

**DEPARTMENT OF HEALTH  
Environmental Health Programs  
Division of Radiation Protection**

April 7, 1998

**TO: Gary Robertson**  
**FROM: Jamil Ahmad**  
**SUBJECT: TRENCH INFORMATION**

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**PURPOSE**

To verify and document trench data as they relate to its dimensions, slope, depth of interim trench cover, waste utilization factor, and fill efficiency.

**BACKGROUND**

A review of the existing trench data as they relate to their dimensions, slope, depth of interim cover, and the fill efficiency found the data to be inconsistent and lacking in proper documentation, especially for earlier trenches. Precise and well-documented information on these parameters is needed to evaluate radon (and other gaseous elements) gas diffusion through the trench cover, short and long-term dose assessment to the general public as well as intruder(s), design of the interim and final cover over the trenches, and cost evaluation for the closure of the facility.

In order to resolve some of these long-standing issues, a meeting was held at the Department of Health, Olympia, Washington, on March 26, 1998. The following Waste Management Section staff members were present: Gary Robertson, John Blacklaw, Mike Elsen, Jamil Ahmad, and Drew Thatcher (conference call).

Existing trench data available with US Ecology and the Division of Radiation Protection, including the A.T. Kearney Report published December 1, 1998 (Attachments 1 through 4) were examined to determine and/or establish the most reasonable values for these parameters, based on the best available information. Of particular concern was the values for slopes (horizontal to vertical ratio) within each trench, and the thickness of the waste for earlier trenches. The Waste Management Section (WDOH) in consultation with Mike Ault of US Ecology affirmed the following values for the trench parameters; these are shown in Table 1. The interim cover for each trench which is the backfill (soil) that forms the cover from the top of the waste to the grade level, is estimated by subtracting the waste height (depth) from the trench depth.

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It should be pointed out that even though the above values for trench parameters as shown in Table 1 could be used with reasonable accuracy to determine the backfill within the trench, the Trench Utilization Factor (derived by dividing the waste volume by the excavated volume of the trenches) and the Fill Efficiency (ratio of waste to the backfill), extra caution and additional investigation/verification are needed when using the above data for locating and angling the vadose zone wells for soil and water monitoring and sampling.

SJA:krf

Attachments:

1. Trench dimensions and slope for the US Ecology Richland LLRW Facility, inter-office memo from M.R. Ault to Barry Bede, September 5, 1995.
2. "Waste Volume (cubic feet), Activity (curies), Special Nuclear Material (SNM), and Source Material (kg) Disposed in Each Trench." Information from Mike Ault (US Ecology) to Jamil Ahmad (WDOH), March 16, 1998.
3. Trench data for Richland LLRW facility, inter-office memo from Earl Fordham (WDOH) to Jamil Ahmad (WDOH), March 16, 1998.
4. A.T. Kearney, Inc. "Closure and Perpetual Care and Maintenance of the Commercial LLRW Disposal Facility on the Hanford Reservation," Phase 2 Report, Alexandria, Virginia, December 1, 1988.
5. Schematic map of US Ecology's Richland low-level radioactive waste facility.
6. Calculations

**TABLE 1  
TRENCH INFORMATION  
US ECOLOGY LLRW FACILITY, RICHLAND, WA**

TRENCH #	TRENCH DIMENSIONS						WASTE INFORMATION				DATES		
	LENGTH (feet)	WIDTH (feet)	DEPTH (feet)	SLOPE W (H::V)	SLOPE L (H::V)	WASTE THICKNESS (FT)	INTERIM COVER (FT)	VOLUME (ft <sup>3</sup> )	BYPRO- DUCT (Ci)	SNM (GM)	SOURCE (KG)	TRENCH OPENED	TRENCH CLOSED
1	315	133	*25	1.5	0.5	22	3	64,571.30	1,106.36	916.03	242.07	9/16/65	9/12/66
2	311	61	*25	1.5	0.5	22	3	148,075.60	168,855.06	861.81	741.77	8/18/66	11/30/71
3	315	45	*25	1.5	0.5	22	3	129,549.10	101,690.10	14,790.72	5,423.13	12/1/71	3/31/75
4	400	100	30	1.5	0.5	27	3	300,646.10	247,660.00	93,017.74	11,233.34	4/1/75	8/10/78
4A	137	25	20	1.5	0.5	12	8	12,143.72	4.36	0.00	3,916.70	4/30/82	6/18/82
4B	376	40	40	1.5	0.5	12	8	411.00	251,797.26	0.00	0.00	7/9/84	8/23/85
5	425	80	30	1.5	0.5	27	3	485,940.85	251,665.92	10,575.10	53,496.69	4/29/78	9/5/79
6	496	75	30	1.5	0.5	32	3	739,769.53	77,129.06	1,198.94	24,149.25	8/22/79	6/10/80
7	600	100	42	1.5	0.5	34	8	1,087,967.44	42,679.52	2,463.39	1,120,292.81	10/29/82	10/12/83
7A	150	55	24	1.5	1.0	34	8	7,226.00	59.89	6.84	0.08	6/3/85	7/16/85
8	800	130	35	1.5	0.5	27	8	1,119,190.48	43,710.08	0.00	829,954.14	5/5/80	5/22/81
9	830	140	45	1.5	0.5	34	8	1,541,586.06	127,115.04	11,717.495	625,266.52	9/9/83	11/30/84
10	820	140	45	1.5	0.5	37	8	2,183,935.41	95,191.35	0.00	1,729,852.97	5/5/81	12/20/82
11A	638	144	45	1.5	0.5	37	8	1,155,765.13	8,615.66	7,602.24	383,761.52	10/29/84	11/7/85
11B	200	140	45	1.5	1.0	37	8	open	open	open	open	10/29/84	open
13	800	148	45	1.5	1.0		—	1,247,726.76	243,193.26	14,084.94	547,847.29	7/29/85	3/31/85
14	1320	150	40	1.5	0.5	37	8	open	open	open	open	2/2/87	open
16	850	150	45	1.5	1.0	37	8	open	open	open	open	1/8/92	open
18	850	150	45	1.5	1.0	37	8	open	open	open	open	11/21/95	open
Rx head				1.5	1.0			605.90	49.40	0.00	0.00	4/22/76	4/22/76
Tank farm								7,384.00	0.58	0.00	0.00	6/12/72	5/4/87
Chemical	303	37		1.5	1.0								1971

- NOTE: 1. The depth and slope (horizontal to vertical ratio) for some of the earlier trenches could not be verified and hence is based on the best available information, including those from the A.T. Kearney Report (December 1, 1988).
2. Caution and further investigation/verification is required when using the above trench data for locating and angling the vadose zone wells.

\* A.T. Kearney Report (December 1, 1998)