
0643	*	4.77×10^{-7}						
0923	*	1.3×10^{-7}						
1553	* BRGD	4.7×10^{-8}						
1833	*	5.04×10^{-8}						
2183	*	6.7×10^{-8}						
2743	*	1.8×10^{-7}						
3373	*	5.8×10^{-8}						

PF = POWER FAILURE OF THE SAMPLING EQUIPMENT
* = RESULTS AT THE LIMIT OF SENSITIVITY

$f = 1.505 \times 10^{-10}$

LRL HAZARDS CONTROL RADIOACTIVITY COUNTING LABORATORY
COMPILATION OF ENVIRONMENTAL RADIOACTIVITY LEVELS 930 07

SAMPLE TYPE SLUDGE LOCATION FROM BOTTOM OF OXIDATION POND #1

SAMPLING OR OFF DATE	[redacted] OR μC/GM ALPHA	BETA	SAMPLING OR OFF DATE	μC/CC OR μC/GM ALPHA	BETA	SAMPLING OR OFF DATE	μC/CC OR μC/GM ALPHA	BETA
1553	* 6.75×10^{-7}	3.5×10^{-5}						

PF = POWER FAILURE OF THE SAMPLING EQUIPMENT
* = RESULTS AT THE LIMIT OF SENSITIVITY

1964

LRL HAZARDS CONTROL RADIOACTIVITY COUNTING LABORATORY
COMPILATION OF ENVIRONMENTAL RADIOACTIVITY LEVELS

SAMPLE TYPE SLUDGE LOCATION 930 01 DIGESTER #1

	SAMPLING OR OFF DATE	μC/CC OR μC/GM ALPHA	μC/CC OR μC/GM BETA	SAMPLING OR OFF DATE	μC/CC OR μC/GM ALPHA	μC/CC OR μC/GM BETA	SAMPLING OR OFF DATE	μC/CC OR μC/GM ALPHA	μC/CC OR μC/GM BETA
Y	0074	5.1×10^{-6}	8.6×10^{-5}						
	0354	5.2×10^{-6}	4.1×10^{-5}						
*	0634	*	4.7×10^{-5}						
M	1264	6.36×10^{-5}	*						
J	1544	2.23×10^{-5}	3.48×10^{-5}						
J	1894	1.14×10^{-4}	2.4×10^{-5}						
A	2174	4.95×10^{-4}	3.6×10^{-5}						
A	2334	1.47×10^{-4}	2.7×10^{-5}						
S	2454	2.54×10^{-4}	2.7×10^{-5}						
N	3084	1.41×10^{-4}	4.3×10^{-5}						

PF = POWER FAILURE OF THE SAMPLING EQUIPMENT

* = RESULTS AT THE LIMIT OF SENSITIVITY 5.0×10^{-6} α 11 DPM α
2.3×10^{-5} β 51 DPM β

LRL HAZARDS CONTROL RADIOACTIVITY COUNTING LABORATORY
COMPILATION OF ENVIRONMENTAL RADIOACTIVITY LEVELS

SAMPLE TYPE SLUDGE LOCATION 930 02 DIGESTER #2

SAMPLING OR OFF DATE	μC/CC OR μC/GM ALPHA	BETA	SAMPLING OR OFF DATE	μC/CC OR μC/GM ALPHA	BETA	SAMPLING OR OFF DATE	μC/CC OR μC/GM ALPHA	BETA
0074	*	6.2×10^{-5}						
0984	*	*						
1544	1.33×10^{-5}	3.38×10^{-5}						
1894	1.09×10^{-4}	2.8×10^{-5}						
2174	3.85×10^{-4}	4.9×10^{-5}						
2454	9.8×10^{-5}	2.0×10^{-5}						
2804	1.4×10^{-4}	5.9×10^{-5}						
3084	3.78×10^{-4}	3.7×10^{-5}						
3364	1.95×10^{-4}	*						

PF = POWER FAILURE OF THE SAMPLING EQUIPMENT
* = RESULTS AT THE LIMIT OF SENSITIVITY

LRL HAZARDS CONTROL RADIOACTIVITY COUNTING LABORATORY
COMPILATION OF ENVIRONMENTAL RADIOACTIVITY LEVELS

SAMPLE TYPE SLUDGE LOCATION 930 03 DRIED SLUDGE #1

SAMPLING OR OFF DATE	μC/CC OR μC/GM ALPHA	BETA	SAMPLING OR OFF DATE	μC/CC OR μC/GM ALPHA	BETA	SAMPLING OR OFF DATE	μC/CC OR μC/GM ALPHA	BETA
0634	5.2×10^{-6}	5.3×10^{-5}						
0984	*	*						
1264	1.3×10^{-5}	2.9×10^{-5}						
1544	6.85×10^{-6}	3.95×10^{-5}						
1894	2.0×10^{-5}	*						
2174	2.0×10^{-5}	*						
2454	3.5×10^{-5}	2.4×10^{-5}						
3084	4.5×10^{-5}	2.5×10^{-5}						
3364	3.7×10^{-5}	2.5×10^{-5}						

PF = POWER FAILURE OF THE SAMPLING EQUIPMENT
* = RESULTS AT THE LIMIT OF SENSITIVITY

LRL HAZARDS CONTROL RADIOACTIVITY COUNTING LABORATORY
COMPILATION OF ENVIRONMENTAL RADIOACTIVITY LEVELS

SAMPLE TYPE SLUDGE LOCATION 930 04 DRIED SLUDGE #2

	SAMPLING OR OFF DATE	μC/CC OR μC/GM ALPHA	BETA	SAMPLING OR OFF DATE	μC/CC OR μC/GM ALPHA	BETA	SAMPLING OR OFF DATE	μC/CC OR μC/GM ALPHA	BETA
F	0354	1.2×10^{-5}	7.1×10^{-5}						
M	1264	*	*						
A	1544	*	2.76×10^{-5}						
J	1894	5.4×10^{-5}	4.1×10^{-5}						
A	2174	1.3×10^{-5}	*						
S	2454	2.6×10^{-5}	*						
O	2804	2.2×10^{-5}	2 *						
N	3084	6.9×10^{-5}	4.1×10^{-5}						
D	3364	3.8×10^{-5}	*						

PF = POWER FAILURE OF THE SAMPLING EQUIPMENT

* = RESULTS AT THE LIMIT OF SENSITIVITY

LRL HAZARDS CONTROL RADIOACTIVITY COUNTING LABORATORY
COMPILATION OF ENVIRONMENTAL RADIOACTIVITY LEVELS

SAMPLE TYPE Sludge LOCATION 930 05 OXIDATION POND #

SAMPLING OR OFF DATE	µC/CC OR µC/GM ALPHA	BETA	SAMPLING OR OFF DATE	µC/CC OR µC/GM ALPHA	BETA	SAMPLING OR OFF DATE	µC/CC OR µC/GM ALPHA	BETA
0024	*	1.1×10^{-9}						
0354	*	6.6×10^{-8}						
0634	*	*						
0984	*	9.7×10^{-8}						
1544	*	1.9×10^{-7}						
1894	*	4.3×10^{-8}						
2174	1.1×10^{-8}	*						
2454	1.4×10^{-8}	6.5×10^{-8}						
2804	3.4×10^{-8}	7.0×10^{-8}						
3084	*	*						
3364	*	5.9×10^{-8}						

PF = POWER FAILURE OF THE SAMPLING EQUIPMENT

* = RESULTS AT THE LIMIT OF SENSITIVITY 9.0×10^{-9} 4.0×10^{-8}

LRL HAZARDS CONTROL RADIOACTIVITY COUNTING LABORATORY
COMPILATION OF ENVIRONMENTAL RADIOACTIVITY LEVELS

SAMPLE TYPE SLUDGE LOCATION 930 06 OXIDATION POND #2

SAMPLING OR OFF DATE	μC/CC OR μC/GM ALPHA	BETA	SAMPLING OR OFF DATE	μC/CC OR μC/GM ALPHA	BETA	SAMPLING OR OFF DATE	μC/CC OR μC/GM ALPHA	BETA
0074	*	1.1×10^{-7}						
0354	*	4.4×10^{-8}						
0634	* ~~7.8×10^{-6}~~	*						
0984	*	8.4×10^{-8}						
1264	*	*						
1544	*	7.5×10^{-8}						
1894	*	*						
2174	*	5.1×10^{-8}						
2454	9.5×10^{-9}	7.1×10^{-8}						
2804	1.7×10^{-8}	6.8×10^{-8}						
3084	4.4×10^{-8}	*						
3364	*	3.1×10^{-8}						

PF = POWER FAILURE OF THE SAMPLING EQUIPMENT
* = RESULTS AT THE LIMIT OF SENSITIVITY

LRL HAZARDS CONTROL RADIOACTIVITY COUNTING LABORATORY
COMPILATION OF ENVIRONMENTAL RADIOACTIVITY LEVELS

SAMPLE TYPE SLUDGE LOCATION 930 07

SAMPLING OR OFF DATE	μC/CC OR μC/GM ALPHA	BETA	SAMPLING OR OFF DATE	μC/CC OR μC/GM ALPHA	BETA	SAMPLING OR OFF DATE	μC/CC OR μC/GM ALPHA	BETA

PF = POWER FAILURE OF THE SAMPLING EQUIPMENT

* = RESULTS AT THE LIMIT OF SENSITIVITY

1965

LRL HAZARDS CONTROL RADIOACTIVITY COUNTING LABORATORY
COMPILATION OF ENVIRONMENTAL RADIOACTIVITY LEVELS

930 1

SAMPLE TYPE SLUDGE LOCATION DIGESTER #1

SAMPLING OR OFF DATE	pCi/m3, pCi/l, or pCi/gm ALPHA	BETA	SAMPLING OR OFF DATE	pCi/m3, pCi/l, or pCi/gm ALPHA	BETA	SAMPLING OR OFF DATE	pCi/m3, pCi/l, or pCi/gm ALPHA	BETA
0055	13.0	19.5						
0335	17.6	54.3						
0615	44.1	23.1						
0965	*	6.3						
1245	47.1	61.4						
1525	69.6	66.6						
1875	53.1	36.8						
2155	49.8	41.8						
2505	56.0	41.9						
2785	19.6	20.7						
3065	48.8	32.0						
3415	35.3	19.5						

PF = POWER FAILURE OF THE SAMPLING EQUIPMENT
* = RESULTS AT THE LIMIT OF SENSITIVITY

LRL HAZARDS CONTROL RADIOACTIVITY COUNTING LABORATORY
COMPILATION OF ENVIRONMENTAL RADIOACTIVITY LEVELS

930 2

SAMPLE TYPE SLUDGE LOCATION DIGESTER #2

SAMPLING OR OFF DATE	pCi/m3, pCi/l, or pCi/gm ALPHA	BETA	SAMPLING OR OFF DATE	pCi/m3, pCi/l, or pCi/gm ALPHA	BETA	SAMPLING OR OFF DATE	pCi/m3, pCi/l, or pCi/gm ALPHA	BETA
0055	*	*						
0335	55.3	54.8						
0965	135.1	55.1						
1245	44.7	60.8						
1525	43.5	59.6						
1875	69.9	52.1						
2155	30.7	43.3						
2505	78.7	40.7						
3065	8.5	16.4						
3415	29.9	145.8						

PF = POWER FAILURE OF THE SAMPLING EQUIPMENT

* = RESULTS AT THE LIMIT OF SENSITIVITY

LRL HAZARDS CONTROL RADIOACTIVITY COUNTING LABORATORY
COMPILATION OF ENVIRONMENTAL RADIOACTIVITY LEVELS

930 3

SAMPLE TYPE SLUDGE LOCATION ~~DRIED SLUDGE #1~~

SAMPLING OR OFF DATE	pCi/m3, pCi/l, or pCi/gm ALPHA	BETA	SAMPLING OR OFF DATE	pCi/m3, pCi/l, or pCi/gm ALPHA	BETA	SAMPLING OR OFF DATE	pCi/m3, pCi/l, or pCi/gm ALPHA	BETA
1525	157.1	29.4						
1875	92.7	15.8						
2155	150.3	21.2						
2505	127.8	17.0						
2785	22.6	7.5						
3065	68.2	17.3						
3415	53.1	26.8						

PF = POWER FAILURE OF THE SAMPLING EQUIPMENT
* = RESULTS AT THE LIMIT OF SENSITIVITY

LRL HAZARDS CONTROL RADIOACTIVITY COUNTING LABORATORY
COMPILATION OF ENVIRONMENTAL RADIOACTIVITY LEVELS

930 4

SAMPLE TYPE SLUDGE LOCATION DRIED SLUDGE #2

SAMPLING OR OFF DATE	pCi/m3, pCi/l, or pCi/gm ALPHA	BETA	SAMPLING OR OFF DATE	pCi/m3, pCi/l, or pCi/gm ALPHA	BETA	SAMPLING OR OFF DATE	pCi/m3, pCi/l, or pCi/gm ALPHA	BETA
0055	20.2	21.5						
0335	33.0	21.4						
0615	*	70.3						
0965	8.8	53.2						
1245	18.6	56.4						
1525	33.3	33.7						
1875	22.1	15.8						
2155	41.8	20.6						
2505	28.9	20.9						
2785	30.2	13.2						
3065	26.8	19.5						

PF = POWER FAILURE OF THE SAMPLING EQUIPMENT
* = RESULTS AT THE LIMIT OF SENSITIVITY

LRL HAZARDS CONTROL RADIOACTIVITY COUNTING LABORATORY
COMPILATION OF ENVIRONMENTAL RADIOACTIVITY LEVELS

930 5

SAMPLE TYPE SLUDGE LOCATION OXIDATION POND #1

SAMPLING OR OFF DATE	pCi/m3, pCi/l, or pCi/gm ALPHA	BETA	SAMPLING OR OFF DATE	pCi/m3, pCi/l, or pCi/gm ALPHA	BETA	SAMPLING OR OFF DATE	pCi/m3, pCi/l, or pCi/gm ALPHA	BETA
0335	*	35.9						
0615	*	56.8						
0965	155.4	190.4						
1245	*	35.9						
1525	*	65.4						
1875	83.1818	61.363						
2155	*	145.4						
2505	*	20.0						
2985	*	44.5						
3065	*	190.9						
3415	*	76.8						

PF = POWER FAILURE OF THE SAMPLING EQUIPMENT
* = RESULTS AT THE LIMIT OF SENSITIVITY

LRL HAZARDS CONTROL RADIOACTIVITY COUNTING LABORATORY
COMPILATION OF ENVIRONMENTAL RADIOACTIVITY LEVELS

930 6

SAMPLE TYPE SLUDGE LOCATION OXIDATION POND #2

SAMPLING OR OFF DATE	pCi/m3, pCi/l, or pCi/gm ALPHA	BETA	SAMPLING OR OFF DATE	pCi/m3, pCi/l, or pCi/gm ALPHA	BETA	SAMPLING OR OFF DATE	pCi/m3, pCi/l, or pCi/gm ALPHA	BETA
1875	*	*						
2155	*	21.8						
2505	*	19.0						
2785	*	33.6						
3065	*	19.1						
3415	*	203.						

PF = POWER FAILURE OF THE SAMPLING EQUIPMENT
* = RESULTS AT THE LIMIT OF SENSITIVITY

1966

LRL HAZARDS CONTROL RADIOACTIVITY COUNTING LABORATORY
COMPILATION OF ENVIRONMENTAL RADIOACTIVITY LEVELS

930 01

SAMPLE TYPE SLUDGE LOCATION DIGESTER #1

SAMPLING OR OFF DATE	pCi/m3, pCi/l, or pCi/gm ALPHA	BETA	SAMPLING OR OFF DATE	pCi/m3, pCi/l, or pCi/gm ALPHA	BETA	SAMPLING OR OFF DATE	pCi/m3, pCi/l, or pCi/gm ALPHA	BETA
0046	20.6818	24.659						
0326	12.0	21.0						
0606	31.8	73.3						
0956	19.318	28.068						
1236	2.4	23.9						
1516	5.8	21.0						
1866	30.6	34.5						
2276	18.4	16.6						
3056	25.8	21.8						
3406	*	14.4						

PF = POWER FAILURE OF THE SAMPLING EQUIPMENT
* = RESULTS AT THE LIMIT OF SENSITIVITY

LRL HAZARDS CONTROL RADIOACTIVITY COUNTING LABORATORY
COMPILATION OF ENVIRONMENTAL RADIOACTIVITY LEVELS

C30 C2

SAMPLE TYPE SLUDGE LOCATION DIGESTER #2

SAMPLING OR OFF DATE	pCi/m3, pCi/l, or pCi/gm ALPHA	BETA	SAMPLING OR OFF DATE	pCi/m3, pCi/l, or pCi/gm ALPHA	BETA	SAMPLING OR OFF DATE	pCi/m3, pCi/l, or pCi/gm ALPHA	BETA
0046	29.3181	27.954						
0326	10.9	17.6						
0606	32.2	42.4						
0956	17.386	22.954						
1236	*	25.8						
1586	11.1	22.5						
1866	20.1	234.4						
2776	23.1	71.0						
3056	19.7	22.0						
3406	53.4	18.8						

PF = POWER FAILURE OF THE SAMPLING EQUIPMENT
* = RESULTS AT THE LIMIT OF SENSITIVITY

LRL HAZARDS CONTROL RADIOACTIVITY COUNTING LABORATORY
COMPILATION OF ENVIRONMENTAL RADIOACTIVITY LEVELS

SAMPLE TYPE SLUDGE LOCATION DRIED SLUDGE #1

SAMPLING OR OFF DATE	pCi/m3, pCi/l, or pCi/gm ALPHA	BETA	SAMPLING OR OFF DATE	pCi/m3, pCi/l, or pCi/gm ALPHA	BETA	SAMPLING OR OFF DATE	pCi/m3, pCi/l, or pCi/gm ALPHA	BETA
0846	187.5	21.818						
0956	21.590	15.454						
1236	7.3	7.2						
1556	10.8	12.5						
1866	11.9	13.9						
2146	3.2	13.9						

PF = POWER FAILURE OF THE SAMPLING EQUIPMENT
* = RESULTS AT THE LIMIT OF SENSITIVITY

LRL HAZARDS CONTROL RADIOACTIVITY COUNTING LABORATORY
COMPILATION OF ENVIRONMENTAL RADIOACTIVITY LEVELS

930 04

SAMPLE TYPE SLUDGE LOCATION ~~DRIED SLUDGE #2~~

SAMPLING OR OFF DATE	pCi/m3, pCi/l, or pCi/gm ALPHA	BETA	SAMPLING OR OFF DATE	pCi/m3, pCi/l, or pCi/gm ALPHA	BETA	SAMPLING OR OFF DATE	pCi/m3, pCi/l, or pCi/gm ALPHA	BETA
0956	12.500	17.386						
1236	25.9	14.4						
1586	24.4	16.8						
1866	34.6	38.8						
2776	16.6	16.7						
3056	20.0	17.2						

PF = POWER FAILURE OF THE SAMPLING EQUIPMENT
* = RESULTS AT THE LIMIT OF SENSITIVITY

LRL HAZARDS CONTROL RADIOACTIVITY COUNTING LABORATORY
COMPILATION OF ENVIRONMENTAL RADIOACTIVITY LEVELS

SAMPLE TYPE sludge LOCATION OXIDATION POND #1 000 05

SAMPLING OR OFF DATE	pCi/m3, pCi/l, or pCi/gm ALPHA	BETA	SAMPLING OR OFF DATE	pCi/m3, pCi/l, or pCi/gm ALPHA	BETA	SAMPLING OR OFF DATE	pCi/m3, pCi/l, or pCi/gm ALPHA	BETA
0046	*	*						
0326	*	23.6						
0606	*	*						
0956	20.000	35.909						

PF = POWER FAILURE OF THE SAMPLING EQUIPMENT
* = RESULTS AT THE LIMIT OF SENSITIVITY

LRL HAZARDS CONTROL RADIOACTIVITY COUNTING LABORATORY
COMPILATION OF ENVIRONMENTAL RADIOACTIVITY LEVELS

SAMPLE TYPE sludge LOCATION OXIDATION POND #2 330 06

SAMPLING OR OFF DATE	pCi/m3, pCi/l, or pCi/gm ALPHA	BETA	SAMPLING OR OFF DATE	pCi/m3, pCi/l, or pCi/gm ALPHA	BETA	SAMPLING OR OFF DATE	pCi/m3, pCi/l, or pCi/gm ALPHA	BETA
0046	*	19,545						
0326	*	23.6						
1866	*	236						
2146	*	26.4						

PF = POWER FAILURE OF THE SAMPLING EQUIPMENT

* = RESULTS AT THE LIMIT OF SENSITIVITY

1967

Compilation of Environmental Radioactivity Levels for 1967
(Reconstructed from Hazards Control Radioactivity Sampling Records for 1967)

Sampling date	Sampling date (standard format)	ALPHA pCi/L	BETA pCi/L	g (solids) /100 mL	ALPHA pCi/g	BETA pCi/g
Digester #1 (Location 01)						
37	1/3/67				15.3	17.1
387	2/7/67				1.2	45.4
667	3/7/1967				ND	90.9
947	4/4/1967				ND	15.5
1577	6/6/1967				652.5	39.2
1647	6/13/1967				839.1	83.4
1667	6/15/1967				1205.0	78.2
1677	6/16/1967				1100.6	67.3
1687	6/17/1967				995.3	72.2
1707	6/19/1967				923.0	59.3
1717	6/20/1967	18628.7	1088.9	1.92	971.9	56.8
1727	6/21/1967	2900.1	143.5	0.57	513.1	25.4
1737	6/22/1967	13987.0	1203.3	2.15	649.9	55.9
1747	6/23/1967	11689.1	3275.2	1.73	675.5	189.3
1777	6/26/1967	4996.3	438.0	1.04	478.4	41.9
1787	6/27/1967	8310.3	1208.2	1.81	459.0	66.7
1797	6/28/1967	1554.4	115.3	0.52	298.9	22.2
1807	6/29/1967	10283.0	1951.3	1.39	740.1	140.4
1817	6/30/1967	11827.6	3463.9	2.60	454.9	133.2
1847	7/3/1967	7219.1	1692.3	1.36	530.8	124.4
1867	7/5/1967	8346.0	2175.8	2.16	386.4	100.7
1877	7/6/1967	8135.6	2601.3	2.06	394.3	126.1
1887	7/7/1967	6237.2	1522.0	1.85	336.7	82.2
1917	7/10/1967	1905.8	709.1	0.82	232.4	86.5
1927	7/11/1967	931.1	717.0	0.82	113.6	87.4
1937	7/12/1967	5892.6	1228.0	1.28	458.8	95.6
1947	7/13/1967	5818.0	1493.0	1.36	427.8	109.8
1957	7/14/1967	4042.0	1300.9	1.16	348.4	112.1
1987	7/17/1967	1385.9	657.9	1.28	108.3	51.4
1997	7/18/1967	1717.6	826.5	1.54	111.8	53.8
2007	7/19/1967	2299.4	1177.2	2.06	111.5	57.1
2017	7/20/1967	2276.1	1193.8	1.00	227.6	119.4
2027	7/21/1967	4100.9	1297.1	2.74	149.4	47.3
2057	7/24/1967	1389.7	1244.0	3.16	43.9	39.3
2067	7/25/1967	3696.0	1331.8	3.11	119.0	42.9
2077	7/26/1967	3238.7	1213.5	2.67	121.5	45.5
2087	7/27/1967	2155.4	2206.3	3.81	56.5	57.8
2097	7/28/1967	2868.9	1077.2	3.15	91.0	34.2
2127	7/31/1967	4089.8	1292.7	2.51	162.9	51.5
2137	8/1/1967	5650.8	2522.5	6.84	82.6	36.9
2147	8/2/1967	3765.9	1572.8	2.47	152.6	63.7

Compilation of Environmental Radioactivity Levels for 1967
(Reconstructed from Hazards Control Radioactivity Sampling Records for 1967)

Sampling date	Sampling date (standard format)	ALPHA pCi/L	BETA pCi/L	g (solids) /100 mL	ALPHA pCi/g	BETA pCi/g
2157	8/3/1967	3675.6	1386.6	3.32	110.7	41.8
2167	8/4/1967	3964.9	1381.5	3.25	121.9	42.5
2197	8/7/1967	3148.3	1228.5	3.68	85.6	33.4
2207	8/8/1967	2352.6	1184.0	3.35	70.3	35.4
2217	8/9/1967	2720.9	1158.8	2.33	116.6	49.7
2227	8/10/1967	2657.5	1125.6	3.37	78.9	33.4
2237	8/11/1967	2454.1	1001.0	2.61	94.0	38.3
2267	8/14/1967	4141.2	1637.1	2.16	191.6	75.8
2277	8/15/1967	2681.8	6758.4	2.06	130.3	328.4
2287	8/16/1967	1985.9	844.6	2.12	93.6	39.8
2297	8/17/1967	2239.2	941.9	2.26	99.0	41.7
2307	8/18/1967	1951.0	796.8	2.15	90.9	37.1
2337	8/21/1967	1235.0	723.2	1.59	77.6	45.4
2347	8/22/1967	1449.5	754.2	1.49	97.0	50.5
2357	8/23/1967	314.8	687.6	1.34	23.5	51.3
2367	8/24/1967	426.9	832.9	1.39	30.8	60.0
2377	8/25/1967	3915.8	1496.7	3.16	124.0	47.4
2407	8/28/1967	3689.6	882.5	1.33	276.7	66.2
2417	8/29/1967	1188.7	449.6	1.14	104.3	39.4
2427	8/30/1967	6347.4	1367.1	1.92	330.6	71.2
2437	8/31/1967	346.2	552.5	1.17	29.7	47.4
2447	9/1/1967	2623.9	898.3	1.73	151.6	51.9
2487	9/5/1967	839.5	674.0	1.48	56.8	45.6
2497	9/6/1967	1533.1	605.8	1.75	87.6	34.6
2507	9/7/1967	502.2	674.9	2.07	24.3	32.7
2517	9/8/1967	2546.9	1077.6	3.28	77.5	32.8
2557	9/12/1967	1347.1	623.1	1.69	79.8	36.9
2627	9/19/1967	2281.1	1114.8	1.88	121.3	59.3
2697	9/26/1967	2571.1	1694.7	1.11	231.4	152.5
2767	10/3/1967	3148.4	1170.3	1.91	164.7	61.2
2837	10/10/1967	2624.4	1198.2	1.72	152.6	69.7
2907	10/17/1967	2299.4	834.6	1.18	194.9	70.7
2977	10/24/1967	1457.3	527.2	1.16	125.6	45.5
3047	10/31/1967	1531.5	577.8	1.14	134.3	50.7
3117	11/7/1967	1318.6	754.4	1.54	85.6	49.0
3117	11/7/1967	1243.2	681.1	1.30	95.6	52.4
3187	11/14/1967	1353.1	1129.6	1.38	98.0	81.9
3327	11/28/1967	875.9	1918.1	1.82	48.2	105.6
3397	12/5/1967	421.9	706.8			
3467	12/12/1967	769.0	662.6			
3537	12/19/1967	335.9	561.2	0.89	37.8	63.1
3607	12/26/1967	189.8	721.7	1.02	18.6	70.8

Compilation of Environmental Radioactivity Levels for 1967
(Reconstructed from Hazards Control Radioactivity Sampling Records for 1967)

Sampling date	Sampling date (standard format)	ALPHA pCi/L	BETA pCi/L	g (solids) /100 mL	ALPHA pCi/g	BETA pCi/g
Digester #2 (Location 02)						
37	1/3/67				8.2	14.9
387	2/7/67				ND	33.0
667	3/7/1967				10.9	59.7
1227	5/2/1967				ND	21.5
1647	6/13/1967				419.9	26.4
1667	6/15/1967				1062.4	45.2
1677	6/16/1967				995.3	
1687	6/17/1967				809.9	33.5
1707	6/19/1967				351.7	21.5
1717	6/20/1967	8103.4	383.0	0.97	836.8	39.5
1727	6/21/1967	1008.2	53.9	0.20	499.0	26.7
1737	6/22/1967	1636.8	106.1	0.45	366.3	23.8
1747	6/23/1967	392.1	50.3	0.29	133.3	17.1
1777	6/26/1967	23675.0	6772.7	6.67	355.1	101.6
1787	6/27/1967	862.5	103.4	0.43	201.2	24.1
1797	6/28/1967	1080.5	97.6	0.44	243.1	22.0
1807	6/29/1967	1260.9	75.5	0.30	420.3	25.2
1817	6/30/1967	224.5	121.9	0.26	86.3	46.9
1847	7/3/1967	313.0	68.7	0.21	148.7	32.6
1867	7/5/1967	10153.2	2460.1	2.59	392.5	95.1
1877	7/6/1967	328.3	109.6	0.28	117.2	39.1
1887	7/7/1967	1032.0	286.9	0.62	166.8	46.4
1917	7/10/1967	937.1	438.3	0.58	161.6	75.6
1927	7/11/1967	3931.0	1592.8	1.60	245.7	99.5
1937	7/12/1967	4646.0	1128.1	1.28	363.0	88.1
1947	7/13/1967	3302.9	690.9	0.90	367.0	76.8
1957	7/14/1967	4791.0	1437.6	1.62	295.7	88.7
1987	7/17/1967	1863.9	583.3	0.74	251.9	78.8
1997	7/18/1967	1879.9	616.5	0.84	223.2	73.2
2007	7/19/1967	2308.3	826.5	1.04	221.6	79.3
2017	7/20/1967	3787.6	1363.1	1.22	310.2	111.6
2027	7/21/1967	4819.3	1303.4	1.10	436.5	118.0
2057	7/24/1967	1133.1	1158.4	1.22	92.8	94.9
2067	7/25/1967	3333.2	815.3	1.20	277.8	67.9
2077	7/26/1967	4067.0	956.1	1.33	306.6	72.1
2087	7/27/1967	4605.0	1121.3	1.48	311.1	75.8
2097	7/28/1967	1299.9	315.3	1.17	111.1	26.9
2127	7/31/1967	3360.8	958.8	1.29	257.7	74.6
2137	8/1/1967	3317.0	958.9	1.36	243.7	70.5
2147	8/2/1967	3705.3	1891.9	1.26	293.9	150.0
2157	8/3/1967	3180.0	2454.9	1.16	274.6	212.0

Compilation of Environmental Radioactivity Levels for 1967
(Reconstructed from Hazards Control Radioactivity Sampling Records for 1967)

Sampling date	Sampling date (standard format)	ALPHA pCi/L	BETA pCi/L	g (solids) /100 mL	ALPHA pCi/g	BETA pCi/g
2167	8/4/1967	3484.9	1122.0	1.56	223.0	71.8
2197	8/7/1967	2196.8	615.4	0.84	261.5	73.3
2207	8/8/1967	4155.5	1372.5	1.17	354.6	117.1
2217	8/9/1967	2945.4	1167.9	1.09	269.1	106.7
2227	8/10/1967	4124.8	1423.4	1.30	317.3	109.5
2237	8/11/1967	3495.4	1045.7	1.65	211.9	63.4
2267	8/14/1967	4450.0	46825.5	1.64	271.5	2856.4
2277	8/15/1967	3628.6	1080.5	1.65	220.0	65.5
2287	8/16/1967	3425.1	1166.3	1.91	179.7	61.2
2297	8/17/1967	3127.4	809.2	1.73	181.2	46.9
2307	8/18/1967	3310.0	1003.6	1.69	195.6	59.3
2337	8/21/1967	2747.4	898.5	1.36	202.0	66.1
2347	8/22/1967	1983.2	749.9	1.13	176.3	66.7
2357	8/23/1967	1046.2	963.9	1.30	80.5	74.1
2367	8/24/1967	518.6	805.9	1.25	41.6	64.6
2377	8/25/1967	2240.5	814.2	1.15	194.6	70.7
2407	8/28/1967	1523.6	481.3	1.19	128.3	40.5
2417	8/29/1967	1890.2	1302.6	1.39	135.9	93.7
2427	8/30/1967	860.7	307.7	0.61	140.6	50.3
2437	8/31/1967	523.5	767.3	1.52	34.5	50.5
2447	9/1/1967	9061.5	2292.3	3.40	266.4	67.4
2487	9/5/1967	1193.8	612.1	1.16	103.3	53.0
2497	9/6/1967	2291.0	10067.1	1.33	171.8	755.0
2507	9/7/1967	2371.2	842.1	1.87	129.9	44.9
2517	9/8/1967	2010.9	983.7	1.38	146.0	71.4
2557	9/12/1967	2648.0	799.1	1.74	151.8	45.8
2627	9/19/1967	2174.0	859.2	1.56	139.4	55.1
2697	9/26/1967	2588.1	861.1	1.33	194.1	64.6
2767	10/3/1967	1583.0	647.9	1.14	138.3	56.6
2837	10/10/1967	2923.6	949.2	1.38	211.9	68.8
2907	10/17/1967	3696.2	1044.9	1.96	188.6	53.3
2977	10/24/1967	1683.9	570.4	1.28	131.6	44.6
3047	10/31/1967	2128.9	842.7	1.44	147.8	58.5
3117	11/7/1967	1526.5	2165.5	1.84	83.0	117.7
3117	11/7/1967	2317.0	1175.8	2.30	100.7	51.1
3187	11/14/1967	2323.8	1202.4	1.91	121.5	62.9
3327	11/28/1967	693.8	1183.3	1.37	50.5	86.2
3397	12/5/1967	471.4	992.9			
3467	12/12/1967	919.1	2576.4			
3537	12/19/1967	377.3	842.0	1.52	24.8	55.4
3607	12/26/1967	779.4	1042.5	2.14	36.4	48.7

Compilation of Environmental Radioactivity Levels for 1967
(Reconstructed from Hazards Control Radioactivity Sampling Records for 1967)

Sampling date	Sampling date (standard format)	ALPHA pCi/L	BETA pCi/L	g (solids) /100 mL	ALPHA pCi/g	BETA pCi/g
Dried Sludge #1 (Location 03)						
947	4/4/1967				ND	13.0
1887	7/7/1967				ND	15.0

Compilation of Environmental Radioactivity Levels for 1967
(Reconstructed from Hazards Control Radioactivity Sampling Records for 1967)

Sampling date	Sampling date (standard format)	ALPHA pCi/L	BETA pCi/L	g (solids) /100 mL	ALPHA pCi/g	BETA pCi/g
Dried Sludge #2 (Location 04)						
1227	5/2/1967				25.6	26.4

Compilation of Environmental Radioactivity Levels for 1967
(Reconstructed from Hazards Control Radioactivity Sampling Records for 1967)

Sampling date	Sampling date (standard format)	ALPHA pCi/L	BETA pCi/L	g (solids) /100 mL	ALPHA pCi/g	BETA pCi/g
Aerator (Location 14)						
1677	6/16/1967	2922.5	119.4			
1717	6/20/1967	1954.8	102.1			
1727	6/21/1967	2052.3	65.5			
1737	6/22/1967	1710.4	322.4			
1747	6/23/1967	1480.4	130.9			
1777	6/26/1967	1247.8	128.6			
1787	6/27/1967	1133.0	195.9			
1797	6/28/1967	1075.4	148.9			
1807	6/29/1967	1316.7	435.2			
1817	6/30/1967	2272.2	637.4			
1847	7/3/1967	912.5	265.8			
1867	7/5/1967	307.3	1112.6			
1877	7/6/1967	527.4	208.5			
1887	7/7/1967	407.4	283.1			
1917	7/10/1967	797.6	489.0			
1927	7/11/1967	480.0	267.1			
1937	7/12/1967	589.8	257.5			
1947	7/13/1967	644.2	300.8			
1957	7/14/1967	719.5	358.5			
1987	7/17/1967	440.8	320.0			
1997	7/18/1967	461.2	246.1			
2007	7/19/1967	263.8	171.6			
2017	7/20/1967	389.6	211.6			
2027	7/21/1967	368.2	325.0			
2057	7/24/1967	266.5	191.2			
2067	7/25/1967	444.6	4256.8			
2077	7/26/1967	299.3	1580.1			
2087	7/27/1967	126.7	157.8			
2097	7/28/1967	207.4	127.1			
2127	7/31/1967	164.0	431.4			
2137	8/1/1967	129.2	105.8			
2147	8/2/1967	241.3	151.3			
2157	8/3/1967	323.0	177.6			
2167	8/4/1967	80.0	70.2			
2197	8/7/1967	94.4	77.0			
2207	8/8/1967	120.6	102.9			
2217	8/9/1967	108.8	108.9			
2227	8/10/1967	80.5	88.8			
2237	8/11/1967	72.1	216.3			
2267	8/14/1967	70.9	86.3			
2277	8/15/1967	96.0	81.9			

Compilation of Environmental Radioactivity Levels for 1967
(Reconstructed from Hazards Control Radioactivity Sampling Records for 1967)

Sampling date	Sampling date (standard format)	ALPHA pCi/L	BETA pCi/L	g (solids) /100 mL	ALPHA pCi/g	BETA pCi/g
2287	8/16/1967	32.1	65.8			
2297	8/17/1967	92.2	205.9			
2307	8/18/1967	123.0	91.6			
2337	8/21/1967	129.3	82.6			
2347	8/22/1967	100.9	88.7			
2357	8/23/1967	118.6	82.2			
2367	8/24/1967	167.7	84.2			
2377	8/25/1967	151.9	74.0			
2407	8/28/1967	426.6	83.0			
2417	8/29/1967	147.3	79.0			
2427	8/30/1967	118.7	85.1			
2437	8/31/1967	170.1	80.9			
2447	9/1/1967	132.8	70.8			
2487	9/5/1967	107.5	58.1			
2497	9/6/1967	82.1	66.8			
2507	9/7/1967	84.6	68.1			
2517	9/8/1967	28.4	71.8			
2557	9/12/1967	88.8	68.7			
2627	9/19/1967	317.1	109.3			
2697	9/26/1967	336.4	122.6			
2767	10/3/1967	503.2	166.6			
2837	10/10/1967	233.3	79.8			
2907	10/17/1967	266.6	63.5			
2977	10/24/1967	79.3	61.4			
3047	10/31/1967	206.8	110.6			
3117	11/7/1967	84.0	69.6			
3117	11/7/1967	457.7	229.8			
3187	11/14/1967	136.7	213.3			
3397	12/5/1967	87.1	185.1			
3467	12/12/1967	98.8	261.5			
3537	12/19/1967	82.8	120.6			
3607	12/26/1967	61.2	98.4			

LRL HAZARDS CONTROL RADIOACTIVITY COUNTING LABORATORY
COMPILATION OF ENVIRONMENTAL RADIOACTIVITY LEVELS

SAMPLE TYPE Sludge LOCATION Digester #1 930 1

SAMPLING OR OFF DATE	pCi/m3, pCi/l, or pCi/gm ALPHA	BETA	SAMPLING OR OFF DATE	pCi/m3, pCi/l, or pCi/gm ALPHA	BETA	SAMPLING OR OFF DATE	pCi/m3, pCi/l, or pCi/gm ALPHA	BETA
0037	15.23	17.05						
0387	*	45.8						
0667	*	91.7						
0947	*	16						
1577	658 ~~1448~~	40 ~~87~~						
1647	847	84						
1667	1216	77						
1687	1004	94						
1707	931	59.8						
1717	987	58						
1727	520	26						
1737	635	55						
1747	678	190						
1777	479	42						
1787	461	67						
1797	302	9.0						
1807	752	143						
1817	448	131						
1847	546	128						
1867	379	99						
1877	390	50						
1887	346	84						
1917	236	193						
1927	115	89						
1937	461	96						

PF = POWER FAILURE OF THE SAMPLING EQUIPMENT

* = RESULTS AT THE LIMIT OF SENSITIVITY

LRL HAZARDS CONTROL RADIOACTIVITY COUNTING LABORATORY
COMPILATION OF ENVIRONMENTAL RADIOACTIVITY LEVELS

SAMPLE TYPE Sludge LOCATION Digester #2 930Z 2

SAMPLING OR OFF DATE	pCi/m3, pCi/l, or pCi/gm ALPHA	BETA	SAMPLING OR OFF DATE	pCi/m3, pCi/l, or pCi/gm ALPHA	BETA	SAMPLING OR OFF DATE	pCi/m3, pCi/l, or pCi/gm ALPHA	BETA
0037	8.18	15.11						
0387	*	33.3						
0667	11.0	60.1						
1227	*	6.7						
1647	424	206						
1667	1072	46						
1687	817	34						
1707	355	22						
1717	838	40						
1727	504	27						
1737	372	24						
1747	134	17						
1777	358	103						
1787	202	24						
1797	245	22						
1807	423	25						
1817	87	47						
1847	151	33						
1867	384	93						
1877	118	40						
1887	169	47						
1917	163	76						
1927	248	100						
1937	363	88						

PF = POWER FAILURE OF THE SAMPLING EQUIPMENT
* = RESULTS AT THE LIMIT OF SENSITIVITY

LRL HAZARDS CONTROL RADIOACTIVITY COUNTING LABORATORY
COMPILATION OF ENVIRONMENTAL RADIOACTIVITY LEVELS

SAMPLE TYPE Sludge LOCATION Dried Sludge #1 930 3

SAMPLING OR OFF DATE	pCi/m3, pCi/l, or pCi/gm ALPHA	BETA	SAMPLING OR OFF DATE	pCi/m3, pCi/l, or pCi/gm ALPHA	BETA	SAMPLING OR OFF DATE	pCi/m3, pCi/l, or pCi/gm ALPHA	BETA
0947	*	13						

PF = POWER FAILURE OF THE SAMPLING EQUIPMENT

* = RESULTS AT THE LIMIT OF SENSITIVITY

LRL HAZARDS CONTROL RADIOACTIVITY COUNTING LABORATORY
COMPILATION OF ENVIRONMENTAL RADIOACTIVITY LEVELS

SAMPLE TYPE Sludge LOCATION Dried Sludge #2 930 4

SAMPLING OR OFF DATE	pCi/m3, pCi/l, or pCi/gm ALPHA	BETA	SAMPLING OR OFF DATE	pCi/m3, pCi/l, or pCi/gm ALPHA	BETA	SAMPLING OR OFF DATE	pCi/m3, pCi/l, or pCi/gm ALPHA	BETA
1227	25.8	26.7						

PF = POWER FAILURE OF THE SAMPLING EQUIPMENT

* = RESULTS AT THE LIMIT OF SENSITIVITY

LRL HAZARDS CONTROL RADIOACTIVITY COUNTING LABORATORY
COMPILATION OF ENVIRONMENTAL RADIOACTIVITY LEVELS

SAMPLE TYPE Sludge LOCATION Oxidation Pond #1 930 5

SAMPLING OR OFF DATE	pCi/m3, pCi/l, or pCi/gm ALPHA	BETA	SAMPLING OR OFF DATE	pCi/m3, pCi/l, or pCi/gm ALPHA	BETA	SAMPLING OR OFF DATE	pCi/m3, pCi/l, or pCi/gm ALPHA	BETA

PF = POWER FAILURE OF THE SAMPLING EQUIPMENT
* = RESULTS AT THE LIMIT OF SENSITIVITY

LRL HAZARDS CONTROL RADIOACTIVITY COUNTING LABORATORY
COMPILATION OF ENVIRONMENTAL RADIOACTIVITY LEVELS

SAMPLE TYPE Sludge LOCATION Oxidation Pond #2 930 6

SAMPLING OR OFF DATE	pCi/m3, pCi/l, or pCi/gm ALPHA	BETA	SAMPLING OR OFF DATE	pCi/m3, pCi/l, or pCi/gm ALPHA	BETA	SAMPLING OR OFF DATE	pCi/m3, pCi/l, or pCi/gm ALPHA	BETA

PF = POWER FAILURE OF THE SAMPLING EQUIPMENT
* = RESULTS AT THE LIMIT OF SENSITIVITY

1968

Compilation of Environmental Radioactivity Levels for 1968
(Reconstructed from handwritten records from 1968)

Sampling date	Sampling date (standard format)	ALPHA pCi/L	BETA pCi/L	ALPHA pCi/g	BETA pCi/g
Digester #1 (Location 01)					
28	1/2/1968	753.6	632.4	64.0	53.6
98	1/9/1968	469.4	645.0		41.9
168	1/16/1968	513.1	822.1		
238	1/23/1968	381.5	495.9	27.5	36.0
308	1/30/1968	540.5	824.3	33.8	51.4
378	2/6/1968	457.2	541.0	20.3	39.2
448	2/13/1968	0.0	314.9		12.2
518	2/20/1968	286.0	530.2	36.5	67.6
658	3/5/1968	604.1	614.0	50.0	50.5
728	3/12/1968	1720.3	2924.8	38.3	65.8
798	3/19/1968	105.0	1362.6	44.6	58.1
868	3/26/1968	356.3	786.0	25.7	57.2
938	4/2/1968	145.9	464.9	15.8	50.0
1008	4/9/1968	313.1	613.5	29.7	58.6
1078	4/16/1968	107.7	487.4	17.6	78.8
1148	4/23/1968	589.2	1074.8	19.4	35.1
1218	4/30/1968	311.3	1417.6	11.7	53.2
1288	5/7/1968	480.6	887.8	30.2	55.4
1358	5/14/1968	321.6	686.5	21.6	46.4
1428	5/21/1968	138.7	214.9	27.9	43.2
1498	5/28/1968	203.6	565.3	15.8	43.7
1568	6/4/1968	166.2	589.6	11.3	39.6
1638	6/11/1968	762.2	704.5	47.7	21.6
1708	6/18/1968	0.0	466.7	0.0	45.5
1778	6/25/1968	337.8	672.5	20.3	40.5
1848	7/2/1968	0.0	1222.5	0.0	73.4
1988	7/16/1968	191.0	477.5	12.2	32.4
2058	7/23/1968	281.5	516.7	18.9	34.7
2128	7/30/1968	271.2	2122.1	16.2	127.5
2198	8/6/1968	317.1	800.9	11.7	30.2
2268	8/13/1968	341.4	1366.7	16.2	64.9
2338	8/20/1968	474.8	589.6	9.9	40.1
2478	9/3/1968	823.0	1397.3	36.9	63.1
2548	9/10/1968	0.0	283.3	0.0	12.6
2618	9/17/1968	308.1	1341.9	15.3	67.1
2688	9/24/1968	0.0	1156.8	0.0	49.5
2758	10/1/1968	0.0	1599.1	0.0	47.7
2968	10/22/1968	1407.2	1024.3	59.9	43.7
3038	10/29/1968	470.3	3095.5	11.7	12.6
3108	11/5/1968	307.2	810.4	14.4	38.3
3178	11/12/1968	0.0	1497.7	0.0	30.2
3248	11/19/1968	462.6	2633.3	16.2	92.3

Compilation of Environmental Radioactivity Levels for 1968
(Reconstructed from handwritten records from 1968)

Sampling date	Sampling date (standard format)	ALPHA pCi/L	BETA pCi/L	ALPHA pCi/g	BETA pCi/g
3318	11/26/1968	254.5	3323.9	14.9	191.4
3388	12/3/1968	0.0	923.4	0.0	23.0
3458	12/10/1968	0.0	1084.2	0.0	43.2
3528	12/17/1968	0.0	1304.5	0.0	39.2
3598	12/24/1968	495.5	1341.9	12.6	33.8
3668	12/31/1968	311.7	808.1	18.9	48.6

Compilation of Environmental Radioactivity Levels for 1968
(Reconstructed from handwritten records from 1968)

Sampling date	Sampling date (standard format)	ALPHA pCi/L	BETA pCi/L	ALPHA pCi/g	BETA pCi/g
Digester #2 (Location 02)					
28	1/2/1968	845.9	1214.9	41.9	60.8
98	1/9/1968	485.6	812.2	36.5	60.8
168	1/16/1968	478.4	590.5		
238	1/23/1968	487.8	2582.4	22.1	116.2
308	1/30/1968	114.0	121.2	40.1	42.3
378	2/6/1968	1114.4	1077.9	30.6	29.7
448	2/13/1968	358.1	481.1	23.4	31.5
518	2/20/1968	701.8	1115.3	40.5	64.0
658	3/5/1968	419.8	977.0	18.9	44.1
728	3/12/1968	344.1	1361.7	19.8	78.8
798	3/19/1968	157.2	343.7	21.2	46.4
868	3/26/1968	332.0	961.7	17.6	50.9
938	4/2/1968	252.7	893.7	12.2	42.3
1008	4/9/1968	462.6	1114.0	30.2	72.5
1078	4/16/1968	307.2	2845.5	17.1	156.8
1148	4/23/1968	0.0	173.0	0.0	39.6
1218	4/30/1968	0.0	270.7	0.0	84.7
1288	5/7/1968	726.6	1864.0	21.6	55.9
1358	5/14/1968	825.7	1522.1	24.8	45.5
1428	5/21/1968	659.5	1553.6	14.9	35.1
1498	5/28/1968	45.9	476.6	6.8	70.3
1568	6/4/1968	32.9	1059.5	12.2	39.6
1638	6/11/1968	164.0	1191.9	8.6	24.8
1708	6/18/1968	263.5	705.9	17.1	45.9
1778	6/25/1968	0.0	70.3	21.6	33.3
1848	7/2/1968	315.3	5067.6	11.7	190.1
1988	7/16/1968	284.2	597.7	19.4	40.5
2058	7/23/1968	97.7	1444.1	5.9	82.9
2128	7/30/1968	229.3	807.7	12.6	44.6
2198	8/6/1968	1812.2	1152.7	85.6	55.4
2338	8/20/1968	292.8	668.9	14.4	45.9
2478	9/3/1968	307.2	1585.6	17.1	78.4
2548	9/10/1968	233.8	1541.0	13.5	88.7
2618	9/17/1968	0.0	1636.5	0.0	102.3
2688	9/24/1968	0.0	1225.2	0.0	70.3
2968	10/22/1968	1986.9	1200.9	13.5	50.9
3038	10/29/1968	415.8	8038.3	16.7	2573.0
3108	11/5/1968	0.0	1145.5	0.0	40.1
3248	11/19/1968	264.9	1037.4	11.3	44.1
3318	11/26/1968	287.8	1904.5	12.2	85.6
3388	12/3/1968	0.0	1648.6	0.0	9.9
3458	12/10/1968	480.2	1467.6	18.0	55.0

Compilation of Environmental Radioactivity Levels for 1968
(Reconstructed from handwritten records from 1968)

Sampling date	Sampling date (standard format)	ALPHA pCi/L	BETA pCi/L	ALPHA pCi/g	BETA pCi/g
3528	12/17/1968	497.7	1238.3	21.2	52.7
3598	12/24/1968	839.6	1043.7	18.9	23.4
3668	12/31/1968	349.1	921.6	17.6	43.7

Compilation of Environmental Radioactivity Levels for 1968
(Reconstructed from handwritten records from 1968)

Sampling date	Sampling date (standard format)	ALPHA pCi/L	BETA pCi/L	ALPHA pCi/g	BETA pCi/g
Aerator (Location 14)					
28	1/2/1968	69.4	60.8		
98	1/9/1968	102.7	183.8		
168	1/16/1968	51.4	87.4		
238	1/23/1968	40.1	40.5		
308	1/30/1968	80.2	49.1		
378	2/6/1968	59.0	51.4	64.9	56.3
448	2/13/1968	12.6	50.9		
518	2/20/1968	95.5	121.6		
658	3/5/1968	0.0	56.3		
728	3/12/1968	1361.7	78.4	6.3	78.4
798	3/19/1968	0.0	64.9		
868	3/26/1968	0.0	87.4		
938	4/2/1968	33.3	63.1		
1008	4/9/1968	52.3	89.6		
1078	4/16/1968	0.0	66.2		
1148	4/23/1968	0.0	64.0		
1218	4/30/1968	58.1	68.0		
1288	5/7/1968	0.0	25.2		
1358	5/14/1968	0.0	125.7		
1428	5/21/1968	66.7	103.6		
1498	5/28/1968	0.0	98.6		
1568	6/4/1968	58.6	94.6		
1638	6/11/1968	0.0	66.2		
1708	6/18/1968	0.0	45.5		
1778	6/25/1968	0.0	12.6		
1848	7/2/1968	0.0	178.8		
1988	7/16/1968	0.0	41.9		
2058	7/23/1968	56.3	59.5		
2128	7/30/1968	34.7	52.3		
2198	8/6/1968	0.0	111.3		
2268	8/13/1968	0.0	84.7		
2338	8/20/1968	0.0	93.7		
2478	9/3/1968	24.3	74.8		
2548	9/10/1968	73.4	166.7		
2618	9/17/1968	67.1		145.0	
2688	9/24/1968	0.0			
2758	10/1/1968	0.0	66.2	0.0	70.3
2968	10/22/1968	77.5	114.4		
3038	10/29/1968	45.0	112.6		
3108	11/5/1968	0.0	73.0		
3178	11/12/1968	65.3	95.5		
3248	11/19/1968	43.7	56.8		

Compilation of Environmental Radioactivity Levels for 1968
(Reconstructed from handwritten records from 1968)

Sampling date	Sampling date (standard format)	ALPHA pCi/L	BETA pCi/L	ALPHA pCi/g	BETA pCi/g
3318	11/26/1968	0.0	102.7		
3388	12/3/1968	0.0	61.7		
3458	12/10/1968	50.5	160.4		
3528	12/17/1968	0.0	133.3		
3668	12/31/1968	31.5	121.6	31.5	121.6

1968

Sewer Monitor

Date	Loc	DPM/l α	DPM/l β	DPM/gr α	DPM/gr β
0028	01	1673	1404	142	119
	02	1878	2697	93	135
	14	154	135	—	—
0098	01	1042	1432		93
	02	1078	1803	81	135
	14	228	408	—	—
0168	01	1139	1825		
	02	1062	1311		
	14	114	194		
0238	01	847	1101	61	80
	02	1083	5733	49	258
	14	89	90	—	—
0308	01	1200	1830	75	114
	02	253	269	89	94
	14	178	109	—	—
0378	01	1015	1201	45	87
	02	2474	2393	68	66
	14	131	114	144	125
0448	01		699		27
	02	795	1068	52	70
	14	28	113	—	—
0518	01	635	1177	81	150
	02	1558	2476	90	142
	14	212	270	—	—
0588					

1968
SEWER MONITOR

DATE	LOC	DPM/l α	DPM/l β	DPM/gr α	DPM/gr β
0658	01	1341	1363	111	112
	02	932	2169	42	98
	14	0	125	—	—
0728	01	3819	6493	85	146
	02	764	3023	44	175
	04	3023	174	14	174
0798	01	233	3025	99	129
	02	349	763	47	103
	04	0	144	—	—
0868	01	791	1745	57	127
	02	737	2135	39	113
	14	0	194	—	
0938	01	324	1032	35	111
	02	561	1984	27	94
	14	74	140	—	—
1008	01	695	1362	66	130
	02	1027	2473	67	161
	14	116	199	—	—
1078	01	239	1082	39	175
	02	682	6317	38	348
	14	0	147	—	—
1148	01	1308	2386	43	78
	? — 02	0	384	0	88
	04	0	142		

1968

SEWER MONITOR (DIGESTERS)

DATE	LOC	DPM/l α	DPM/l β	DPM/GRAM α	DPM/GRAM β
1218	01	691	3147	26	118
	02	0	601	0	188
	04	129	151	-	-
1288	01	1067	1971	67	123
	02	1613	4138	48	124
	04	0	56	-	-
1358	01	714	1524	48	103
	02	1833	3379	55	101
	04	0	279	-	-
1428	01	308	477	62	96
	02	1464	3449	33	78
	04	148	230	-	-
1498	01	452	1255	35	97
	02	102	1058	15	156
	04	0	219	-	-
1568	01	369	1309	25	88
	02	73	2352	27	88
	04	130	210	-	-
1638	01	1692	1564	106	98
	02	364	2646	19	140
	04	0	117		
1708	01	0	1036	0	101
	02	585	1567	38	102
	04	0	101		
1778	01	750	1493	45	90
	02	0	156	48	74
	04	0	28	-	-

1968
SEWER MONITOR
(DIGESTERS)

DATE	LOC	DPM/L α	DPM/L β	DPM/GRAM α	DPM/GRAM β
1848	01	0	2714	0	163
	02	700	11250	26	422
	04	0	397	—	—
1918	01				
	02				
	04				
1988	01	424	1060	27	72
	02	631	1327	43	90
	04	0	93	—	—
2058	01	625	1147	42	77
	02	217	3206	13	184
	04	125	132	—	—
2128	01	602	4711	36	283
	02	509	1793	28	99
	04	77	116	—	—
2198	01	704	1778	26	67
	02	4023	2559	190	123
	04	0	247	—	—
2268	01	758	3034	36	144
	02	NO SAMPLE		NO SAMPLE	
	04	0	188	—	—
2338	01	1054	1309	22	89
	02	650	1485	32	102
	04	0	208	—	—

1968

SEWER MONITOR
(DIGESTERS)

DATE	LOC	DPM/L α	DPM/L β	DPM/GRAM α	DPM/GRAM β
2478	01	1827	3102	82	140
	02	682	3520	38	194
	04	54	166	—	—
2548	01	0	629	0	28
	02	519	3421	30	197
	04	163	370	—	—
2618	01	684	2979	34	149
	02	0	3633	0	227
	04	149	-	322	—
2688	01	0	2586	0	110
	02	0	2720	0	156
	14	0		—	—
2758	01	0	3550	0	142
	02	NO SAMPLE		—	—
	14	0	147	0	156
2828	01	0	514	0	27
	02	0	4071	0	130
	14	0	248	-	—
2898	01				
	02				
	14				
2968	01	3124	2274	133	~~2274~~ 97
	02	4411	2666	30	113
	14	172	254	—	—

1968 - SEWER TREATMENT PLANT DIGESTERS

DATE	LOC	DPM / Liter α	DPM / Liter β	DPM / GR. α	DPM / GR. β
3038	01	1044	6872	26	28
	02	923	(7895) ?	37	(5716) ?
	14	100	250	—	—
3108	01	682	1799	32	85
	02	0	2543	0	89
	14	0	162	—	—
3178	01	0	3325	0	67
	02	NO SAMPLE		NO SAMPLE	
	14	145	212	—	—
3248	01	1027	5846	36	205
	02	588	2303	25	98
	14	97	126	—	—
3318	01	565	7379	33	425
	02	639	4228	27	190
	14	0	228	—	—
3388	01	0	2050	0	51
	02	0	3660	0	22
	14	0	137	—	—
3458	01	0	2407	~~0~~ 0	~~2407~~ 96
	02	1066	3258	~~1066~~ 40	122
	14	112	356	~~112~~	~~35~~
3528	01	0	2896	0	87
	02	1105	2749	47	117
	14	0	296	0	296
3598	01	1100	2979	28	75
	02	1864	2317	42	52
	14	no sample		no sample	

DATE	LOC	DPM/LITER α	DPM/LITER β	DPM/GRAM α	DPM/GRAM β
3668	01	692	1994	42	108
	02	775	2046	37	97
	14 (comp)	70	270	70	270
	19	0	287	—	—

1968 SEWER TREATMENT PLANT RADIOACTIVITY ANALYSIS

DATE	LOC		pCi/l α	pCi/l β	pCi/gram α	pCi/gram β
0028	01	> digester sludge	752.9	631.8		
	02		845.1	1213.7		
aeration pond	14		69.3	60.8		
0098	01		468.9	644.4		
	02		485.1	811.4		
	14		102.6	183.6		
0168	01		513	821		
	02		478	215		
	14		51	87		
0238	01		381.2	495.5		
	02		487.5	2579.9		
	14		40.1	40.1		
0308	01		540.0	823.5		
	02		113.9	121.1		
	14		80.1	49.1		
0378	01		456.8	540.5		
	02		1113.3	1076.9		
	14		59.6	51.3		
0448	01		—	314.6		
	02		357.8	479.3		
	14		12.6	50.9		
0518	01		285.8	529.7		
	02		701.1	1114.2		
	14		95.4	121.5		
0588	01		0	577.4		
	02		0	1216.4		
	14		0	92.3		
0658	01		603.5	613.4		
	02		419.4	976.1		
	14		0	55.8		

DATE	LOC	α pCi/l	β
0728	01	1732.3	2949.1
	02	341.9	1371.4
	14	33.8	92.3
0798	01	1061.5	1374.1
	02	157.4	346.4
	14	0	65.0
0868	01	355.9	785.3
	02	331.7	960.8
	14.	0	87.3
0938	01	144.8	468.2
	02	255.9	899.1
	14	33.6	63.2
1008	01	314.6	616.8
	02	466.8	1124.1
	14	52.3	90.5
1078	01	106.9	490.9
	02	309.9	2671.8
	14	0	66.4
1148	01	594.4	1083.6
	02	0	170.9
	14	0	64.1
1218	01	203.0	1427.3
	02	0	272.7
	14	58.3	68.2
1288	01	485.5	894.5
	02	731.1	1878.6
	14	0	70.5
1358	01	324.9	690.0
	02	833.3	1530.0
	14	0	126.8

pCi/l

DATE	LOC	α	β
1428	01	138.1	216.4
	02	656.6	1565.5
	14	67.1	109.1
1498	01	205.3	568.6
	02	46.2	479.6
	14	0	99.1
1568	01	168.4	592.3
	02	324.2	1066.4
	14	59.1	95.5
1638	01	0	709.1
	02	0	1119.1
	14	0	66.4
1708	01	0	470.5
	02	262.2	709.6
	14	0	45.5
		0	
1778	01	339.0	677.7
	02	308.4	818.2
	14	0	70.5
1848	01	0	1230.9
	02	312.1	5115.0
	14	0	180.0
1988	01	190.2	479.6
	02	286.2	602.3
	14	0	42.3
2058	01	281.3	516.2
	02	97.7	442.7
	14	56.3	59.4

CON'T ON NEXT PAGE

DATE	LOC	α pCi/l	β
2128	01	270.8	2138.2
	02	227.3	813.6
	14	34.7	52.7
2198	01	312.1	809.1
	02	1825.4	1160.0
	14	0	111.8
2268	01	342.1	1375.5
	02		
	14	476.4	579.1
2338	01	476.4	579.1
	02	295.5	909.1
	14	0	94.1
*2408 listed on back			
2478	01	825.8	1409.1
	02	309.9	1596.8
	14	24.7	75.0
2548	01	0	285.4
	02	237.2	1551.4
	14	73.8	167.7
2618	01	311.4	1354.6
	02	0	1650.9
	14	67.4	145.9
2688	01	0	1164
	02	0	1224
	14	0	95
2758	01	0	1597.5
	02	NO Sample	NO sample
	14	0	66.2

notified Ken Case 10-23-68

		α	β
2408	01	243.1	1082.7
	02	no	Sample
	14	131.2	166.8
3108	01	311.00	813.181
	02	.000	1152.272
	14	.000	73.181
	19	.000	48.181
3098		.000	29.545
	I	.000	.000
3118		0	54.090
		0	0
3138		55.1818	398.636
	I	0	19.545
3178		16.6363	77.727
		0	41.363

LRL HAZARDS CONTROL RADIOACTIVITY COUNTING LABORATORY
COMPILATION OF ENVIRONMENTAL RADIOACTIVITY LEVELS

SAMPLE TYPE 093 - LOCATION 01

SAMPLING OR OFF DATE	pCi/m3, pCi/l, or pCi/gm ALPHA	BETA	SAMPLING OR OFF DATE	pCi/m3, pCi/l, or pCi/gm ALPHA	BETA	SAMPLING OR OFF DATE	pCi/m3, pCi/l, or pCi/gm ALPHA	BETA
			1988					
			2140					
			2268	342.1052	1315.454			
			2338	476.1309	579.090			
1638	.0000	709.090						
1708	.0000	470.454						
1848	.0000	1230.909						

PF = POWER FAILURE OF THE SAMPLING EQUIPMENT
* = RESULTS AT THE LIMIT OF SENSITIVITY

LRL HAZARDS CONTROL RADIOACTIVITY COUNTING LABORATORY
COMPILATION OF ENVIRONMENTAL RADIOACTIVITY LEVELS

SAMPLE TYPE 093 - LOCATION 02

SAMPLING OR OFF DATE	pCi/m3, pCi/l, or pCi/gm ALPHA	BETA	SAMPLING OR OFF DATE	pCi/m3, pCi/l, or pCi/gm ALPHA	BETA	SAMPLING OR OFF DATE	pCi/m3, pCi/l, or pCi/gm ALPHA	BETA
			2338	295.4545	909.090			
1638	.0000	1119.090						
1708	262.2377	769.545						
1848	312.1211	5115.000						

PF = POWER FAILURE OF THE SAMPLING EQUIPMENT
* = RESULTS AT THE LIMIT OF SENSITIVITY

LRL HAZARDS CONTROL RADIOACTIVITY COUNTING LABORATORY
COMPILATION OF ENVIRONMENTAL RADIOACTIVITY LEVELS

SAMPLE TYPE 093 · LOCATION 04

SAMPLING OR OFF DATE	pCi/m3, pCi/l, or pCi/gm ALPHA	BETA	SAMPLING OR OFF DATE	pCi/m3, pCi/l, or pCi/gm ALPHA	BETA	SAMPLING OR OFF DATE	pCi/m3, pCi/l, or pCi/gm ALPHA	BETA
			2268	476.309	579.090			
			2338	~~2.338~~	94.090 ~~.0000~~			
1638	.0000	66.363						
1708	.0000	45.454						
1848	.0000	180.000						

PF = POWER FAILURE OF THE SAMPLING EQUIPMENT

* = RESULTS AT THE LIMIT OF SENSITIVITY

1969

Compilation of Environmental Radioactivity Levels for 1969
(Reconstructed from Hazards Control Radioactivity Sampling Records for 1969)

Sampling date	Sampling date (standard format)	ALPHA pCi/L	BETA pCi/L	ALPHA pCi/g	BETA pCi/g
Digester #1 (Location 01)					
79	1/7/69	470	1339	12	33
149	1/14/69	0	952	0	50
289	1/28/69	0	1606	0	24
359	2/4/69	314	1182	12	44
429	2/11/69	0	2190	0	49
499	2/18/69	808	2177	14	38
569	2/25/69	0	1408	0	42
639	3/4/69	0	821	0	64
709	3/11/69	0	1741	0	35
779	3/18/69	0	2295	0	92
919	4/1/69	0	817		
989	4/8/69	190	823	14	60
1059	4/15/69	208	1080	14	73
1129	4/22/69	89	1083	6	73
1199	4/29/69	213	1209	15	136
1269	5/6/69	176	1824	10	105
1339	5/13/69	167	162	10	10
1409	5/20/69	311	2139	18	123
1479	5/27/69	292	3238	17	186
1549	6/3/69	57	2093	4	146
1619	6/10/69	287	1745	18	114
1689	6/17/69	113	1508		
1829	7/1/69	161	1459		
1899	7/8/69	172	1158		
1969	7/15/69	525	1169		
2039	7/22/69	184	1864	13	538
2109	7/29/69	295	1995	17	115
2179	8/5/69	152	1335	10	90
2249	8/12/69	414	6055	26	378
2319	8/19/69	339	7023	19	403
2389	8/26/69	298	6446	47	403
2459	9/2/69	448	8908	28	557
2529	9/9/69	361	8856	31	753
2599	9/16/69	288	6802	26	612
2669	9/23/69	0	5920	0	326
2809	10/7/69	287	5508	19	3827
2879	10/14/69	280	4205	22	326
2949	10/21/69	745	17857	24	580
3019	10/28/69	396	3779	29	274
3089	11/4/69	556	3544	32	204

Compilation of Environmental Radioactivity Levels for 1969
(Reconstructed from Hazards Control Radioactivity Sampling Records for 1969)

Sampling date	Sampling date (standard format)	ALPHA pCi/L	BETA pCi/L	ALPHA pCi/g	BETA pCi/g
3159	11/11/69	499	5104	32	332
3229	11/18/69	594	3866	33	213
3299	11/25/69	591	5231	45	392
3369	12/2/69	626	2604	37	156
3439	12/9/69	784	3358	53	227
3509	12/16/69	566	3736	39	290
3579	12/23/69	688	2813	43	169
3649	12/30/69	729	2701	35	128

Compilation of Environmental Radioactivity Levels for 1969
(Reconstructed from Hazards Control Radioactivity Sampling Records for 1969)

Sampling date	Sampling date (standard format)	ALPHA pCi/L	BETA pCi/L	ALPHA pCi/g	BETA pCi/g
Digester #2 (Location 02)					
79	1/7/69	181	1114	7	45
149	1/14/69	0	1193	0	42
289	1/28/69	475	1459	17	51
359	2/4/69	0	1130	0	42
429	2/11/69	0	1371	0	41
499	2/18/69	591	2096	15	52
569	2/25/69	0	1305	0	59
639	3/4/69	342	1156	16	55
709	3/11/69	0	1320	0	20
779	3/18/69	0	1458	0	36
849	3/25/69	0	1353	0	54
989	4/8/69	173	1083	9	59
1059	4/15/69	114	734	7	48
1129	4/22/69	0	1241	0	81
1199	4/29/69	0	1339	0	184
1269	5/6/69	175	1381	12	97
1339	5/13/69	0	79	0	4
1409	5/20/69	470	2208	27	127
1479	5/27/69	148	2604	10	176
1549	6/3/69	127	1965	9	137
1619	6/10/69	139	1326	11	103
1689	6/17/69	0	1447		
1829	7/1/69	119	972		
1899	7/8/69	122	1196		
1969	7/15/69	0	915		
2039	7/22/69	247	2466	10	792
2109	7/29/69	548	2149	31	118
2179	8/5/69	335	2013	16	95
2249	8/12/69	176	4374	12	295
2319	8/19/69	291	5768	20	404
2389	8/26/69	140	4525	10	328
2459	9/2/69	269	8704	23	740
2529	9/9/69	595	15393	25	654
2599	9/16/69	379	8690	22	500
2669	9/23/69	311	10860	19	679
2739	9/30/69	216	11805	16	856
2809	10/7/69	320	5057	27	417
2879	10/14/69	653	12159	21	364
2949	10/21/69	390	8761	19	438
3019	10/28/69	350	17100	23	1112

Compilation of Environmental Radioactivity Levels for 1969
(Reconstructed from Hazards Control Radioactivity Sampling Records for 1969)

Sampling date	Sampling date (standard format)	ALPHA pCi/L	BETA pCi/L	ALPHA pCi/g	BETA pCi/g
3089	11/4/69	943	5791	45	275
3159	11/11/69	1162	8580	61	450
3229	11/18/69	773	3253	54	227
3299	11/25/69	773	3606	60	279
3369	12/2/69	739	2855	37	143
3439	12/9/69	597	3577	37	223
3509	12/16/69	461	2630	31	178
3579	12/23/69	498	4546	47	432
3649	12/30/69	450	6179	34	130

Compilation of Environmental Radioactivity Levels for 1969
(Reconstructed from Hazards Control Radioactivity Sampling Records for 1969)

Sampling date	Sampling date (standard format)	ALPHA pCi/L	BETA pCi/L	ALPHA pCi/g	BETA pCi/g
Aerator (Location 14)					
79	1/7/69	0	60		
149	1/14/69	37	142		
289	1/28/69	72	119		
359	2/4/69	0	1391		
429	2/11/69	0	103		
499	2/18/69	0	211		
569	2/25/69	0	159		
639	3/4/69	34	103		
709	3/11/69	0	96		
779	3/18/69	0	104		
849	3/25/69	0	55		
919	4/1/69	0	42		
989	4/8/69	0	452		
1059	4/15/69	35	113		
1129	4/22/69	22	217		
1199	4/29/69	31	227		
1269	5/6/69	29	136		
1339	5/13/69	39	74		
1409	5/20/69	19	207		
1479	5/27/69	36	833		
1549	6/3/69	31	245		
1619	6/10/69	34	133		
1689	6/17/69	0	140		
1829	7/1/69	32	148		
1899	7/8/69	39	214		
1969	7/15/69	37	190		
2039	7/22/69	0	538		
2109	7/29/69	0	129		
2179	8/5/69	24	296		
2249	8/12/69	44	880		
2319	8/19/69	44	617		
2389	8/26/69	38	626		
2459	9/2/69	58	949		
2529	9/9/69	64	1232		
2599	9/16/69	46	214		
2669	9/23/69	0	283		
2739	9/30/69	25	344		
2809	10/7/69	62	288		
2879	10/14/69	56	282		
2949	10/21/69	59	371		

Compilation of Environmental Radioactivity Levels for 1969
(Reconstructed from Hazards Control Radioactivity Sampling Records for 1969)

Sampling date	Sampling date (standard format)	ALPHA pCi/L	BETA pCi/L	ALPHA pCi/g	BETA pCi/g
3019	10/28/69	64	809		
3089	11/4/69	169	466		
3159	11/11/69	134	495		
3229	11/18/69	64	312		
3299	11/25/69	44	436		
3369	12/2/69	284	391		
3439	12/9/69	212	277		
3509	12/16/69	35	284		
3579	12/23/69	49	170		
3649	12/30/69	37	333		

LRL HAZARDS CONTROL RADIOACTIVITY COUNTING LABORATORY

COMPILATION OF ENVIRONMENTAL RADIOACTIVITY LEVELS

SAMPLE TYPE SEWAGE LOCATION LIVERMORE SEWAGE TREATMENT PLANT DIGESTER 1 093-01

SAMPLING OR OFF DATE	pCi/m3, pCi/l, or pCi/gm ALPHA	BETA	SAMPLING OR OFF DATE	pCi/m3, pCi/l, or pCi/gm ALPHA	BETA	SAMPLING OR OFF DATE	pCi/m3, pCi/l, or pCi/gm ALPHA	BETA
0079	470	1337	1969	524	1167			
0149	0	951	2039	183	1862			
0219	—	—	2109	295	1993			
0289	0	1604	2179	152	1333			
0359	315	1181	2249	414	6048			
0429	0	2190	2319	338	7016			
0499	807	2175	2389	298	6939			
0569	0	1406	2459	448	8900			
0639	0	821	2529	361	8937			
0709	0	1739	2669	+	5973			
0779	0	2293	2739	NO SAMPLE				
0849	NO SAMPLE		2809	0	136			
0919	0	383	2879	280	4242			
0989	190	822						
1059	224	1079						
1129		1081						
1199	212	1208						
1269	176	1822						
1339	166	163						
1409	311	2137						
1479	292	3235						
1549	57	2090						
1619	287	1743						
1689	113	1508						
1759	NO SAMPLE							
1829	161	1458						
1899	192	1157						

PF = POWER FAILURE OF THE SAMPLING EQUIPMENT

* = RESULTS AT THE LIMIT OF SENSITIVITY

LRL HAZARDS CONTROL RADIOACTIVITY COUNTING LABORATORY

COMPILATION OF ENVIRONMENTAL RADIOACTIVITY LEVELS

SAMPLE TYPE SEWAGE LOCATION LIVERMORE SEWAGE TREATMENT PLANT DIGESTER 2 093-02

SAMPLING OR OFF DATE	pCi/m3, pCi/l, or pCi/gm ALPHA	BETA	SAMPLING OR OFF DATE	pCi/m3, pCi/l, or pCi/gm ALPHA	BETA	SAMPLING OR OFF DATE	pCi/m3, pCi/l, or pCi/gm ALPHA	BETA
0079	470	1337	1969	524	1167			
0149	0	951	2039	183	1862			
0219	—	—	2109	295	1993			
0289	0	1604	2179	152	1333			
0359	315	1181	2249	414	6048			
0429	0	2190	2319	338	7016			
0499	807	2175	2389	298	6939			
0569	0	1406	2459	448	8900			
0639	0	821	2529	361	8937			
0709	0	1739	2669	*	5973			
0779	0	2293	2739	215	11912			
0849	NO SAMPLE		2809	320	5103			
0919	0	383	2879	651	12269			
0989	190	822						
1059	224	1079						
1129		1081						
1199	212	1208						
1269	176	1822						
1339	166	1163						
1409	311	2137						
1479	292	3285						
1549	148	2602						
1619	139	1963						
1689	0	1445						
1759	NO SAMPLE							
1829	119	972						
1899	122	1195						

PF = POWER FAILURE OF THE SAMPLING EQUIPMENT

* = RESULTS AT THE LIMIT OF SENSITIVITY

LRL HAZARDS CONTROL RADIOACTIVITY COUNTING LABORATORY
COMPILATION OF ENVIRONMENTAL RADIOACTIVITY LEVELS

SAMPLE TYPE SEWAGE LOCATION LIVERMORE SEWAGE TREATMENT PLANT AIERIATION TANK 093-~~04~~ 14

SAMPLING OR OFF DATE	pCi/m3, pCi/l, or pCi/gm ALPHA	BETA	SAMPLING OR OFF DATE	pCi/m3, pCi/l, or pCi/gm ALPHA	BETA	SAMPLING OR OFF DATE	pCi/m3, pCi/l, or pCi/gm ALPHA	BETA
0079	0	330	1969	19	190			
0149	37	142	2039	0	537			
0219	–	–	2109	0	128			
0289	72	164	2179	24	295			
0359	0	69	2249	44	879			
0429	0	104	2319	44	617			
0499	0	211	2389	38	625			
0569	0	159	2459	58	869			
0639	171	515	2529	64	1243			
0709	0	96	2669	*	285			
0779	0	104	2739	25	347			
0849	0	55	2809	NO SAMPLE				
0919	0	41	2879	57	285			
0989	0	113						
1059	35	103						
1129		217						
1199	31	226						
1269	29	136						
1339	39	74						
1409	19	207						
1479	36	832						
1549	31	3283						
1619	34	133						
1689	0	140						
1759	NO SAMPLE							
1829	32	972						
1899	39	214						

PF = POWER FAILURE OF THE SAMPLING EQUIPMENT
* = RESULTS AT THE LIMIT OF SENSITIVITY

1970

Compilation of Environmental Radioactivity Levels for 1970
(Reconstructed from Hazards Control Radioactivity Sampling Records for 1970)

Sampling date	Sampling date (standard format)	ALPHA pCi/L	BETA pCi/L	ALPHA pCi/g	BETA pCi/g
Digester #1 (Location 01)					
60	1/6/70	382	2737	26	185
130	1/13/70	441	7784	23	409
200	1/20/70	372	2397	24	156
340	2/3/70	400	3255	22	178
410	2/10/70	268	2049	17	128
480	2/17/70	222	1892	19	161
550	2/24/70	56	2630		
690	3/10/70	312	1656	27	141
760	3/17/70	326	2131	20	133
830	3/24/70	381	2814	23	169
900	3/31/70	274	1676	18	113
970	4/7/70	141	2202	12	187
1110	4/21/70	280	1089	15	60
1250	5/5/70	358	4928	23	
1320	5/12/70	288	3773	19	255
1390	5/19/70	224	4117	14	268
1460	5/26/70	330	2964		
1530	6/2/70	457	3085		
1600	6/9/70	276	3097	20	225
1670	6/16/70	220	2195	15	154
1740	6/23/70	409	1705	32	132
1810	6/30/70	317	3016		
1880	7/7/70	414	1586		
1950	7/14/70	344	1579		
2020	7/21/70	334	1466		
2090	7/28/70	452	1371		
2160	8/4/70	268	1517		
2230	8/11/70	242	1003		
2300	8/18/70	307	871		
2370	8/25/70	359	1339	23	87
2440	9/1/70	199	617		
2520	9/9/70	268	1205		
2580	9/15/70	238	975		
2650	9/22/70	247	710		
2720	9/29/70	226	792		
2790	10/6/70	225	679		
2860	10/13/70	200	569		
2930	10/20/70	250	666		
3000	10/27/70	346	661		
3070	11/3/70	405	399		

Compilation of Environmental Radioactivity Levels for 1970
(Reconstructed from Hazards Control Radioactivity Sampling Records for 1970)

Sampling date	Sampling date (standard format)	ALPHA pCi/L	BETA pCi/L	ALPHA pCi/g	BETA pCi/g
3140	11/10/70	160	481		
3210	11/17/70	147	537		
3280	11/24/70	214	495		
3360	12/2/70	245	556		
3420	12/8/70	241	569		
3490	12/15/70	387	901		
3560	12/22/70	300	638		
3630	12/29/70	0	765		

Compilation of Environmental Radioactivity Levels for 1970
(Reconstructed from Hazards Control Radioactivity Sampling Records for 1970)

Sampling date	Sampling date (standard format)	ALPHA pCi/L	BETA pCi/L	ALPHA pCi/g	BETA pCi/g
Digester #2 (Location 02)					
60	1/6/70	247	1013	18	76
130	1/13/70	213	1286	19	116
200	1/20/70	159	1430	15	136
270	1/27/70	418	3710	24	213
340	2/3/70	475	2748	32	190
410	2/10/70	254	5119	24	486
480	2/17/70	167	1079	18	114
550	2/24/70	35	1645		
690	3/10/70	0	2035	0	249
760	3/17/70	347	1833	23	124
830	3/24/70	178	1692	11	106
970	4/7/70	292	1008	22	76
1110	4/21/70	334	2358	15	106
1250	5/5/70	287	2219	24	19
1320	5/12/70	0	6783	0	407
1390	5/19/70	135	2133	10	155
1460	5/26/70	295	2579		
1530	6/2/70	204	749		
1600	6/9/70	88	1858	14	302
1670	6/16/70	164	1582	13	123
1740	6/23/70	308	1821	25	146
1810	6/30/70	190	2143		
1880	7/7/70	372	1142		
1950	7/14/70	305	2481		
2020	7/21/70	86	569		
2090	7/28/70	145	554		
2160	8/4/70	456	5545		
2230	8/11/70	251	757		
2300	8/18/70	344	863		
2370	8/25/70	395	1095	22	60
2440	9/1/70	372	908		
2520	9/9/70	265	1033		
2580	9/15/70	167	506		
2650	9/22/70	298	515		
2720	9/29/70	293	1025		
2790	10/6/70	408	1308		
2860	10/13/70	508	1076		
2930	10/20/70	186	808		
3000	10/27/70	206	655		
3070	11/3/70	631	616		

Compilation of Environmental Radioactivity Levels for 1970
(Reconstructed from Hazards Control Radioactivity Sampling Records for 1970)

Sampling date	Sampling date (standard format)	ALPHA pCi/L	BETA pCi/L	ALPHA pCi/g	BETA pCi/g
3140	11/10/70	220	468		
3210	11/17/70	0	550		
3280	11/24/70	166	388		
3360	12/2/70	0	607		
3420	12/8/70	232	539		
3490	12/15/70	301	678		
3560	12/22/70	249	559		
3630	12/29/70	189	423		

Compilation of Environmental Radioactivity Levels for 1970
(Reconstructed from Hazards Control Radioactivity Sampling Records for 1970)

Sampling date	Sampling date (standard format)	ALPHA pCi/L	BETA pCi/L	ALPHA pCi/g	BETA pCi/g
Aerator (Location 14)					
60	1/6/70	35	144		
130	1/13/70	0	219		
200	1/20/70	62	227		
270	1/27/70	31	370		
340	2/3/70	47	306		
410	2/10/70	75	242		
480	2/17/70	48	226		
550	2/24/70	3	547		
690	3/10/70	0	278		
760	3/17/70	64	4141		
830	3/24/70	33	209		
900	3/31/70	67	145		
970	4/7/70	0	100		
1110	4/21/70	34	263		
1250	5/5/70	78	331		
1320	5/12/70	48	1142		
1390	5/19/70	84	741		
1460	5/26/70	4	575		
1530	6/2/70	69	453		
1600	6/9/70	92	516		
1670	6/16/70	172	540		
1740	6/23/70	248	440		
1810	6/30/70	101	309		
1880	7/7/70	201	325		
1950	7/14/70	179	259		
2020	7/21/70	142	262		
2090	7/28/70	131	277		
2160	8/4/70	105	329		
2230	8/11/70	120	162		
2370	8/25/70	97	151		
2520	9/9/70	55	140		
2580	9/15/70	60	155		
2650	9/22/70	38	417		
2720	9/29/70	30	123		
2790	10/6/70	0	77		
2860	10/13/70	33	84		
2930	10/20/70	22	57		
3000	10/27/70	42	50		
3070	11/3/70	0	54		
3140	11/10/70	28	43		

Compilation of Environmental Radioactivity Levels for 1970
(Reconstructed from Hazards Control Radioactivity Sampling Records for 1970)

Sampling date	Sampling date (standard format)	ALPHA pCi/L	BETA pCi/L	ALPHA pCi/g	BETA pCi/g
3210	11/17/70	40	70		
3280	11/24/70	41	53		
3360	12/2/70	37	64		
3420	12/8/70	47	54		
3490	12/15/70	0	39		
3560	12/22/70	49	103		
3630	12/29/70	27	39		

University of California
Lawrence Livermore National Laboratory
Technical Information Department
Livermore, CA 94551