



Clean Harbors Deer Trail, LLC
108555 E. US Highway 36
Deer Trail, CO 80105

May 31, 2010

James H. Grice III, Licensing Lead
Radiation Management Unit
Hazardous Materials and Waste Management Division
Colorado Department of Public Health and Environment
4300 Cherry Creek Drive South
Denver, CO 80248-1530

Re: Renewal Application for License Colo. 1102-1

Via: Hand Delivery

Mr. Grice,

Attached, please find our renewal application for License Colo. 1102-1. The renewal application consists of seven volumes. We hereby present one printed hard copy of the application and two electronic copies on compact disk for your review.

Regards,

A handwritten signature in black ink, appearing to read "Phillip Retallick", is written over a large, light-colored oval shape.

Phillip Retallick, SVP Regulatory Affairs
Clean Harbors Environmental Services

Cc: Jennifer Opila
David Nielsen



**Colorado Department of Public Health and Environment
Radioactive Materials License 1102-01
Renewal Application**

Volume 1A of 7

Contents:

Renewal Application and Technical Basis,
Attachments A, B, C, D, E, F, G, H, I

May 31, 2010

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108555 East Highway 36
Deer Trail, CO 80105-9611**

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18.0 ATTACHMENT J – CHDT ANNUAL REPORT FOR 2007

19.0 ATTACHMENT J – CHDT ANNUAL REPORT FOR 2008

20.0 ATTACHMENT J – CHDT ANNUAL REPORT FOR 2009

1.0 INTRODUCTION

This package of documents is intended to serve as the license renewal application for Radioactive Materials License 1102-1 for the Clean Harbors Deer Trail, LLC, (CHDT) facility in Deer Trail, Colorado. License 1102-1 was issued by the Radiation Program of the Hazardous Materials and Waste Management Division of the Colorado Department of Public Health and Environment (CDPHE) in December, 2005. The expiration date of License 1102-1 is December 31, 2010, and pursuant to Colorado Code of Regulations (CCR) 6 CCR 1007-1, Part 14.13.1, the renewal request must be filed one year prior to expiration. The date of submission of the renewal request was extended by CDPHE at Clean Harbors' Request until June 1, 2010.

The initial license application followed the requirements of 6 CCR 1007-1 Parts 14.5 through 14.10. As the majority of the technical bases for suitability of the site for acceptance of radioactive materials is unchanged, much of the original application is still relevant and applicable and is incorporated by reference to this renewal package. This initial volume will serve to summarize the operations of the CHDT facility under License 1102-1 since its issue and present the proposed changes in scope, procedures, and technical basis that are now appropriate with operational history and data to warrant such changes. This volume (**Volume 1**) is organized as follows:

- Section 1 – Introduction
- Section 2 – Summary of Site Operations Under License 1102-1
- Section 3 – Proposed Changes to License Scope
- Section 4 – Proposed Changes to Radiation Protection Program
- Section 5 – Compliance with Regulatory Requirements
- Section 6 – Conclusions
- Section 7 - References
- Attachment A – Form OR-RH-12
- Attachment B – Cell 2 Closure and Cell 3 Approval Documentation
- Attachment C – Revised CHDT Radiation Protection Plan and Procedures
- Attachment D - Technical Basis Document for Pipe Scale Waste Acceptance
- Attachment E – Technical Basis Document for Groundwater Sampling Modifications
- Attachment F – Staffing and Key Personnel
- Attachment G – Radiation Detection Instruments
- Attachment H –Financial Assurance Warranty
- Attachment I – Corporate Environment, Health and Safety Commitment

- Attachment J - CHDT Annual Reports for 2006, 2007, 2008, and 2009

Additional volumes in this license renewal package are as follows.

Volume 2 –Original License Application (January 2005). Additional information provided by Clean Harbors during the CDPHE request for information (RFI) and comment-response phases of the original application process is included as Attachment A to Volume 2.

- Section 1 – General Information
- Section 2 – Site Characteristics
- Section 3 – Design and Construction
- Section 4 – Facility Operations
- Section 5 – Site Closure Plan and Institutional Controls
- Section 6 - Safety Assessment
- Section 7 – Occupational Radiation Protection
- Section 8 – Conduct of Operations
- Section 9 – Quality Assurance
- Section 10 – Financial Assurance
- Attachment A – Clean Harbors’ responses to CDPHE RFI

Volume 3 - Chemical Waste Treatment/Solidification & Disposal Facility Plan

Volume 4 - Chemical Waste Treatment/Solidification & Disposal Facility Plan; Candidate Area Evaluation Report, Low-Level Radioactive Waste Disposal, Colorado

Volume 5 - Permit Renewal Report for Incorporation of a Geosynthetic Clay Liner (GCL) in the Liner Section for Secure Cells 3 Through 7 and in the Cover Section for Secure Cells 1 Through 7 (the Permit Renewal Report – Volume 1)

Volume 6 - Permit Renewal Report for Incorporation of a Geosynthetic Clay Liner (GCL) in the Liner Section for Secure Cells 3 Through 7 and in the Cover Section for Secure Cells 1 Through 7 (the Permit Renewal Report – Volume 2)

Volume 7 - Analysis of Pertinent Weather Factors Related to the Permit Application for Proposed Highway 36 Waste Management Facility; Highway 36 Facility Groundwater Protection Program Design and Rationale; Annual Groundwater Protection Monitoring Report; Waste Filling Plan and Drawings for Secure Cell Number 2, Revision 1

2.0 SUMMARY OF SITE OPERATIONS UNDER LICENSE 1102-1

The Annual Reports, required per License Condition 41, provide a year-by-year summary of operations under License 1102-1. The yearly Annual Reports from 2006 through 2009 have been included with this volume as Attachment A.

2.1 Waste Characteristics and Disposal Activities

Initial shipments of radioactive materials for disposal were received in December 2006, but due to weather conditions, were not disposed into a secure cell until January of 2007. Table 2-1 presents a summary of the wastes received under License 1102-1 from January 2007 through December 2009.

Of the 35,632 tons of radioactive materials disposed at CHDT during its operations under License 1102-1, approximately 97 percent originated from two remediation projects: the Denver Radium Streets project in Denver, CO, or the Cyprus Amax Vanadium Mill Tailings project in Telluride, CO. Over 98 percent of all disposed materials originated from the Rocky Mountain Low Level Radioactive Waste Compact states of Colorado, New Mexico, and Nevada. The largest out-of-compact waste stream was uranium-contaminated metal scrap and debris from an abandoned uranium mine at a National Park Service site in Arizona.

All radioactive materials have been disposed in Cell 3 at CHDT, which was constructed in 2006. The cap for Cell 2 was constructed in 2008, and the post-closure period for Cell 2 became effective in November 2009. Cell 3 was permitted by CDPHE in 2006; the approval letter is included as Attachment B to this volume.

Table 2-1. Operational Disposal History, 2007 to 2009

Generator	Total (tons)
2007	
<i>In Compact</i>	
City and County of Denver - Colorado	22,969
Rocky Mountain Bottle Corporation - Colorado	135.7
Colorado School of Mines - Colorado	202.9
El Paso Natural Gas - New Mexico	6.3
<i>Out of Compact</i>	
Total for 2007	23,314
2008	
<i>In Compact</i>	
El Paso Natural Gas - New Mexico	3.5
El Paso Natural Gas - New Mexico	4.2
<i>Out of Compact</i>	
ENSR (Amerada Hess) - North Dakota	23.2
Total for 2008	30.9
2009	
<i>In Compact</i>	
Cyprus Amax Minerals Co - Telluride, CO	11,718
Blake Street Partnership - Denver, CO	1.2
Oxy WTP LP – New Mexico	3.1
El Paso Natural Gas Company - New Mexico	1.92
<i>Out of Compact</i>	
United Water - Toms River, New Jersey	35.35
Flint Hills Resources, LP - Minnesota	1.92
ENSR (Amerada Hess) - North Dakota	13.23
National Park Service, Bright Angel Uranium Mine, Arizona	511.77
Total for 2009	12,287
Operational Total, 2007 to 2009	35,632

2.2 Environmental Monitoring

Environmental monitoring at CHDT has been performed in four areas. Air particulates, groundwater, radon, and environmental dose rates have been collected from 2006 to the present to evaluate impacts from radioactive materials brought onsite. A discussion of each type of monitoring is presented in the subsections below.

2.2.1 Air Particulate Monitoring

Air monitoring is performed at four locations at the CHDT facility. Samples were initially collected weekly and analyzed as monthly composites; however, it was determined that sufficient mass loading was not occurring on the filters, and sample collection time was extended to the whole month. Additionally, the air monitors were operated by an automatic wind direction gauge, which initiated sample collection when the wind was coming from the prevailing south-

southwest direction. The switch to continuous air monitor operation was made after repeated complications with the direction gauges.

After collection, the air filters are allowed to decay for a minimum period of 21 days, and are then counted onsite for gross alpha and beta radiation. The filters are then sent to an offsite analytical laboratory for gross alpha, gross beta, isotopic uranium, isotopic thorium, and radium-226 analyses. Results (or the analytical minimum detection limit as a surrogate for non-detected results) are used with the collection time and average pump flow rates to determine an average air concentration for each analyte. The air concentrations are then used to determine the committed effective dose equivalent (CEDE) for site personnel.

The air data are summarized in Tables 2-2 and 2-3. Table 2-2 summarized the measured activity for each analysis in disintegrations per minute (dpm) or picocuries (pCi). Table 2-3 presents a summary of the calculated air concentrations, along with the air effluent limits per Table 4B2, Column 2 of Appendix 4B of 6 Colorado Code of Regulations (CCR) 1007-1 Part 4, Standards for Protection Against Radiation. The time-series graphs of the air concentrations from alpha emitters (including gross alpha) are presented in Figures 2-1 through 2-4.

In only two cases were the effluent limits exceeded for a given month. Both the U-238 and Th-230 results from September 2009 at Station B exceeded the effluent limit (the maximum values are bolded in Table 2-3). As shown in Figure 2-2, the detected U-238 and Th-230 results for this time period were significantly higher than at any other time. Potential data quality issues were identified from the analyses conducted this month; uranium and thorium were also detected in the field blank submitted with the collected filters.

The Ra-226 results show considerable variation relative to the other results, as shown in Figures 2-1 through 2-4. This variation is due in part to highly variable detection limits from the gamma spectroscopy analysis performed on the filters. In October 2009, the analytical method used for Ra-226 was switched from a gamma spectroscopy based method to a wet chemistry method (E903), which has a lower and more consistent detection limit.

Table 2-2. Summary of Air Filter Activity Data

Analysis	Count	Average	Standard Deviation	Minimum	Maximum	Median
Station A						
<i>On-Site Results</i>						
Gross Alpha (dpm)	48	11.6	28.2	1	172	5
Gross Beta (dpm)	48	181.6	131.3	72	878	146.5
<i>Off-Site Results</i>						
Gross Alpha (pCi)	48	12.3	7.9	3	36	9.3
Gross Beta (pCi)	48	47.9	23.3	18	122	40.75
Th-232 (pCi)	48	0.4	0.4	0.03	1.7	0.2
Th-230 (pCi)	48	0.6	0.8	-0.09	5	0.28
Th-228 (pCi)	48	0.4	0.4	0.1	1.6	0.2
U-238 (pCi)	48	0.3	0.4	0.01	1.5	0.2
U-235 (pCi)	48	0.3	0.4	-0.06	1.6	0.2
U-234 (pCi)	48	0.4	0.5	0.01	1.7	0.2
Ra-226 (pCi)	48	20.0	14.4	0.001	79.8	20
Station B						
<i>On-Site Results</i>						
Gross Alpha (dpm)	48	7.2	13.1	1	76	4
Gross Beta (dpm)	48	160.9	104.3	24	520	133
<i>Off-Site Results</i>						
Gross Alpha (pCi)	48	10.4	7.0	1.1	32.8	7.95
Gross Beta (pCi)	48	43.9	31.9	2	160	35.3
Th-232 (pCi)	47	0.4	0.4	0.14	2.2	0.2
Th-230 (pCi)	48	3.3	18.0	-0.03	125	0.245
Th-228 (pCi)	48	0.5	0.6	0.1	2.9	0.2
U-238 (pCi)	47	5.7	36.6	0.01	251	0.2
U-235 (pCi)	48	0.5	1.6	-0.02	11	0.175
U-234 (pCi)	48	5.4	34.4	0.01	239	0.2
Ra-226 (pCi)	48	19.1	11.1	0.001	66.3	20
Station C						
<i>On-Site Results</i>						
Gross Alpha (dpm)	48	10.6	26.0	0	153	4.5
Gross Beta (dpm)	48	163.1	109.1	0	603	142.5
<i>Off-Site Results</i>						
Gross Alpha (pCi)	48	10.3	7.5	1	32.9	7.95
Gross Beta (pCi)	48	41.2	24.8	2	120	35.5
Th-232 (pCi)	48	0.4	0.4	0.06	2.1	0.2
Th-230 (pCi)	48	0.8	1.4	-0.28	9.4	0.215
Th-228 (pCi)	48	0.5	0.7	0.1	4.8	0.2
U-238 (pCi)	48	1.8	9.6	0.01	67	0.2
U-235 (pCi)	48	0.4	0.6	0.01	3	0.2
U-234 (pCi)	48	1.8	9.8	0.01	68	0.2
Ra-226 (pCi)	48	20.6	19.6	0.001	129	20
Station D						
<i>On-Site Results</i>						

Analysis	Count	Average	Standard Deviation	Minimum	Maximum	Median
Gross Alpha (dpm)	48	10.6	28.3	0	172	4.5
Gross Beta (dpm)	48	165.1	137.3	0	878	138.5
<i>Off-Site Results</i>						
Gross Alpha (pCi)	48	9.5	7.2	1	38	7.3
Gross Beta (pCi)	48	37.6	21.8	2	111	37.45
Th-232 (pCi)	48	0.4	0.4	0.1	1.53	0.2
Th-230 (pCi)	48	0.8	0.9	0.02	3.8	0.285
Th-228 (pCi)	48	0.5	0.9	0.1	6	0.2
U-238 (pCi)	48	0.6	1.2	0.01	6.3	0.2
U-235 (pCi)	48	0.3	0.4	0.01	1.5	0.2
U-234 (pCi)	48	0.6	1.2	0.01	6	0.2
Ra-226 (pCi)	48	17.1	7.0	0.001	20	20

Table 2-3. Summary of Ambient Air Concentrations

Analysis	Count	Average	Standard Deviation	Minimum	Maximum	Median	Air Effluent Limit
Station A							
<i>On-Site Results</i>							
Gross Alpha (uCi/ml)	48	2.8E-15	7.4E-15	2.6E-16	4.7E-14	9.7E-16	
Gross Beta (uCi/ml)	48	4.1E-14	3.4E-14	1.6E-14	2.4E-13	3.3E-14	
<i>Off-Site Results</i>							
Gross Alpha (uCi/ml)	48	6.0E-15	3.6E-15	2.2E-15	1.9E-14	4.7E-15	
Gross Beta (uCi/ml)	48	2.3E-14	6.6E-15	1.2E-14	5.4E-14	2.2E-14	
Th-232 (uCi/ml)	48	1.9E-16	2.2E-16	1.3E-17	1.1E-15	1.1E-16	4.0E-15
Th-230 (uCi/ml)	48	3.1E-16	3.9E-16	-5.4E-17	2.3E-15	1.3E-16	2.0E-14
Th-228 (uCi/ml)	48	2.2E-16	2.3E-16	5.1E-17	9.6E-16	1.1E-16	2.0E-14
U-238 (uCi/ml)	48	1.8E-16	2.2E-16	3.8E-18	8.8E-16	1.0E-16	6.0E-14
U-235 (uCi/ml)	48	1.6E-16	2.5E-16	-3.4E-17	1.1E-15	7.4E-17	6.0E-14
U-234 (uCi/ml)	48	2.4E-16	3.0E-16	3.8E-18	1.2E-15	1.1E-16	5.0E-14
Ra-226 (uCi/ml)	48	1.1E-14	7.9E-15	1.7E-19	4.5E-14	1.1E-14	9.0E-13
Station B							
<i>On-Site Results</i>							
Gross Alpha (uCi/ml)	48	1.6E-15	3.1E-15	1.3E-16	1.8E-14	7.6E-16	
Gross Beta (uCi/ml)	48	3.5E-14	2.0E-14	4.3E-15	1.2E-13	2.8E-14	
<i>Off-Site Results</i>							
Gross Alpha (uCi/ml)	48	5.0E-15	3.0E-15	4.3E-16	1.4E-14	4.0E-15	
Gross Beta (uCi/ml)	48	2.0E-14	8.1E-15	7.9E-16	4.6E-14	2.0E-14	
Th-232 (uCi/ml)	48	2.4E-16	3.3E-16	1.4E-17	2.0E-15	1.1E-16	4.0E-15
Th-230 (uCi/ml)	48	1.2E-15	5.7E-15	-2.0E-17	4.0E-14	1.2E-16	2.0E-14
Th-228 (uCi/ml)	48	2.9E-16	4.6E-16	2.2E-17	2.6E-15	1.2E-16	2.0E-14
U-238 (uCi/ml)	48	1.9E-15	1.2E-14	3.2E-18	8.0E-14	1.0E-16	6.0E-14
U-235 (uCi/ml)	48	2.6E-16	6.1E-16	-1.1E-17	3.5E-15	7.5E-17	6.0E-14
U-234 (uCi/ml)	48	1.8E-15	1.1E-14	3.2E-18	7.6E-14	1.0E-16	5.0E-14

Analysis	Count	Average	Standard Deviation	Minimum	Maximum	Median	Air Effluent Limit
Ra-226 (uCi/ml)	48	1.2E-14	1.1E-14	1.6E-19	6.6E-14	1.0E-14	9.0E-13
Station C							
<i>On-Site Results</i>							
Gross Alpha (uCi/ml)	48	2.4E-15	6.1E-15	0.0E+00	3.9E-14	1.0E-15	
Gross Beta (uCi/ml)	48	4.0E-14	2.8E-14	7.2E-15	1.5E-13	3.3E-14	
<i>Off-Site Results</i>							
Gross Alpha (uCi/ml)	48	5.3E-15	3.3E-15	7.8E-16	1.6E-14	4.4E-15	
Gross Beta (uCi/ml)	48	2.0E-14	6.2E-15	2.7E-15	3.9E-14	1.9E-14	
Th-232 (uCi/ml)	48	2.9E-16	4.5E-16	1.3E-17	2.7E-15	1.1E-16	4.0E-15
Th-230 (uCi/ml)	48	4.3E-16	5.4E-16	-1.6E-16	2.2E-15	1.5E-16	2.0E-14
Th-228 (uCi/ml)	48	3.3E-16	5.2E-16	4.9E-17	2.2E-15	1.1E-16	2.0E-14
U-238 (uCi/ml)	48	6.0E-16	2.2E-15	3.7E-18	1.6E-14	9.7E-17	6.0E-14
U-235 (uCi/ml)	48	2.7E-16	5.0E-16	3.7E-18	2.3E-15	7.6E-17	6.0E-14
U-234 (uCi/ml)	48	6.3E-16	2.3E-15	3.7E-18	1.6E-14	1.1E-16	5.0E-14
Ra-226 (uCi/ml)	48	1.5E-14	1.9E-14	2.0E-19	1.1E-13	1.1E-14	9.0E-13
Station D							
<i>On-Site Results</i>							
Gross Alpha (uCi/ml)	48	2.7E-15	6.6E-15	0.0E+00	4.4E-14	1.4E-15	
Gross Beta (uCi/ml)	48	3.9E-14	3.2E-14	7.6E-15	2.2E-13	3.2E-14	
<i>Off-Site Results</i>							
Gross Alpha (uCi/ml)	48	5.3E-15	3.9E-15	7.8E-16	1.8E-14	3.6E-15	
Gross Beta (uCi/ml)	48	1.9E-14	8.4E-15	2.6E-15	5.3E-14	1.9E-14	
Th-232 (uCi/ml)	48	2.6E-16	3.3E-16	2.0E-17	1.8E-15	1.1E-16	4.0E-15
Th-230 (uCi/ml)	48	4.7E-16	5.2E-16	1.1E-17	2.4E-15	1.8E-16	2.0E-14
Th-228 (uCi/ml)	48	3.4E-16	5.0E-16	4.1E-17	2.5E-15	1.1E-16	2.0E-14
U-238 (uCi/ml)	48	3.2E-16	5.1E-16	3.7E-18	2.8E-15	1.1E-16	6.0E-14
U-235 (uCi/ml)	48	2.3E-16	4.2E-16	3.7E-18	2.0E-15	9.6E-17	6.0E-14
U-234 (uCi/ml)	48	3.6E-16	5.6E-16	3.7E-18	2.9E-15	1.0E-16	5.0E-14
Ra-226 (uCi/ml)	48	1.3E-14	1.7E-14	2.6E-19	1.1E-13	1.0E-14	9.0E-13

2.2.2 Groundwater Monitoring

Groundwater monitoring for radionuclides and other water quality parameters is conducted quarterly and is reported to CDPHE in both the License 1102-1 Annual Reports and as part of the RCRA Permit reporting requirements. Due to the quantity of data involved, groundwater monitoring is not summarized here; the reader is referred to the Annual Reports in Attachment J of this Volume.

2.2.3 Radon Monitoring

Radon monitoring is performed quarterly at CHDT at ten locations throughout the facility using alpha track RadTrak detectors from Landauer, Inc. Table 2-4 presents a summary of the reported radon concentrations in units of picocuries per liter (pCi/l). Figures 2-5 and 2-6 present time-series graphs of the radon data grouped by location – immediately adjacent to the Cell 3, and all

other locations. Three results over the monitoring history at CHDT exceeded the EPA residential limit of 4 pCi/l; each result exceeding that limit was detected in a different location, and did not appear to be associated with the emplacement of radioactive materials within the cell. The average for each location is below the EPA limit. Based on these results, site activities are not impacting radon levels throughout the facility.

Table 2-4. Summary of Radon Monitoring Results

Location	Number of Measurements	Average (pCi/l)	Standard Deviation (pCi/l)	Minimum (pCi/l)	Maximum (pCi/l)
Cell 3 - South	15	1.09	0.3	0.5	1.6
Cell 3 - East	15	2.30	2.3	0.5	9.6
Cell 3 - North	16	1.70	1.1	0.3	4
Cell 3 - West	16	1.06	0.5	0.3	2.1
South Air Sampler	16	1.17	0.4	0.4	1.7
Central Air Sampler - East	16	2.76	4.9	0.7	20.9
Central Air Sampler - West	16	1.54	0.5	0.6	2.4
North Air Sampler	16	1.28	0.5	0.4	2.1
Treatment Bldg	16	1.13	1.8	0.3	7.7
Lunch Room	16	0.76	0.6	0.3	2.6

2.2.4 Environmental Dosimetry

Environmental dose rates are measured quarterly at CHDT using long-term thermoluminescent dosimeters at 16 locations throughout the facility. Total dose in units of millirem (mrem) and average dose rates in units of microrem per hour ($\mu\text{rem/hr}$) are summarized in Tables 2-5 and 2-6, respectively. None of the tabulated values have been corrected for background.

Table 2-5. Summary of Cumulative Quarterly Environmental Dose Results

Location	Number of Measurements	Average (mrem)	Standard Deviation (mrem)	Minimum (mrem)	Maximum (mrem)
Control	16	37.5	4.2	31.7	47.1
Admin Bldg	16	42.1	5.1	34.4	52.8
Scale	16	36.0	4.3	30.2	45.5
Cell 2 - South	16	38.3	4.5	30.1	46.6
Cell 2 - East	16	38.1	4.7	30.2	48.9
Cell 2 - North	16	38.2	2.8	32	42.1
Cell 2 - West	16	37.9	4.4	32.3	49.1
East Gate	16	37.6	6.2	20.7	45.5
Lunch Room	16	39.7	4.1	31.4	47.9
Laboratory	16	34.4	4.2	26.2	44.3
Sample Bay	16	37.0	3.4	32.4	43.4
Maintenance	16	41.5	3.3	36.4	47.2
Treatment Bldg	16	34.7	2.7	30.9	40.9
Outside Admin Bldg	10	38.9	5.7	28	47.2
South Air Sampler	10	37.3	5.5	30	50.6

Location	Number of Measurements	Average (mrem)	Standard Deviation (mrem)	Minimum (mrem)	Maximum (mrem)
Central Air Sampler	10	37.6	4.5	32.4	47.7
North Air Sampler	10	37.6	5.6	29.5	49.3

Table 2-6. Summary of Average Environmental Dose Rate

Location	Number of Measurements	Average (μ rem/hr)	Standard Deviation (μ rem/hr)	Minimum (μ rem/hr)	Maximum (μ rem/hr)
Control	16	17.4	2.0	14.7	21.8
Admin Bldg	16	19.5	2.4	15.9	24.4
Scale	16	16.7	2.0	14.0	21.1
Cell 2 - South	16	17.7	2.1	13.9	21.6
Cell 2 - East	16	17.6	2.2	14.0	22.6
Cell 2 - North	16	17.7	1.3	14.8	19.5
Cell 2 - West	16	17.6	2.1	15.0	22.7
East Gate	16	17.4	2.9	9.6	21.1
Lunch Room	16	18.4	1.9	14.5	22.2
Laboratory	16	15.9	1.9	12.1	20.5
Sample Bay	16	17.1	1.6	15.0	20.1
Maintenance	16	19.2	1.5	16.9	21.9
Treatment Bldg	16	16.1	1.2	14.3	18.9
Outside Admin Bldg	10	18.0	2.6	13.0	21.9
South Air Sampler	10	17.2	2.5	13.9	23.4
Central Air Sampler	10	17.4	2.1	15.0	22.1
North Air Sampler	10	17.4	2.6	13.7	22.8

Time-series graphs of environmental dose results are presented in Figures 2-7 through 2-9, grouped by Cell 3 locations, other exterior locations, and interior locations. The variability in the graphed results generally correlates to fluctuations in the control dosimeter, indicating that there are no significant impacts to environmental dose from site-related activities. The average dose rates calculated from the cumulative quarterly dose are consistent with exposure rates observed with field instrumentation throughout the facility.

2.3 Evaluation of Public Dose

Public dose from activities involving radioactive materials at CHDT are evaluated with each Annual Report using data from received wastes and the EPA CAP88PC radiological risk assessment software. The nearest local residents are evaluated for potential exposure from conservative estimates of emissions from waste disposal. Annual public dose assessment results from the operational history under License 1102-1 are presented in Table 2-7.

Table 2-7. Summary of Calculated Public Dose

Year	Maximum Calculated Dose (mrem/yr)	Dose to Nearest Resident (mrem/yr)
2006	Not calculated	Not calculated
2007	6.82E-04	2.80E-04
2008	5.56E-07	2.30E-07
2009	1.30E-05	5.80E-06

Both the calculated doses to the maximally exposed resident (located 3500 meters north of the facility) and the hypothetical closest resident (located 1500 meters east of the facility) are several orders of magnitude below the public dose limit of 25 mrem/yr. As no radioactive materials were received at CHDT for disposal in 2006, the public dose was not calculated for that year. Year-to-year, public doses correlate to the relative amounts of radioactive materials disposed at CHDT, with the highest totals of disposed materials resulting in the highest calculated public dose, and the lowest total resulting in the lowest calculated public dose. The public dose modeling demonstrates that activities involving radioactive materials at CHDT have negligible impact on public health.

2.4 Occupational Dose and ALARA

Occupational dose for CHDT personnel is measured using TLDs and using the air monitoring data described in Section 2.2.1. Worker exposures are expected to be maintained as low as reasonably achievable (ALARA), with an ALARA dose goal of 25 mrem/yr. Results for assigned CEDE, maximum reported external deep dose equivalent (DDE), and maximum total effective dose equivalent (TEDE) are presented in Table 2-8.

Table 2-8. Summary of Occupational Dose

Year	Annual CEDE (mrem)	Maximum DDE (mrem)	Maximum TEDE (mrem)
2006	N/A	2	2
2007	2	2	4
2008	0.2	2	2.2
2009	16	4	18 ⁽¹⁾

(1) The individual with the maximum DDE in 2009 was in an administrative position and had an assigned CEDE of zero.

TEDE results for all personnel during operations with radioactive materials have all been below the ALARA goal of 25 mrem/yr.

2.5 Site Decommissioning Warranty

In 2008, CHDT made adjustments to the funding mechanism for the Decommissioning Warranty and the Long-Term Care Warranty insurance policies, which are also integrated into the RCRA Permit Closure and Post-Closure costs. The inflated closure and post-closure cost estimates were

calculated by multiplying the current cost estimate by the current annual inflation factor (1.02165). This inflation factor was calculated by dividing the current annual Implicit Price Deflator (IPD) for Gross National Product (GNP) for 2008 (122.407) by the annual IPD for GNP for 2007 (119.813). These IPD's were obtained from the U.S. Department of Commerce's Bureau of Economic Analysis and are the values that existed on July 9, 2009.

The current Closure warranty is \$5,108,087.56. The current Post Closure warranty is \$5,285,474.60. CHDT feels that these amounts are sufficient to cover projected activities for 2010 and to complete site decommissioning activities. A copy of the current Closure and Post Closure Warranty is located in Attachment H of this volume.

CHDT also has a sinking fund for decommissioning costs which increases in two ways. One is based on accruing an amount per cubic yard on monthly units of consumption. The other is based on accreting the cumulative balance at the weighted average discount rate.

Following are the accrued balances as of December 31, 2009:

Cell 2 Closure	\$0 – Cell 2 was closed in 2009.
Cell 3 Closure	\$62,638
Site Closure	\$29,073
Post Closure	\$32,321
Total	\$124,032

Figure 2-1. Air Monitoring Station A – Alpha Emitters

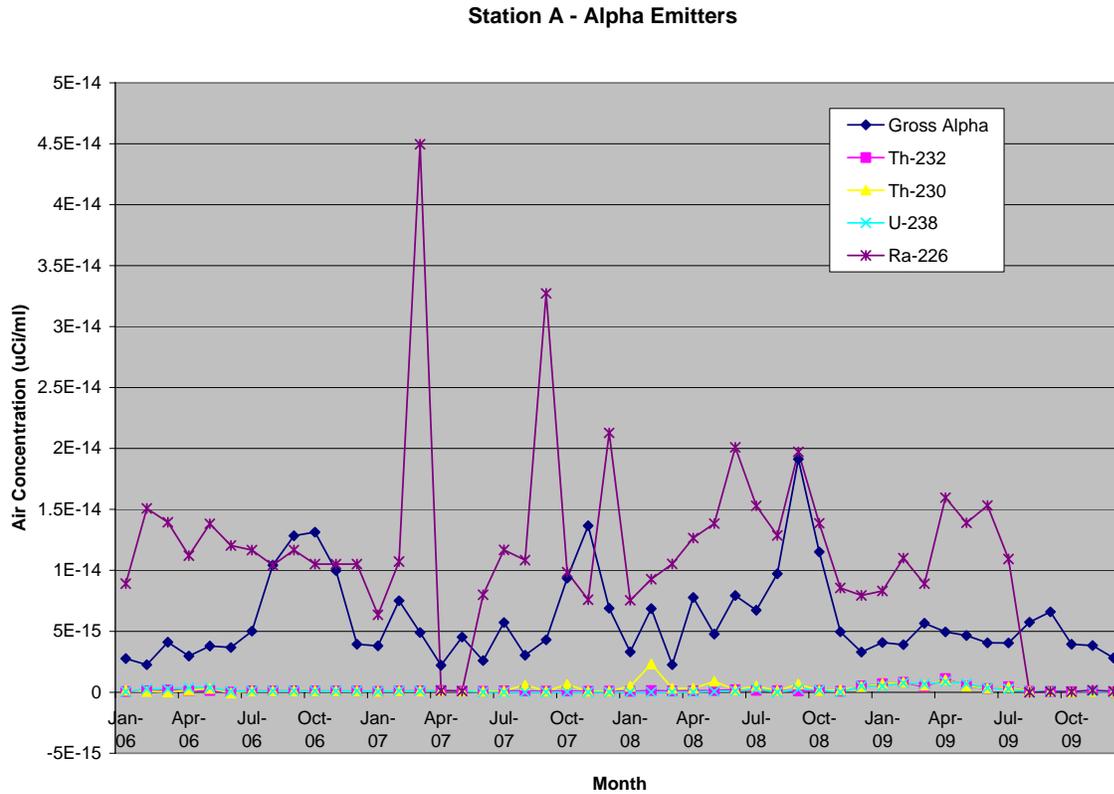


Figure 2-2. Air Monitoring Station B – Alpha Emitters

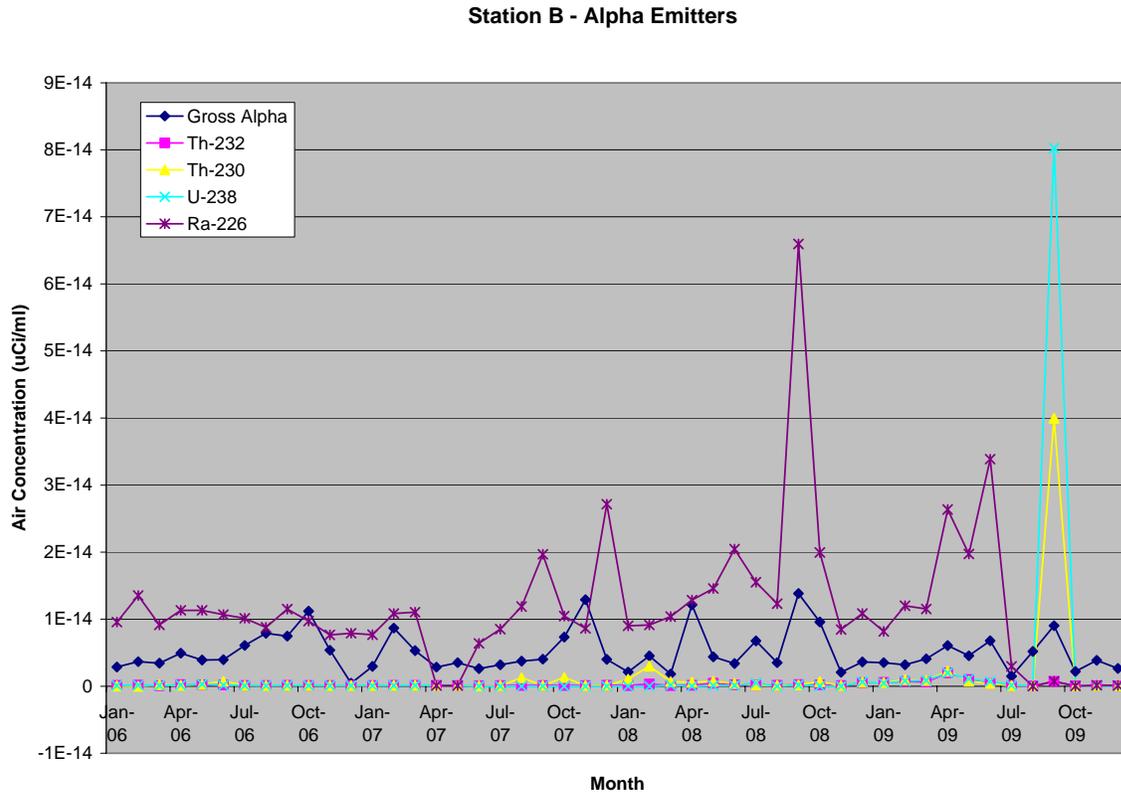


Figure 2-3. Air Monitoring Station C – Alpha Emitters

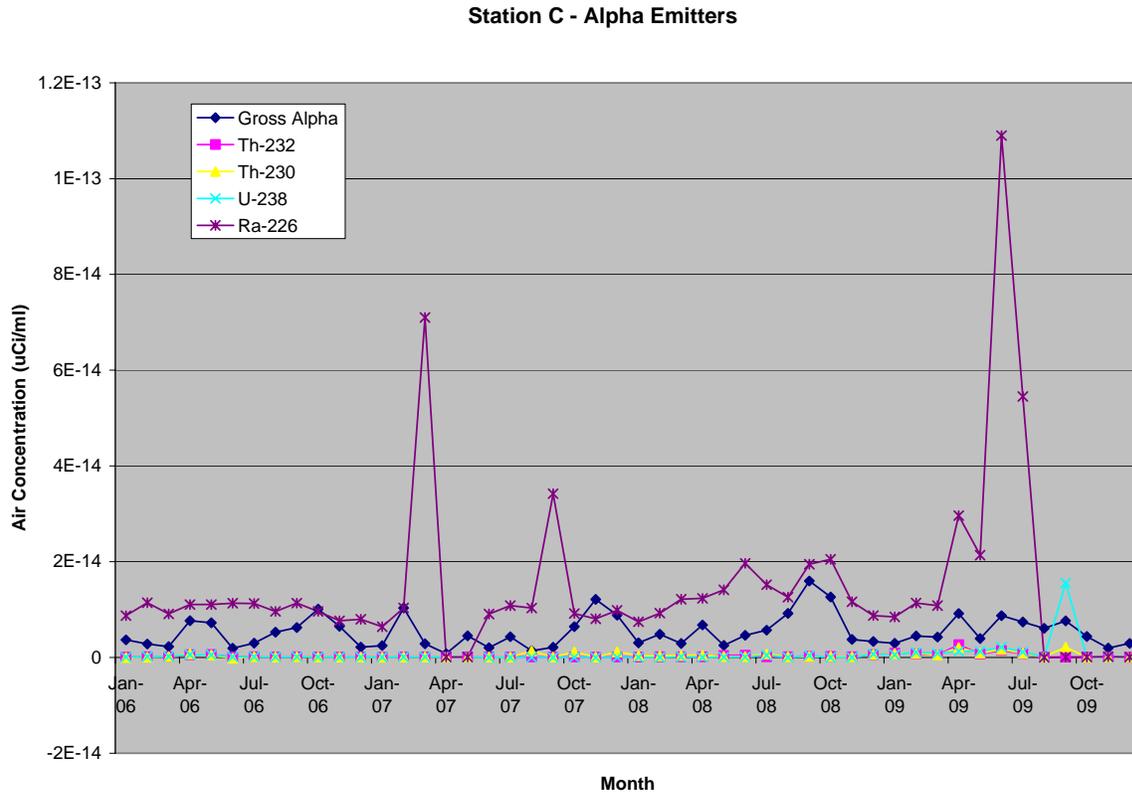


Figure 2-4. Air Monitoring Station D – Alpha Emitters

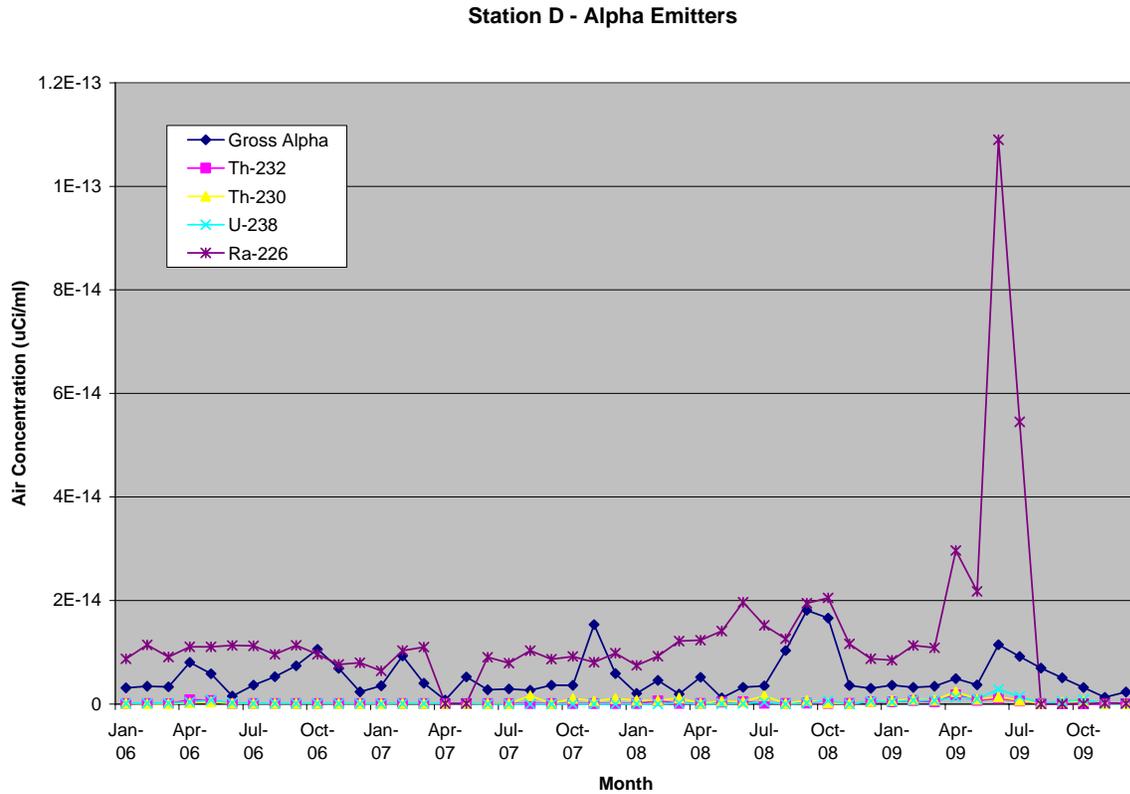


Figure 2-5. Radon Monitoring Data – Cell 3 Locations

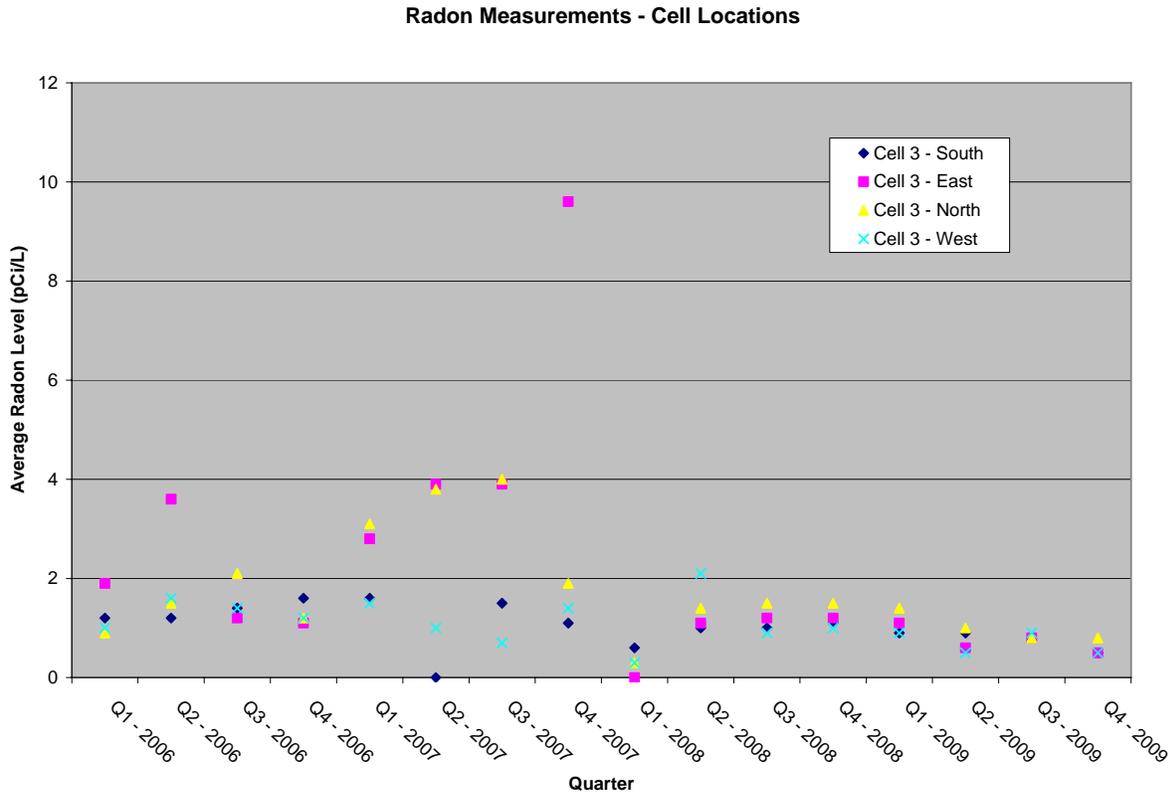


Figure 2-6. Radon Monitoring Data – Other Facility Locations

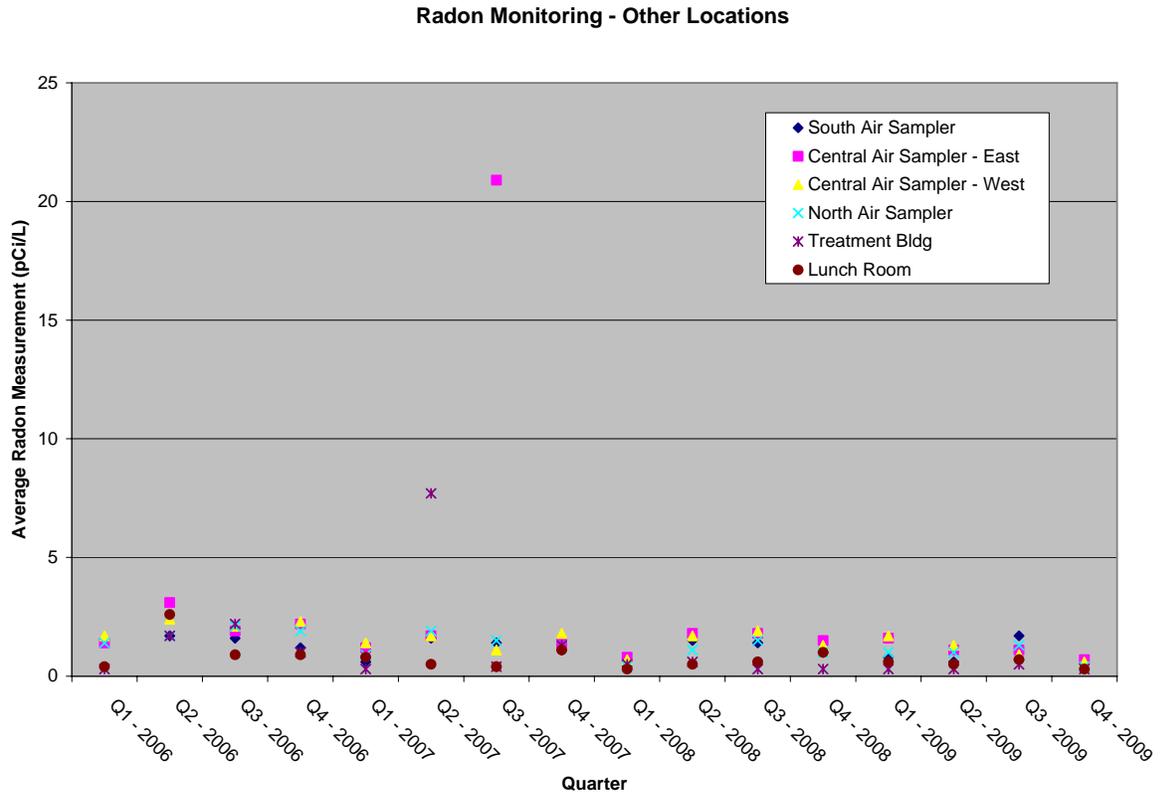


Figure 2-7. Environmental Dosimetry Data – Cell 3 Locations

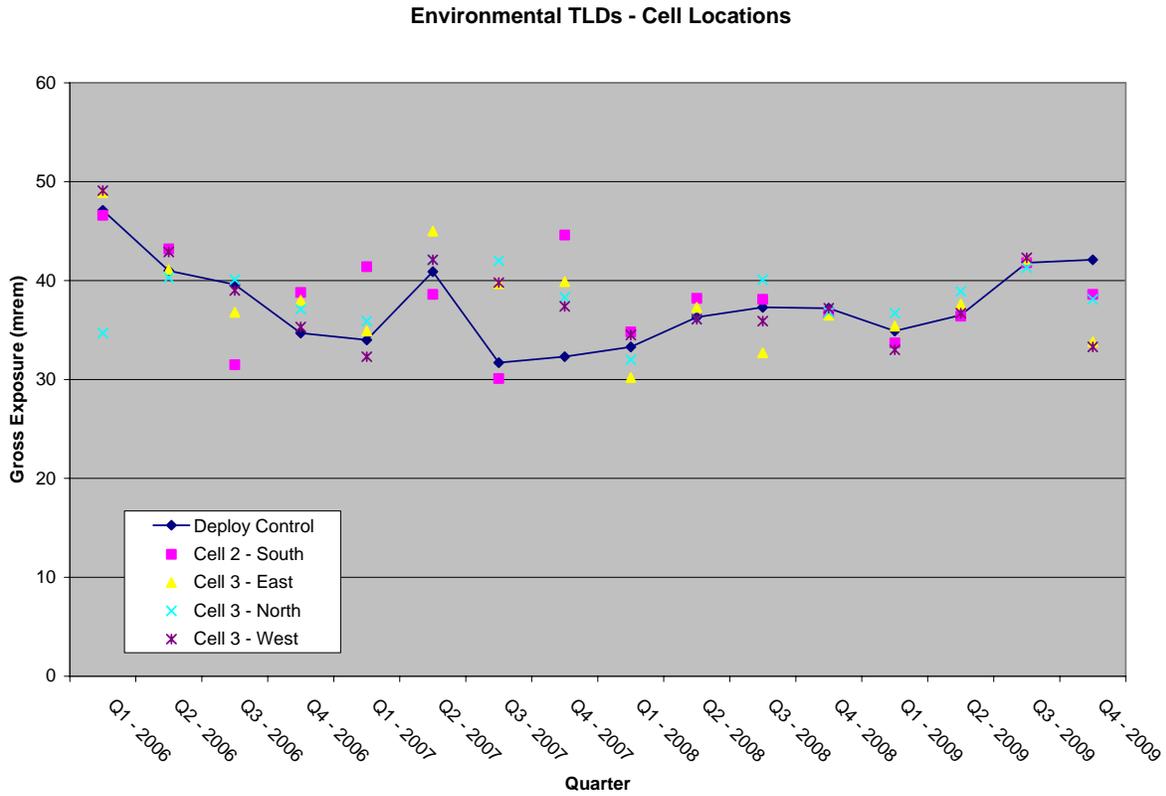


Figure 2-8. Environmental Dosimetry Data – Exterior Locations

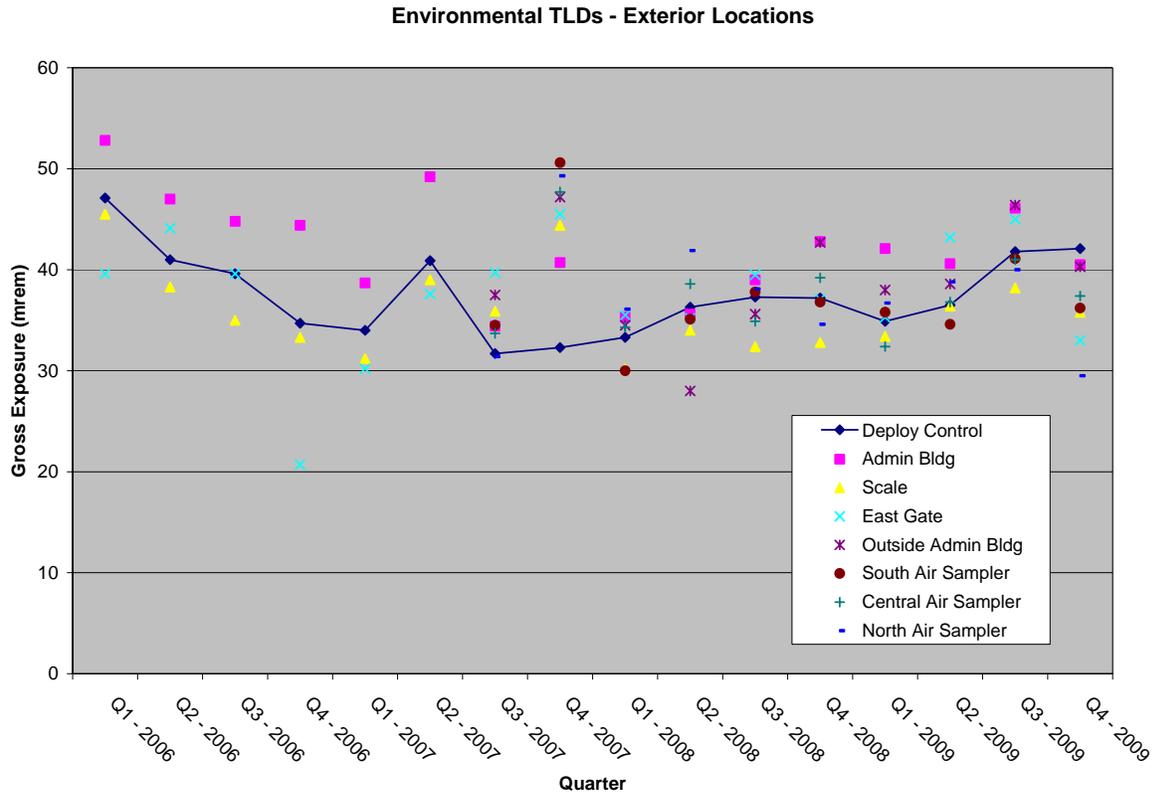
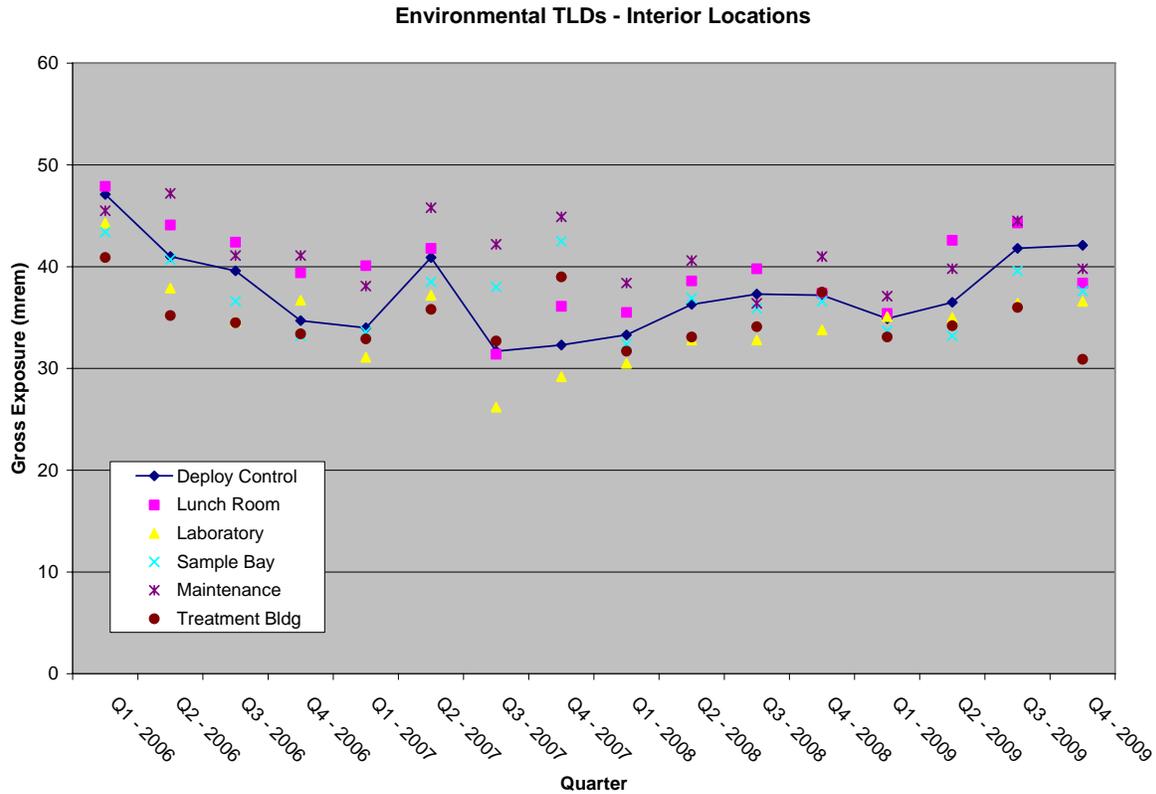


Figure 2-9. Environmental Dosimetry Data – Interior Locations



3.0 PROPOSED CHANGES TO LICENSE SCOPE

There are no proposed changes to the types and quantities of acceptable materials for the Deer Trail facility.

4.0 PROPOSED CHANGES TO RADIATION PROTECTION PROGRAM

4.1 Procedure Organization and Format

4.1.1 Proposed Change

The original application and radiation protection program contained fifteen standard operating procedures (SOPs). Over the course of operations an additional three SOPs have been instituted, and fifteen additional procedures as described in Section 4.3 are proposed with this renewal application. Clean Harbors proposes revising the SOP numbering system and organization to facilitate organization and future revisions of the SOPs, as well as facilitate the use of the procedures at other Clean Harbors facilities. The complete list of SOPs submitted with this application is provided in Table 4-1. The revised CHDT Radiation Protection Program and SOPs is included with this volume as Attachment C.

Table 4-1. Standard Operating Procedures for CHDT Radiation Protection Program

SOP Number	Title	Previously Existed	New Procedure
15.RPP	Radiation Protection Program		
15.RPP.01	Radiation Protection Plan	X	
15.RPP.02	Radiation Safety Training	X	
15.RPP.03	Worker Protection Records	X	
15.RPP.04	Individual and Area Dosimetry	X	
15.RPP.05	Estimating Inhalation Doses	X	
15.RPP.06	Emergency Response		X
15.RPP.07	ALARA		X
15.RPP.08	Radiation Work Permits		X
15.RPP.09	Personal Protective Equipment		X
15.RPP.10	Determination of Prior Occupational Dose		X
15.WAC	Waste Acceptance and Analysis		
15.WAC.01	Radioactive Materials Acceptance	X	
15.WAC.02	Waste Tracking	X	
15.WAC.03	Survey of Radium Scale Waste		X
15.OPS	Facility and Field Operations		
15.OPS.01	Landfill Operations	X	
15.OPS.02	Contamination Control during Waste Treatment Activities	X	
15.OPS.03	Operation of Portable Gamma Spectroscopy Unit	X	

SOP Number	Title	Previously Existed	New Procedure
15.OPS.04	Operation of Alpha-Beta Smear Counter	X	
15.OPS.05	Operation of Gate Monitor Detectors	X	
15.OPS.06	Operation of Digital Waste Monitor	X	
15.OPS.07	Operation of Exposure Rate/ Dose Rate Meters		X
15.OPS.08	Operation of Alpha-Beta Scintillation Detector		X
15.OPS.09	Operation of GM Pancake Probe		X
15.OPS.10	Operation of Gamma Scintillation Detectors		X
15.OPS.11	Routine Contamination Surveys	X	
15.OPS.12	Personnel Contamination Surveys	X	
15.OPS.13	Equipment and Vehicle Release Surveys	X	
15.OPS.14	Spill Surveys	X	
15.OPS.15	Air Monitoring for Radioactive Materials	X	
15.OPS.16	Groundwater Monitoring	X	
15.OPS.17	Volumetric and Material Sampling		X
15.OPS.18	Decontamination of Surfaces and Equipment		X
15.OPS.19	Decontamination of Personnel		X
15.OPS.20	Handling of Liquids		X
15.OPS.21	Package Receipt Surveys		X

4.1.2 Basis for Change

Standardization of the SOP numbering and format improves the organization of the program, and will bring the program more into compliance with Clean Harbors corporate procedure organization and format.

4.2 Terminology

4.2.1 Proposed Change

As noted in Section 3.1.1, the term “regulated materials” was used to describe materials acceptable for disposal at CHDT. Clean Harbors proposes revising this term to “radioactive materials” or the specific radionuclides comprising the material.

4.2.2 Basis for Change

More specific terminology regarding waste materials will allow broader application of the procedures outside of the CHDT facility, if required. The use of an arbitrarily-defined term such

as “regulated materials” may potentially lead to confusion on the part of CHDT personnel, waste generators, and others.

4.3 Additional Procedures

4.3.1 Proposed Change

The SOPs listed in Table 4-2 have been added to the CHDT radiation protection program.

Table 4-2. New Standard Operating Procedures for CHDT Radiation Protection Program

SOP Number	Title
15.RPP	Radiation Protection Program
15.RPP.06	Emergency Response
15.RPP.07	ALARA
15.RPP.08	Radiation Work Permits
15.RPP.09	Personal Protective Equipment
15.RPP.10	Determination of Prior Occupational Dose
15.WAC	Waste Acceptance and Analysis
15.WAC.03	Survey of Radium Scale Waste
15.OPS	Facility and Field Operations
15.OPS.07	Operation of Exposure Rate/ Dose Rate Meters
15.OPS.08	Operation of Alpha-Beta Scintillation Detector
15.OPS.09	Operation of GM Pancake Probe
15.OPS.10	Operation of Gamma Scintillation Detectors
15.OPS.17	Volumetric and Material Sampling
15.OPS.18	Decontamination of Surfaces and Equipment
15.OPS.19	Decontamination of Personnel
15.OPS.20	Handling of Liquids
15.OPS.21	Package Receipt Surveys

4.3.2 Basis for Change

SOPs 15.RPP.06 through 15.RPP.10 have been added to the RPP to provide additional instruction on specific radiation protection topics that were previously not addressed. The inclusion of these procedures is intended to supplement and/or provide radiological counterparts to existing non-radiological procedures that are part of the CHDT RCRA operations.

SOP 15.WAC.03 was developed to provide a consistent procedure for site personnel and waste generators to follow in demonstrating that waste streams consisting of radium scale containing pipe and debris meet CHDT waste acceptance criteria. The technical basis document for the procedure is included with this Volume as Attachment D.

SOPs 15.OPS.07 through 15.OPS.10 have been added to the program to provide additional instruction on the use of specific instruments. Previous instruction has been provided as part of survey procedures. Instrument-specific procedures also enable their use across the company at other Clean Harbors facilities.

SOPs 15.OPS.17 through 15.OPS.21 are additional operations procedures that were developed for use at CHDT or elsewhere within the Clean Harbors organization, if needed.

4.4 Revisions to Existing Procedures

The revisions to existing SOPs, along with the technical basis for each revision, are addressed below, by SOP. All SOPs have been reformatted to be more consistent with existing procedures, have been included in the numbering system described in Section 4.1, and have been revised to reflect the changes in terminology proposed in Section 4.2. Only further changes in content are discussed below.

4.4.1 15.RPP.01 Radiation Protection Plan

Proposed Change: Revised to reflect the application of the annual occupational dose limit of 5,000 millirem per year to CHDT workers.

Basis for Change: Based on the job responsibilities, level of training, and dosimetry program, workers at CHDT are considered to be occupational radiation workers subject to the dose limits in 6 CCR 1007-1, Part 4, Section 4.6. Per the May 24, 2005 letter with comments on the original license application (Volume 2, Attachment A), CDPHE also considers CHDT workers to be occupationally exposed. Historical exposures (Section 2.4) demonstrate that worker exposures have not exceeded the ALARA goals of the program or the individual member of the public dose limit of 100 mrem/yr.

Proposed Change: Added requirement for annual audit of the radiation protection program to coincide with the ALARA audit and Annual Report.

Basis for Change: Additional review will provide an opportunity for worker feedback on the program, to identify any equipment needs, to prepare any additional needed procedures, etc.

4.4.2 15.RPP.02 Radiation Protection Training

Proposed Change: The General Employee Radiation Protection Program training has been reorganized into two rather than three parts – radiation basics; and applied radiation protection, including instrumentation use and site-specific information.

Basis for Change: The discussion of a three-part program in the original SOP was confusing, as the second and third parts of the program were not well-defined. The intent of the two part organization is to create an initial, standardized, radiation safety basis course that is required of all workers, and then a second part consisting of additional instruction in applied radiation safety that may be tailored to the job requirements of the individual.

4.4.3 15.RPP.03 Worker Protection Records

Proposed Change: No substantive changes.

Basis for Change: Not applicable.

4.4.4 15.RPP.04 Individual and Area Dosimetry

Proposed Change: Revised to reflect the application of the annual occupational dose limit of 5,000 millirem per year to CHDT workers.

Basis for Change: Consistency with the revised Radiation Protection Plan.

4.4.5 15.RPP.05 Estimating Inhalation Doses

Proposed Change: Revised to reflect the application of the annual occupational dose limit of 5,000 millirem per year to CHDT workers.

Basis for Change: Consistency with the revised Radiation Protection Plan.

Proposed Change: Clarified calculation for determining air concentrations.

Basis for Change: Eliminates potential source of confusion on requirements.

4.4.6 15.RPP.10 Determination of Prior Occupational Dose

Proposed Change: This procedure was added to comply with CO regulations. While the purpose of this procedure is determination of prior doses in order to determine if workers should be administratively excluded from Planned Special Exposures, the regulations require determination and recording of Prior Dose. The waste that can be accepted by CHDT makes Planned Special Exposures unlikely, however, CHDT will determine Prior Dose in accordance with the procedures of SOP 15.RPP.10.

4.4.7 15.WAC.01 Radioactive Materials Acceptance

Proposed Change: Added provision for case-by-case evaluation of alternate means of compliance with Waste Acceptance Criteria.

Basis for Change: Alternate means of demonstrating compliance may be more economically feasible, safer for workers, or more practical. CHDT has previously received approval for exposure modeling to determine activity levels on objects from which a discrete sample could not be obtained.

Proposed Change: Clarified analyses required for the random sample program.

Basis for Change: Previous required analyses for random confirmation samples (gross alpha and beta only) were inconsistent with requirements for characterization and pre-acceptance samples.

Proposed Change: Clarified procedure for received and buried wastes in the event of a profile discrepancy from confirmation sampling.

Basis for Change: Previous language was unclear about the handling of wastes from which confirmation samples do not meet the Waste Acceptance Criteria. As excavation of these wastes may not be feasible and may pose a worker exposure risk, shipments received and buried during the analytical turnaround time of the non-compliant confirmation sample will remain in the landfill unless the RSO determines that their presence presents an unacceptable exposure risk to workers or the general public.

Proposed Change: Define a lower level of activity below which waste materials would no longer be subject to the Radioactive Materials License provided the waste materials are disposed of at CHDT. Specifically, wastes that have measured activity at or below the levels providing for unrestricted disposal in the *Interim Policy and Guidance Pending Rulemaking for Control and Disposition of Technologically Enhanced Naturally Occurring Radioactive Materials in Colorado* shall not be subject to this License and shall be under the jurisdiction of the RCRA Permit.

Basis for Change: The License had no lower limit on radioactivity. Radioactivity can be found in all waste materials to some extent, yet it is considered to be background radiation and not subject to regulation and control. In order to provide a numerical limit on this, we propose the use the criteria of the Interim Policy and Guidance... as these have already been subject to stakeholder and public review and are protective of workers and the general public. Concurrence on this was requested from CDPHE on January 20, 2010 and granted on February 8, 2010. CHDT wishes to incorporate this into our renewal language.

Proposed Change: Acceptance criteria will be based upon “as received” samples, i.e. wet weight. If results are presented on a dry weight basis, then the percent moisture will be used to calculate acceptability.

Basis for Change: The License mandates waste acceptance criteria as measured upon receipt at the CHDT facility. Many test methods involve a drying procedure to remove moisture from the material before further sample preparation. Many dry appearing soil type wastes may contain 30% to 40% moisture and measurements based only on the dry weight can yield misleading and inconsistent results.

Proposed Change: Remove naturally-occurring potassium-40 (K-40) present within the normal range of background levels (up to 40 pCi/g) from consideration in calculating total activity when determining waste acceptance.

Basis for Change: Potassium-40 is a ubiquitous, primordial radionuclide that is present naturally with stable potassium and makes up a large part of the natural background radiation of the earth. The natural K-40 concentration averages 17 pCi/g and ranges up to 40 pCi/g¹. Its concentration can vary widely as a part of the background. Background radiation is not normally subject to Radioactive Materials Licensing and Control. Removing background K-40 from the total activity consideration will not impact workers and the general public as they are already exposed to background radiation. CHDT would only consider K-40 as part of the total activity of waste shipments if it is present at concentrations greater than 40 pCi/g.¹

Proposed Change: Ra-226 must be less than 222 pCi/g, not 400 pCi/g as expressed in the current License.

Basis for Change: Ra-226 limits expressed in the existing License are contradictory with the License condition that total activity be less than 2000 pCi/g. Ra-226 will always be close to being in equilibrium with its 8 progeny so that if Ra-226 is the only “parent” radionuclide present, the activity of the Ra-226 plus its progeny would exceed 2000 pCi/g if Ra-226 is greater than 222 pCi/g.

Proposed Change: Eliminate testing for gross alpha and gross beta radiation from the Pre-Acceptance Requirements and Random Sample Program

Basis for Change: Gross alpha and beta analysis has not provided useful information on waste samples at the CHDT facility. These tests have not resulted in information that could not be readily calculated from gamma measurements and uranium and thorium analysis. The test is designed as a screening method for water samples with low dissolved solids (EPA Publication SW846, Test Methods for Evaluating Solid Waste, Volume 1C, Method 9310). It is not a very accurate test method for solid waste materials because the large amounts of dissolved solids in digested solid waste samples interfere with the method. The large amount of solids require that extremely small samples be used resulting in extremely poor counting efficiency especially for alpha radiation.

Proposed Change: Replace Total Radium Analysis with isotopic Ra-226 analysis.

Basis for Change: These radionuclides are commonly analyzed using different methods. Total Radium Analysis has not been a useful test and provides no information that can not otherwise be provided. Ra-228 activity is always easily determined by the gamma emissions of its progeny Ac-228.

Proposed Change: Remove Gamma Spectroscopy Screening on pre-acceptance samples using the SAIC Exploranium Model 135D Analyzer.

¹ *Exposure of the Population in the United States and Canada from Natural Background Radiation.* 1987. NCRP Report No. 94. National Council on Radiation Protection and Measurements, Bethesda, Maryland.

Basis for Change: This test method has not proven practical. Normal sized samples (500gm) of waste acceptable for CHDT do not emit enough radiation for a gamma spectrum to be determined above background radiation using this equipment. No useful data has been provided. CHDT will continue to obtain gamma spectra from all Radioactive Material shipments both for confirmation of expected radionuclide identities and to screen for un-permitted radionuclides.

4.4.8 15.WAC.02 Waste Tracking

Proposed Change: No substantive changes.

Basis for Change: Not applicable.

4.4.9 15.OPS.01 Landfill Operations

Proposed Change: No substantive changes.

Basis for Change: Not applicable.

4.4.10 15.OPS.02 Contamination Control During Waste Treatment Activities

Proposed Change: The SOP title was changed to reflect the content of the procedure. Removed requirement for daily washing of floor. Added will be decontaminated if surveys show the need. .

Basis for Change: Consistency of title with procedure content. Experience with waste operations.

4.4.11 15.OPS.03 Operation of Portable Gamma Spectroscopy Unit

Proposed Change: Specify the use of the SOP for only the Exploranium GR-135.

Basis for Change: The proposed change eliminates a potential source of confusion or misapplication of the procedure to other types of gamma spectroscopy systems.

4.4.12 15.OPS.04 Operation of Alpha-Beta Smear Counter

Proposed Change: Specify the use of the SOP for the Ludlum Model 3030 smear counter. Added specific surface radioactivity criteria for free release and for Department of Transportation (DOT) surveys. Added discussion of downloading requirements for logged data. Added discussion of minimum detectable concentration (MDC) calculation.

Basis for Change: The changes result in a more stand-alone document.

4.4.13 15.OPS.05 Operation of Gate Monitor Detectors

Proposed Change: Specify the 116 $\mu\text{R/hr}$ limit as an investigation limit.

Basis for Change: Radioactive materials acceptance at CHDT is based on status as NORM/TENORM and the activity constraints described in 15.WAC.01, *Radioactive Materials Acceptance*.

4.4.14 15.OPS.06 Operation of Digital Waste Monitor

Proposed Change: Specify the 116 $\mu\text{R/hr}$ limit as an investigation limit.

Basis for Change: Radioactive materials acceptance at CHDT is based on status as NORM/TENORM and the activity constraints described in 15.WAC.01, *Radioactive Materials Acceptance*.

4.4.15 15.OPS.11 Routine Surveys

Proposed Change: Revisions were made to specify locations, types, and frequencies of routine contamination surveys to be performed during active radioactive material disposal operations and during operations for non-radioactive materials.

Basis for Change: The proposed changes reduce confusion about the requirements for and purpose of routine contamination surveys.

4.4.16 15.OPS.12 Personnel Surveys

Proposed Change: Add surface contamination criteria and discussion on data conversion.

Basis for Change: The changes result in a more stand-alone document.

4.4.17 15.OPS.13 Equipment Surveys

Proposed Change: Add surface contamination criteria and discussion on data conversion.

Basis for Change: The changes result in a more stand-alone document.

4.4.18 15.OPS.14 Spill Surveys

Proposed Change: Add surface contamination criteria and discussion on data conversion.

Basis for Change: The changes result in a more stand-alone document.

4.4.19 15.OPS.15 Air Monitoring for Radioactive Materials

Proposed Change: Specify calculations for on-site air filter analysis from ambient air sampling.

Basis for Change: The changes result in a more stand-alone document.

Proposed Change: Specify minimum sampling time of 300 hours per month for ambient air monitoring.

Basis for Change: Provides for down-time for sampler maintenance; 300 hours should allow for sufficient material collection on the air filter.

Proposed Change: Clarify frequency of inspections during ambient sampler operation as weekly.

Basis for Change: Weekly inspections will allow flow rates to be recorded and any sampler issues to be identified in a timely manner.

Proposed Change: Add discussion of breathing zone air sampling.

Basis for Change: Breathing zone monitoring may be used during activities with specific radiological exposure concerns and was previously not addressed.

4.4.20 15.OPS.16 Groundwater Monitoring

Proposed Change: Revise to the frequency and location of routine groundwater sampling.

Basis for Change: Refer to technical basis document (prepared as a revision to the original radioactive material license application) in Attachment E.

4.4.21 15.OPS.20 Handling of Liquids

Proposed Change: The SOP title was changed to reflect the content of the procedure. Removed requirement for daily washing of floor. Added area will be decontaminated if surveys determine the need.

4.4.22 15.OPS.21 Package Receipt Surveys

Proposed Change: This SOP was added to comply with CO regulations regarding acceptance of packages contain radioactive materials. Most waste samples containing radioactive materials sent to CHDT are exempt quantity non-DOT labeled shipments. Similarly, most waste shipments containing radioactive materials acceptable to DR under the License are either non-DOT regulated, limited quantity, or LSA-1 shipments not requiring labels. While most of these shipments would appear not to require package receipt surveys under Colorado Regulations (RH Part 4.32), this sections also requires that Licensees “Monitor all packages known to contain radioactive material for radioactive contamination and radiation levels if there is evidence of degradation of package integrity, such as packages that are crushed, wet, or damaged”. RH 4.32.2.3). In the interest of complying with this part, CHDT will conduct receipt surveys on all packages and waste shipments known to contain radioactive materials.

5.0 COMPLIANCE WITH REGULATORY REQUIREMENTS

This section provides a point-by-point discussion of compliance with the applicable State of Colorado Rules and Regulations Pertaining to Radiation Control. Where appropriate, sections of this volume or other components of this renewal application have been referenced to direct the reader to the appropriate source of information.

5.1 Part 3, Licensing of Radioactive Material

5.1.1 RH 3.8 Specific Licenses

5.1.1.1. *RH 3.8.1 Filing information*

Identity of the application: The required information is presented in Form OR-RH-12, included with this application in Attachment A.

5.1.1.2. *RH 3.8.5 Incorporation by Reference*

Much information in this application refers to documents in the previous License application and RFIs which are included with this renewal for convenience.

5.1.1.3. *RH 3.8.8 Environmental Impact Assessment*

The detailed site description and environmental impact assessment was part of the original License. Updated environmental impact is assessed yearly in the annual reports submitted to CDPHE and included in this application in Attachment I. The information in these reports backs up our conclusion that the environmental impact of CHDT radioactive material operations is negligible.

5.1.2 RH 3.9 General Requirements for the Issuance of Specific Licenses

5.1.2.1. *RH 3.9.1 Qualified by reason of training and experience*

CHDT personnel have more than three years experience in conducting radioactive materials disposal operations. All staff has been trained on the basics of radioactive materials and basic radiation safety. The staff has been trained in CHDT Operational SOP's. Operations staff are trained and experienced in the use of radiation instruments. CHDT Key Personnel have many years of education and experience. CHDT Key personnel resumes and staff training histories are presented in Attachment F.

5.1.2.2. *RH 3.9.2 Equipment Facilities and Procedures are adequate to minimize danger to public health and safety*

CHDT facilities and control systems were described in the original application which is included in this application for convenience. CHDT procedures have been updated to incorporate improvements and experience and they have been reorganized. Additional procedures are presented with this application to improve the radiation protection program. Radiation detection instrumentation is listed in Attachment G. CHDT believes that its equipment, facilities, and procedures are adequate to minimize danger to public health and safety.

5.1.2.3. *RH 3.9.5 Department-approved financial assurance warranties*

CHDT has Department-approved financial assurance warranties in place. A copy of the latest certificate can be found in Attachment H.

5.1.2.4. RH 3.9.11 Contingency Plans

CHDT has a contingency plan in the RCRA permit which is included in this application. CHDT systems and procedures are designed to prevent the release of radioactivity from the site. Spill control survey procedures for radioactive material can be found in SOP 15.OPS.14. CHDT's control systems and daily cover procedure prevent the release of airborne radioactive material. Effectiveness of procedures and control systems has been demonstrated by the air monitoring results that have been presented in the annual report. Due to the extremely low activity of radioactive materials disposed of at CHDT, it seems very unlikely that a release of radioactive materials would exceed 0.01 Sv (1 rem) effective dose equivalent to a person off site (RH 3.9.11.1 (1)).

5.1.3 RH 3.10 Additional Requirements of Issuance of Specific Licenses for Use of Unsealed Radioactive Material

5.1.3.1. RH 3.10.1 Minimize Contamination

CHDT's Updated Radiation Protection Plan and Standard Operating Procedures are designed to prevent and minimize contamination of the facility and the environment. The effectiveness of these procedures will be demonstrated and measured on an ongoing basis by the survey procedures and the environmental monitoring program.

5.1.3.2. RH 3.10.3 Minimize generation of radioactive waste

Clean Harbors company policy is to minimize generation of all waste.

5.1.4 RH 3.11 Special Requirements for Specific Licenses of Broad Scope

Supervision - CHDT has presented a list of authorized users who have been trained in the nature of radioactive materials, basic radiation safety and the facility SOPs. All operations will be conducted under the supervision of Key Facility Management and authorized users. Key Facility Managers have degrees in the physical sciences and/or engineering or have equivalent experience and have at documented training in radiation safety. Resumes and training history of Key Facility Management are included in Attachment F.

Administrative Controls - CHDT has administrative controls and provisions relating to procedures, record keeping, material control and accounting, and management review necessary to assure safe operations. The procedures can be found in Attachment C.

5.2 Part 4, Standards for Protection against Radiation

5.2.1 RH 4.7 Compliance with Requirements for Summation of External and Internal Doses

CHDT's policy in compliance with this requirement is state in Section 4.0 of the Radiation Protection Plan.

5.2.2 RH 4.8 Determination of External Dose from Airborne Radioactive Material

CHDT's policy in compliance with this requirement is state in Section 4.2 of the Radiation Protection Plan.

5.2.3 RH 4.9 Determination of Internal Exposure

CHDT's policy in compliance with this requirement is state in Section 4.2 of the Radiation Protection Plan.

5.2.4 RH 4.10 Determination of Prior Occupational Dose

The prior occupational dose will be determined for CHDT employees in accordance with the procedures of SOP 15.RPP.10 revision 0.

5.2.5 RH 4.11 Planned Special Exposures

CHDT's policy in compliance with this requirement is stated in the Radiation Protection Plan. Planned Special Exposures are unlikely given that nature of the waste materials handled by CHDT.

5.2.6 RH 4.12 Occupational Dose Limits for Minors

CHDT's policy in compliance with this requirement is stated in the Radiation Protection Plan.

5.2.7 RH 4.13 Dose Equivalent to an Embryo/Fetus

CHDT's policy in compliance with this requirement is stated in the Radiation Protection Plan.

5.2.8 RH 4.14 Dose limits for Individual Members of the Public

CHDT's policy in compliance with this requirement is stated in the Radiation Protection Plan.

5.2.9 RH 4.15 Compliance with Dose Limits for Individual Members of the Public

CHDT's policy in compliance with this requirement is stated in the Radiation Protection Plan. Surveys and monitoring of unrestricted and restricted areas are conducted to ensure that these limits are met.

5.2.10 RH 4.16 Testing for Leakage or Contamination of Sealed Sources

CHDT has no regulated sealed sources at this time. If sealed sources are obtained, they will be tested per the regulations.

5.2.11 RH 4.17 Surveys and Monitoring General

CHDT has detailed survey and monitoring procedures that meet the requirements of this part. See Attachment C for the Radiation Protection Plan and Procedures.

5.2.12 RH 4.18 Conditions Requiring Individual Monitoring of External or Occupational Dose

CHDT's policy in compliance with this requirement is stated in the Radiation Protection Plan.

5.2.13 RH 4.19 Control of Access to High Radiation Areas, RH 4.20, 4.21

CHDT has no high radiation areas, and given the nature of the waste materials handled, is unlikely to have any. Nevertheless, if areas are determined to be high radiation areas, access will be controlled and the areas will be appropriately posted.

5.2.14 RH 4.25 Security of Stored Sources of Radiation

CHDT maintains a secure site that is surrounded by an 8 foot chain link fence. The facility gates are closed and secured during normal operations. Entrance is controlled by site personnel. The fenced and closed facility provides sufficient security. Bulk shipments of waste materials are normally processed and disposed of in the landfill in an expeditious manner, usually the same day. After waste is land-filled, covered, and compacted, it presents very little security risk as it would need heavy construction equipment to remove. Containerized waste may be stored while

it is waiting on treatment or lab analysis. Given the very low activity of the wastes accepted at CHDT, it poses very little security risks.

5.2.15 RH 4.22 Use of Process or Other Engineering Controls, RH 4.23, Use of Other Controls Controls

Clean Harbors Company Health and Safety Policy is to always, where possible, use Engineering Controls and Administrative Controls first in preference to Protective Equipment (PPE). Since CHDT co-disposes RCRA regulated hazardous waste along with radioactive materials, PPE is often needed to meet safety requirements for the RCRA regulated waste. Since the operations occur together and the wastes are processed in the same disposal units using the same equipment, CHDT operators are usually required to wear PPE when working in waste handling areas. While CHDT believes that the Engineering Controls and Administrative controls that it utilizes when disposing of radioactive materials are very effective, it chooses to utilize PPE both to meet RCRA regulated waste requirements and to meet or exceed protection factors for working with radioactive materials. CHDT has chosen to utilize only full face air purifying respirators to take advantage of their higher protection factors. PPE use is detailed in SOP 15.RPP.009 *Personal Protective Equipment*.

5.2.16 RH 4.24 Use of Individual Respiratory Protection Equipment

See SOP 15.RPP.009 for details of CHDT Policy with regard to respiratory protections equipment and its utilization.

5.2.17 RH 4.26 Control of Sources of Radiation not in Storage

CHDT facility design and controls meet requirements of r control and security. CHDT has not regulated sources of radioactive material at the time of License submittal,

5.2.18 RH 4.27 Caution Sign

“Caution Radioactive Materials” signs are and will be utilized to post any areas that require them.

5.2.19 RH 4.28 Posting Requirements

CHDT complies with regulations for posting requirements. All areas where radioactive materials are stored, treated, or disposed of are appropriately posted.

5.2.20 RH 4.29 Exceptions to Posting Requirements

N/A

5.2.21 RH 4.30 Labeling Containers and Radiation Machines

All waste containers known to contain radioactive materials will be appropriately labeled. CHDT has no radiation machines.

5.2.22 RH 4.31 Exemptions to Labeling Requirements

N/A

5.2.23 RH 4.32 Procedures for Receiving and Opening Packages

CHDT policy and procedures for receiving and opening packages are found in SOP 15.OPS.21 Package Receipt Surveys. Most waste samples containing radioactive materials sent to CHDT are exempt quantity non-DOT labeled shipments. Similarly, most waste shipments containing radioactive materials acceptable to DR under the License are either non-DOT regulated, limited quantity, or LSA-1 shipments not requiring labels. While most of these shipments would appear not to require package receipt surveys under Colorado Regulations (RH Part 4.32), this section also requires that Licensees “Monitor all packages known to contain radioactive material for radioactive contamination and radiation levels if there is evidence of degradation of package integrity, such as packages that are crushed, wet, or damaged”. RH 4.32.2.3). In the interest of complying with this part, CHDT will conduct receipt surveys on all packages and waste shipments known to contain radioactive materials.

5.2.24 RH 4.33 Waste Disposal General Requirements

CHDT will comply with regulations governing waste disposal. Waste is normally generated at CHDT only by the sampling and processing of waste materials for disposal. Waste is normally disposed of on site in accordance with approved SOPs.

5.2.25 RH 4.34 Method of Obtaining Approval of Proposed Disposal Procedure

CHDT will seek approval for proposed waste disposal procedures that are not covered by already approved procedures.

5.2.26 RH 4.35 Disposal by Release into Sanitary Sewerage

N/A CHDT does not dispose of any radioactive materials into sanitary sewerage.

5.2.27 RH 4.36 Treatment or Disposal by Incineration

N/A CHDT does not dispose of any radioactive materials via incineration

5.2.28 RH 4.37 Disposal of Specific Wastes

N/A

5.2.29 RH 4.38 Transfer for Disposal and Manifests

CHDT will, if necessary comply with regulations for disposal and manifests of any waste containing radioactive materials shipped off site.

5.2.30 RH 4.39 Compliance with Environmental and Health Protection Regulations

CHDT intends to comply with environmental and health protection regulations. This intention is company policy and is stated in Clean Harbor’s Corporate Commitment to Environment, Health and Safety (Attachment I).

5.2.31 RH 4.40 Records General Provisions

CHDT’s policy in compliance with this requirement is stated in the Radiation Protection Plan and specified in SOP 15.RPP.03 Records.

5.2.32 RH 4.51 Reports

CHDT intends to make all reports required by the License and the regulations.

5.3 Part 14, Licensing Requirements for Land Disposal of Low-Level Radioactive Waste, General, Technical, Institutional, and Financial Information

5.3.1 RH 14.6 - General Information

5.3.1.1. RH 14.6.1

Identity of the application: The required information is presented in Form OR-RH-12, included with this application in Attachment.

5.3.1.2. RH 14.6.2

Qualifications of the applicant: The past four years of operational history managing radioactive materials under License 1102-1 demonstrates the capabilities of the Deer Trail facility. Additional information is presented in Section 8 of the original RML application (Volume 2).

5.3.1.3. RH 14.6.3

A description of:

The location of proposed disposal site: The required information is presented in Section 1 of the original RML application (Volume 2).

The general character of the proposed activities: The required information is presented in Section 1 of the original RML application (Volume 2).

The types and quantities of waste to be received, possessed, and disposal of: The required information is presented in Section 4 of the original RML application (Volume 2).

Plans for use of the land disposal facility for purposes other than disposal of wastes: The required information is presented in Section 1 of the original RML application (Volume 2).

The proposed facilities and equipment: The required information is presented in Section 4 of the original RML application (Volume 2).

5.3.1.4. RH 14.6.4

Proposed schedules for construction, receipt of waste, and first emplacement of waste at the proposed land disposal facility: As the facility is currently in operation, this requirement does not apply for this renewal application. The facility was initially constructed in 1987 and was operational in 1990. Cell 3 (the current disposal cell) was constructed in 2006, and the first radioactive materials disposed were emplaced in January 2007.

5.3.2 RH 14.7 – Specific Technical Information

5.3.2.1. RH 14.7.1

A description of the natural and demographic disposal site characteristics as determined by disposal site selection and characterization activities: The required information is presented in Section 2 of the original RML application (Volume 2).

5.3.2.2. *RH 14.7.2*

A description of the design features of the land disposal facility and the disposal units: The required information is presented in Section 3 of the original RML application (Volume 2).

5.3.2.3. *RH 14.7.3*

A description of the principal design criteria and their relationship to the performance objectives: The required information is presented in Section 3 of the original RML application (Volume 2).

5.3.2.4. *RH 14.7.4*

A description of the design basis natural events or phenomena and their relationship to the principal design criteria: The required information is presented in Section 3 of the original RML application (Volume 2).

5.3.2.5. *RH 14.7.5*

A description of the codes and standards which the applicant has applied to the design and which will apply to the construction of the land disposal facilities: The required information is presented in Section 3 of the original RML application (Volume 2).

5.3.2.6. *RH 14.7.6*

A description of the construction and operation of the land disposal facility: The required information is presented in Sections 3 and 4 of the original RML application (Volume 2).

5.3.2.7. *RH 14.7.7*

A description of the disposal site closure plan, including those design features which are intended to facilitate disposal site closure and to eliminate the need for ongoing active maintenance: The required information is presented in Section 5 of the original RML application (Volume 2).

5.3.2.8. *RH 14.7.8*

An identification of the known natural resources at the disposal site, whose exploitation could result in inadvertent intrusion into the waste after removal of active institutional control: The required information is presented in Section 2 of the original RML application (Volume 2).

5.3.2.9. *RH 14.7.9*

A description of the kind, amount, classification, and specifications of the radioactive materials proposed to be received, possessed, and disposed of at the land disposal facility: The required information is presented in Section 4 of the original RML application (Volume 2).

5.3.2.10. RH 14.7.10

A description of the quality assurance program developed and applied by the applicant for the determination of natural disposal site characteristics and for quality control during the design, construction, operation and closure of the land disposal facility and the receipt, handling, and emplacement of waste: The required information is presented in Section 9 of the original RML application (Volume 2).

5.3.2.11. RH 14.7.11

A description of the radiation safety program for control and monitoring of radioactive effluents to ensure compliance with the performance objective in RH 14.19 and occupational radiation exposure to ensure compliance with Part IV of these regulations, and to control contamination of personnel, vehicles, equipment, buildings, and the disposal site: The required information is presented in Section 7 of the original RML application (Volume 2). The updated radiation protection program is presented in this Volume as Attachment C.

5.3.2.12. RH 14.7.12

A description of the environmental monitoring program to provide data to evaluate potential health and environmental impacts and the plan for taking corrective measures if migration is indicated: The required information is presented in Section 4 of the original RML application (Volume 2). Environmental monitoring data collected during operations under License 1102-1 is summarized in Section 2.2 of this Volume.

5.3.2.13. RH 14.7.13

A description of the administrative procedures that the applicant will apply to control activities at the land disposal facility: The required information is presented in Section 8 of the original RML application (Volume 2).

5.3.2.14. RH 14.7.14

A description of the facility electronic recordkeeping system as required in RH 14.33: Clean Harbors has a company-wide proprietary waste tracking system that is used to track all incoming and outgoing shipments of disposed wastes. Wastes may be tracked by profile number, manifest number, sales order, and load number, and each individual load is given a unique identifier in the system.

5.3.3 RH 14.8 – Technical Analyses

5.3.3.1. RH 14.8.1

Pathways analyzed in demonstrating protection of the general population from release of radioactivity shall include air, soil, groundwater, surface water, plant uptake, and exhumation

by burrowing animals: The required information is presented in Section 6 of the original RML application (Volume 2).

5.3.3.2. *RH 14.8.2*

Analyses of the protection of individuals from inadvertent intrusion shall include demonstration that there is reasonable assurance that the waste classification and segregation requirements will be met and that adequate barriers to inadvertent intrusion will be provided: The required information is presented in Section 6 of the original RML application (Volume 2).

5.3.3.3. *RH 14.8.3*

Analyses of the protection of individuals during operations shall include assessments of expected exposures due to routine operations, and likely accidents during handling, storage, and disposal of waste: The required information is presented in Section 6 of the original RML application (Volume 2).

5.3.3.4. *RH 14.8.4*

Analyses of the long-term stability of the disposal site and the need for ongoing active maintenance after closure shall be based upon analyses of active natural processes such as erosion, mass wasting, slope failure, settlement of wastes and backfill, infiltration through covers over disposal areas and adjacent soils, and surface drainage of the disposal site: The required information is presented the response to RFI 6 of the original RML application (Volume 2).

5.3.4 *RH 14.9 – Institutional Information*

5.3.4.1. *RH 14.9.1*

A certification by the federal or state custodial agency which owns the disposal site that the federal or state agency is prepared to accept transfer of the license when the provisions of RH 14.16 are met, and will assume responsibility for institutional control after site closure and post-closure observation and maintenance: The required information is presented in Clean Harbors' response to CDPHE RFI No. 2, dated March 18, 2005 (Volume 2).

5.3.4.2. *RH 14.9.2*

Where the proposed disposal site is on land not owned by the federal or state government, the applicant shall submit evidence that arrangements have been made for assumption of ownership in fee by the federal or a state agency before the Department issues a license: The required information is presented in Clean Harbors' response to CDPHE RFI No. 2, dated March 18, 2005 (Volume 2).

5.3.5 RH 14.10 – Financial Information

The financial information shall be sufficient to demonstrate that the financial qualifications of the applicant are adequate to carry out the activities for which the license is sought and meet other financial assurance requirements of this part: The required information is presented in Clean Harbors' response to CDPHE RFI No. 2, dated March 18, 2005 (Volume 2). The current Financial Assurance Warranty can be found in Attachment H.

5.4 Part 14, Licensing Requirements for Land Disposal of Low-Level Radioactive Waste, Performance Objectives

5.4.1 RH 14.19 – Protection of the General Population from Release of Radioactivity

Concentrations of radioactive material which may be released to the general environment in groundwater, surface water, air, soil, plants, or animals shall not result in an annual dose exceeding an equivalent of 25 millirems (0.25 mSv) to the thyroid, and 25 millirems (0.25 mSv) to any other organ of any member of the public: The required information is presented in Section 6 of the original RML application (Volume 2).

5.4.2 RH 14.20 – Protection of Individuals from Inadvertent Intrusion

Design, operation, and closure of the land disposal facility shall ensure protection of any individual inadvertently intruding into the disposal site and occupying the site or contacting the waste at any time after active institutional controls over the disposal site are removed: The required information is presented in Section 6 of the original RML application (Volume 2).

5.4.3 RH 14.21 – Protection of Individuals during Operations

Operations at the land disposal facility shall be conducted in compliance with the standards of radiation protection set out in Part IV of these regulations, except for releases of radioactivity in effluents from the land disposal facility, which shall be governed by RH 14.19: The required information is presented in Section 7 of the original RML application (Volume 2). The updated radiation protection program is presented in this Volume as Attachment C.

5.4.4 RH 14.22 – Stability of the Disposal Site after Closure

The disposal facility shall be sited, designed, used, operated, and closed to achieve long-term stability of the disposal site and to eliminate, to the extent practicable, the need for ongoing active maintenance of the disposal site following closure so that only maintenance, monitoring, or minor custodial care are required: The required information is presented in Section 5 of the original RML application (Volume 2).

5.5 Part 14, Licensing Requirements for Land Disposal of Low-Level Radioactive Waste, Technical Requirements for Land Disposal Facilities

5.5.1 RH 14.23 – Disposal Site Suitability Requirements for Land Disposal

The primary emphasis in near-surface disposal site suitability is given to isolation of wastes, and to the disposal site features that ensure that the long-term performance objectives are met.

The required information is presented in Clean Harbors' response to CDPHE RFI No. 6, dated June 7, 2005 (Volume 2).

5.5.2 RH 14.24 – Disposal Site Design for Land Disposal

The required information is presented in Section 3 of the original RML application (Volume 2).

5.5.3 RH 14.25 – Land Disposal Facility Operation and Disposal Site Closure

The required information is presented in Section 4 of the original RML application (Volume 2).

5.5.4 RH 14.26 – Environmental Monitoring

The required information is presented in Section 4 of the original RML application (Volume 2). Environmental monitoring data collected during operations under License 1102-1 is summarized in Section 2.2 of this Volume.

5.5.5 RH 14.27 – Alternative Requirements for Design and Operations

Not applicable.

5.5.6 RH 14.28 – Institutional Requirements

The required information is presented in Clean Harbors' response to CDPHE RFI No. 2, dated March 18, 2005 (Volume 2).

5.5.7 RH 14.29 – Alternative Requirements for Waste Classification and Characteristics

Not applicable.

5.5.8 RH 14.30 – Applicant Qualifications and Assurances

The past four years of operational history managing radioactive materials under License 1102-1 demonstrates the capabilities of the CHDT facility. Additional information is presented in Section 8 of the original RML application (Volume 2).

5.5.9 RH 14.31 – Funding for Disposal Site Closure and Stabilization

The required information is presented in Clean Harbors' response to CDPHE RFI No. 2, dated March 18, 2005 (Volume 2).

5.5.10 RH 14.32 – Financial Assurances for Institutional Controls

The required information is presented in Clean Harbors' response to CDPHE RFI No. 2, dated March 18, 2005 (Volume 2).

5.5.11 RH 14.33 – Maintenance of Records, Reports, and Transfers

The required information is noted in Section 5.1.2.14 of this Volume, and is included in the radiation protection program SOPs provided in Attachment C of this Volume. The Annual Reports submitted to the Department under the operations of License 1102-1 are presented as Attachment J of this Volume.

5.5.12 RH 14.34 – Tests on Land Disposal Facilities

Not applicable.

5.5.13 RH 14.35 – Agency Inspections of Land Disposal Facilities

Not applicable.

6.0 CONCLUSIONS

Since initiating radioactive materials receiving operations under License 1102-1 in January 2007, CHDT has safely handled over 35,000 tons of NORM, TENORM, and radium processing wastes. As shown in Sections 2.2 through 2.4, there have been no adverse impacts to the environment, the general public, or site personnel from site activities involving radioactive materials. In addition, the high percentage of disposed material originating from within the state demonstrates that the facility provides a unique service to the state of Colorado, as well as the other member states of the Rocky Mountain Low Level Radioactive Waste Compact (New Mexico and Nevada).

7.0 REFERENCES

6 CCR 1007-1. Current Version.

8.0 ATTACHMENT A – FORM OR-RH-12

**9.0 ATTACHMENT B – CELL 2 CLOSURE AND CELL 3 APPROVAL
DOCUMENTATION**

10.0 ATTACHMENT C - REVISED CHDT RADIATION PROTECTION PLAN AND PROCEDURES

**11.0 ATTACHMENT D – TECHNICAL BASIS DOCUMENT FOR PIPE SCALE
WASTE ACCEPTANCE**

12.0 ATTACHMENT E - TECHNICAL BASIS DOCUMENT FOR GROUNDWATER SAMPLING MODIFICATIONS

13.0 ATTACHMENT F – STAFFING AND KEY PERSONNEL

14.0 ATTACHMENT G - RADIATION DETECTION INSTRUMENTS

15.0 ATTACHMENT H – FINANCIAL ASSURANCE WARRANTY

**16.0 ATTACHMENT I – CORPORATE ENVIRONMENTAL HEALTH AND SAFETY
COMMITMENT**



**Colorado Department of Public Health and Environment
Radioactive Materials License 1102-01
Renewal Application**

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Attachment J 2006-2009 Annual Reports

May 31, 2010

**Clean Harbors Deer Trail, LLC
108555 East Highway 36
Deer Trail, CO 80105-9611**

17.0 ATTACHMENT J – CHDT ANNUAL REPORT FOR 2006

18.0 ATTACHMENT J – CHDT ANNUAL REPORT FOR 2007

19.0 ATTACHMENT J – CHDT ANNUAL REPORT FOR 2008

20.0 ATTACHMENT J – CHDT ANNUAL REPORT FOR 2009