

Regulated Disposal of NORM/TENORM Waste in Colorado: The Deer Trail Landfill

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ABSTRACT

On January 31, 2005, Clean Harbors Environmental Services submitted a license application to the Colorado Department of Public Health and Environment (CDPHE) for the disposal of naturally occurring radioactive material (NORM) and technologically enhanced radioactive material (TENORM) at Clean Harbor's Deer Trail RCRA Subtitle C landfill. Deer Trail is located 70 miles east of Denver, Colorado. The license application for Deer Trail was submitted under CCR 1007-1, Part 14 [1] the Colorado State equivalent of 10 CFR Part 61 [2] for radioactive waste disposal. A disposal license is required since some of the NORM/TENORM waste in Colorado is licensed by CDPHE. The license application does not extend to byproduct or source material, and thus does not include the broader categories found in Class A radioactive waste. The license application requires the establishment of a radiation protection program, assuring that all NORM/TENORM waste, even non-licensed waste disposed under RCRA, will have appropriate radiological controls for workers, the public, and the environment.

Because Deer Trail is a RCRA Subtitle C facility with an active RCRA Permit and because of the overlapping and similar requirements in the process to obtain either a RCRA permit or a radioactive waste disposal license, the license process for Deer Trail was appropriately focused. This focusing was accomplished by working with the Colorado Department of Public Health and Environment (CDPHE) and excluding or waiving selected radioactive materials license requirements from further consideration because they were found to be adequately addressed under the RCRA Permit. Of most significance, these requirements included:

- Institutional Information – Federal or State ownership will not be required, since the State's Radiation Control regulations allow for private site ownership, consistent with the same financial assurance and institutional control requirements of RCRA.

- Development of Additional Technical Information, Including an Environmental Impact Assessment – since the site has been through the RCRA site selection and permit process.
- Intruder Analyses – because of the low NORM/TENORM waste concentrations to be encountered and because of RCRA site closure requirements.

The results of the waste acceptance criteria analysis included in the license application recommended that the total activity of NORM/TENORM waste, including the alpha and beta emitting radionuclides, be enforced to the limit of 74 Bq/g (2,000 pCi/g), which is also used to define radioactive waste in Colorado, as long as a radium concentration limit of 15 Bq/g (400 pCi/g) is also maintained. A Radiation Protection Plan set of Standard Operating Procedures was developed and submitted as part of the license application. These procedures cover the mandatory worker training program, the various types of radiation surveys that will be conducted during operations, the required records and reporting, and waste tracking and disposal operations. All NORM/ TENORM waste must also meet the RCRA waste acceptance criteria for the landfill, thus assuring that there will be no incompatibilities with waste forms, waste chemistry, or other waste co-mingling issues.

On June 8, 2005, the Rocky Mountain Low Level Waste Compact approved the disposal of radium contaminated waste from a Denver Superfund site at Deer Trail. The specific waste in question was identified as radioactive waste designated by Colorado as requiring disposal under the rules of the regional compact. On August 26, 2005, the CDPHE issued the final draft radioactive materials license for disposal of NORM/TENORM waste at Deer Trail for a 60-day public comment period. The final license was issued on December 21, 2005. Once Clean Harbors has successfully demonstrated that all of the license conditions are met, the site will be authorized to receive waste. This paper provides a discussion of the status of the license, its conditions, and the regulatory process followed to obtain the license.

INTRODUCTION

In 1980, the Highway 36 Land Development Company purchased property in Adams County, Colorado, and began a process to permit a portion of the property (the Deer Trail facility) for a hazardous waste treatment, storage, and/or disposal facility (TSDF). On November 12, 1987, Adams County issued a Certificate of Designation for the Deer Trail facility, currently owned by Clean Harbors Deer Trail (CHDT), to operate as a Resource Conservation and Recovery Act (RCRA) Subtitle C hazardous waste disposal facility. To receive the Certificate of Designation, CHDT conducted lengthy studies of the site, its geology and hydrogeology, environmental setting, potential environmental impacts, and engineering design. The State of Colorado evaluated and ultimately approved these studies before Adams County issued the Certificate of Designation.

The radioactive waste disposal license application allows for transfer of a specific and limited type of licensed radioactive material to CHDT for disposal. The license application applies only to radioactive material consistent with the radionuclides found in Naturally Occurring Radioactive Material (NORM) and Technologically Enhanced Naturally Occurring Radioactive Material (TENORM), with concentrations that are less than the Colorado statutory definition of radioactive waste [3]. However, because of waste-specific regulatory determinations, some of

this waste could be licensed at the generating source and require disposal in a licensed disposal facility. The limited concentrations considered in the radioactive materials license application comprise a total activity of less than 74 Bq/g (2,000 pCi/g) (K-40, natural uranium, and thorium decay chain products only), with a maximum Ra-226 concentration less than 15 Bq/g (400 pCi/g). These materials will have external dose rates that are generally less than about 1 μ Gy/hr (100 μ R/hr), exclusive of background. The license application does not include radioactive waste in the broader definition of low-level radioactive waste, including other licensed forms of manmade radioactive materials.

The strategy of the license application is to limit the concentrations of NORM/TENORM waste to low levels so that radiation exposures to workers will be as low as reasonably achievable (ALARA) not to exceed 1 mSv/yr (100 mrem/yr), with a goal of 0.25 mSv/yr (25 mrem/yr) or less.

In support of the May 2001 rulemaking, "Storage, Treatment, Transportation, and Disposal of Mixed Wastes," the U.S. Environmental Protection Agency (EPA) contracted with the Research Triangle Institute to prepare a report on the containment effectiveness of low-level radioactive waste disposal facilities regulated under 10 CFR 61 in comparison to Subtitle C RCRA facilities [4]. In summary, the report concluded that Subtitle C RCRA disposal facilities provide ground-water protection similar to U.S. Nuclear Regulatory Commission (NRC)-regulated low-level radioactive waste disposal facilities and would be protective of long-term human health and the environment. Although there might be some issues regarding bulk waste disposal and closure conditions, the report based its general conclusions on the similarities of the overall facility designs and estimates of long-term performance regarding ground-water protection.

Working with the CDPHE, CHDT focused the radioactive materials disposal license application to include by reference much of the existing information developed during the technical evaluations and approval process for the Certificate of Designation for the Deer Trail RCRA Subtitle C hazardous waste landfill. This approach was appropriate because much of the information was the same and CHDT proposed to accept for disposal only NORM/TENORM wastes at relatively low concentrations and dose rates. In addition, CHDT will conduct closure consistent with the technical and financial conditions specified in the regulations for both a RCRA Subtitle C facility, and for a low-level radioactive waste disposal facility, as defined in Colorado.

BACKGROUND

Extensive site selection studies supported the RCRA approval process for the Deer Trail facility as a hazardous waste TSDF. These studies are outlined in a report from the Colorado Department of Health, Waste Management Division titled *Technical Guidelines on Siting of Hazardous Waste Disposal Facilities* [5]. The studies include a site description report, an engineering geological data report, a hydrologic report, and a meteorologic/climate data report. The results of these studies were summarized in initial and final two-volume reports developed by the (then) owners, Browning-Ferris Industries, Inc. (BFI), titled *Chemical Waste Treatment/Solidification & Disposal Facility Plan* [6,7]. According to the BFI report, the site was selected from among several candidate sites based on a number of favorable factors consistent with existing and anticipated environmental protection regulations. Although the

geologic strength of the Adams County site was of prime importance, important site selection considerations and requirements included:

- Suitable geologic conditions,
- Convenient location near waste sources,
- Sparsely populated area,
- Good transportation access,
- No anticipated adverse environmental impacts,
- Availability of utilities,
- Land availability and site size requirements,
- No nearby airports,
- Favorable topography,
- Soils suitable for liner material,
- Not within a corridor of growth (i.e., remote location),
- Not within a fault zone,
- Not within a 100-year floodplain,
- Not within a wetland area,
- No impact on endangered or threatened species and critical habitats,
- Extensive buffer zone,
- Not within an aquifer recharge zone, and
- Favorable evaporation rates with minimal rainfall [7].

BFI submitted the 1981 plan and reports to Adams County and the State of Colorado for review and evaluation pursuant to the regulations of the Colorado Solid Waste Act. In response to the request for review, the Colorado Department of Health established a technical review group consisting of nine State agencies, with an emphasis on intensive public input. The lead agency was the Colorado Department of Health, Waste Management Division. Representatives of this division conducted or attended 11 public meetings across Eastern Colorado, and collected 231 questions that were submitted to BFI for response. The original submittal and comment responses from BFI completed the application package, which was sent to the Department of Health for a Finding of Fact from the State. In a letter dated March 19, 1982, the Waste Management Division determined that [8]:

the site proposed by Browning-Ferris Industries would be able to comply with the regulations adopted by the Board of Health pursuant to Section 25-15-208 of the Hazardous Waste Act C.R.S. 1973 as amended, if it was constructed and operated in accordance with the designs and procedures contained in the application documents...

On November 12, 1987, Adams County, Colorado, officially issued a Certificate of Designation for the Hazardous Waste Disposal Site.

REGULATORY BASIS

By Colorado regulation, a radioactive materials license is required to receive licensed radioactive material transferred from other individuals or corporations. The Colorado radioactive waste disposal statute contains the following definition:

“radioactive” means “emitting alpha rays, beta rays, gamma rays, high-energy neutrons or protons, or other high-level radioactive particles. The term ‘radioactive’ does not include material in which the estimated specific activity is not greater than .002 microcuries per gram of material, and in which the radioactivity is essentially uniformly distributed” see C.R.S. § 25-11-201 [3].

Consistent with this definition, CHDT requested a modification to its RCRA permit to dispose of NORM/TENORM waste. The proposed Deer Trail landfill NORM/TENORM waste acceptance criteria for total radioactivity of K-40 and the uranium or thorium decay chains is 74 Bq/g (2,000 pCi/g), and the total proposed Ra-226 content is 15 Bq/g (400 pCi/g). The specific limited types of material received at Deer Trail would also be consistent with all solid waste acceptance criteria in the Deer Trail RCRA permit. However, to assure that Deer Trail can serve the Colorado NORM/TENORM material market, Deer Trail requested a limited radioactive materials license to receive licensed material from other licensees which fit the Deer Trail NORM/TENORM waste acceptance criteria. A disposal license is required since some of the NORM/TENORM waste in Colorado will be licensed by CDPHE.

LICENSE

The licensing process was focused, through negotiation with CDPHE, to exclude or waive selected radioactive materials license requirements from further consideration because of the low concentrations of radioactive materials to be encountered and because Deer Trail has previously demonstrated compliance with equivalent RCRA requirements. Of most significance, the major exclusions are:

- Institutional Information – Federal or State ownership should not be required, as the State’s own Radiation Control regulations allow for private site ownership, consistent with the same financial assurance and institutional control requirements of RCRA; see 6 CCR 1007-1, Part 11 [9]. Moreover, the low concentrations of radioactive material to be disposed (below 74 Bq/g [2,000 pCi/g]), will relieve Deer Trail from any State ownership requirements and the requirements of C.R.S. § 25-11-203 [10], which would have required approval by the governor and the general assembly.
- Development of Additional Technical Information, Including an Environmental Impact Assessment – since the site has been through the RCRA site selection and permit process, and since the proposed radionuclide concentration license limits were developed using a technical analysis based on the Performance Objectives of protecting members of the public and the environment.
- Intruder Analyses – because of the low concentrations to be encountered in the waste and because of RCRA site closure requirements.

By eliminating the above provisions, the 6 CCR 1007-1 Part 14 license [1] is somewhat akin to a broker's license in content and only includes general application information, requirements for an application for renewal or closure, various license-specific reporting and recordkeeping requirements, and provisions relating to facility testing and inspection authority.

SAFETY ANALYSIS FOR TENORM WASTE

As part of the CHDT license application, a safety analysis and the derivation of waste acceptance criteria were developed. For the safety analysis, the goal was to limit the potential radiation exposure to members of the public and Deer Trail workers to less than the performance objectives described as public dose limits of 1 mSv/yr (100 mrem/yr) above background. For a landfill worker exposed to radiation for an entire work year (i.e., 2,000 h) this would equate to a maximum hourly dose rate of 0.5 μ Sv/hr (i.e., 1 mSv/yr divided by 2,000 h/yr; or 0.05 mrem/hr) above background. For employees exposed half of a work year to a radiation source, the maximum hourly dose rate would be 1 μ Sv/hr (i.e., 1 mSv/yr divided by 1,000 h/yr; or 0.1 mrem/hr). The approach was to apply multiple lines of reasoning; that is, to identify different scenarios and use different modeling approaches to develop dose estimates. The primary models used in the safety analysis included TSD-Dose [11], RESRAD [12], and MicroShield[®] [13].

For the safety analysis, a careful evaluation of the documentation provided supporting the RCRA permit was conducted [6,7]. This evaluation revealed that, because of the siting and engineering design of the facility, several of the classical environmental transport pathways did not apply. For example, the location of the Deer Trail facility at the top of a knoll, with no standing water or connection to surface streams. This location promotes the drainage of surface water away from disposal cells before it comes into contact with the waste. In addition, surface drainage features are used during and after operation to direct and contain the flow of storm water runoff. Several additional design features have been included to prevent the contact of waste with standing water. These include a leachate collection and treatment system, as required under the RCRA Permit. The leachate collection system removes water that might percolate through the waste, thereby preventing it from contact with surface or ground water. Because: 1) the waste disposed of in a cell is covered daily, 2) storm water systems minimize contact with the waste, 3) precipitation is relatively low, 4) the leachate collection system removes water from the landfill before it can contact ground or surface water, and 5) there are no flowing streams in the nearby vicinity of the facility, there was no need to conduct an analysis for waterborne releases from the disposal cells to surface waters [6, 7]. Finally, during the site evaluation phase for the Deer Trail landfill, the hydrogeologic analysis demonstrated more than 10,000 years of containment for all the waste. Geotechnical evaluations have found that the site is underlain by no aquifers, apart from unusable, ancient groundwater perched at a depth of 4,000 feet. The site is underlain with Pierre Shale with a natural permeability of 1×10^{-7} [14]. Therefore, there will be no future ground-water protection issues associated with disposal of NORM/TENORM materials at the Deer Trail landfill. This conclusion is consistent with previous analyses used in the initial permit process for Deer Trail.

For the safety analysis, three critical groups are identified: 1) truck drivers hauling waste, 2) workers at the Deer Trail landfill (determined to be members of the public since the facility does not hold a radioactive materials license), and 3) nearby future residents who may reside near or

on the site after closure. Additional analyses were conducted to evaluate potential doses from radon, within the treatment building, near the operating cells, and over the closed cells. The analysis discussed the potential radiation exposure scenarios for each identified group, the selection of alternative models for conducting the analysis, and the conditions that are used to develop waste acceptance criteria for NORM/TENORM wastes for the Deer Trail landfill.

This analysis also used a modeling process to develop dose based waste acceptance criteria as follows:

- First, a suite of radiation exposure scenarios and conditions, which include several representative radiation exposure pathways and groups of individuals, was defined.
- Second, the resulting radiation doses per unit concentration of radionuclides were calculated in terms of mSv/yr per Bq/g (mrem/yr per pCi/g) of activity disposed by applying appropriate models.
- Third, the inverse of the maximum dose results by radionuclide, in units of Bq/g per mSv/yr (pCi/g per mrem/yr) was determined.
- Fourth, the acceptable waste concentration, in Bq/g (pCi/g), was developed by multiplying the Bq/g per mSv/yr (pCi/g per mrem/yr) results by the dose limit, in mSv/yr (mrem/yr).
- Finally, any administrative or practical conditions were identified and addressed, and secondary limits including radiation alarm set points, were established.

This process was designed to help ensure that the maximum exposed individuals in a critical group have been identified and reasonably conservative results have been obtained. The waste acceptance criteria are based on protecting the public (including landfill workers and nearby residents), and the environment. Previous analyses, have established that the individuals in contact with or in the closest proximity to radioactive materials are typically exposed to the greatest number of exposure pathways and typically receive the highest radiation doses. These individuals then become the critical group (or groups).

Intruder Protection

The NRC guidance requires that the applicant provide information on intruder protection measures that would be used to prevent an intruder from coming into contact with Class C waste after the institutional control period [15]. A strict reading of this guidance would indicate that such information is not required for this application because the Deer Trail facility will not accept Class C low-level radioactive waste. The low-level radioactive waste classification system was developed to prevent excessive doses to human intruders, and the waste acceptance criteria proposed in this application are a small fraction of the Class A disposal limits for the identified radionuclides. This means that intruder doses should be well within the public dose limits and be acceptably low. Further, RCRA does not require analysis of potential health risks associated with intrusion into disposed hazardous waste. What is required is a cell closure system (i.e., a multilayered cap) for long-term stability that will reduce infiltration and help protect against biotic and human intrusion. No further intruder analysis was necessary for the license application.

Long-Term Stability

The selected design criteria will ensure that the principal design features provide long-term isolation of disposed waste under normal, abnormal, and accident conditions. These criteria address features to minimize the need for long-term care (active maintenance) and improve the site's natural characteristics to protect public health and safety. The information developed to obtain the Certificate of Designation is included in two key references [6, 7]. In summary, these analyses considered water infiltration into the disposal cells, evaluation of disposal cell cover integrity, maximum earthquake ground motions, contact with standing water, and site drainage among other topics. The conclusions reached in the RCRA siting and permit process confirmed the adequacy of the site and engineered systems to provide long-term stability.

Summary of Impacts and Regulatory Compliance

Table I summarizes individual dose impacts with a comparison against the performance objective dose limits in 6 CCR 1007-1, Radiation Control, Part 14 [1]: *Licensing Requirements for Land Disposal of Low-Level Radioactive Waste*. All estimated radiation doses, both bounding and best-estimate, are within the performance objectives cited for workers, members of the general public, and the environment. The best-estimate values reflect expected conditions and provide assurance that doses can be maintained ALARA. In summary, the radiological safety assessment provided reasonable assurance that CHDT can operate the facility safely to receive limited concentrations of NORM/TENORM waste in bulk form, consistent with the RCRA Permit.

Table I. Estimated Impacts Analysis for the Deer Trail Facility from Normal Operations and Undisturbed Closure.^(a)

Exposure Scenario	Performance Objective mSv/yr (mrem/yr)	Bounding Analysis mSv/yr (mrem/yr)	Best-estimate Analysis mSv/yr (mrem/yr)
Deer Trail Workers - Truck Drivers Hauling Waste	1 (100)	0.48 (48)	0.03 (3)
Deer Trail Landfill Workers – Waste Receipt and Sampling	1 (100)	0.62 (62)	0.06 (6)
Deer Trail Landfill Workers – Workers Exposed to Waste in the Disposal Cell	1 (100)	0.50 (50)	0.10 (10)
Doses to Individuals Near Transport Containers – Deer Trail Workers	1 (100)	0.55 (55)	0.04 (4)
Doses to Individuals Near Transport Containers – Members of the Public	0.25 (25)	0.022 (2.2)	0.001 (0.1)
Doses to Nearby Residents During Operation	0.25 (25)	0.25 (25)	0.01 (1)
Doses to Nearby Residents – Post Closure	0.25 (25)	0.0005 (0.05)	~0
Waterborne Releases to Surface Water	0.25 (25)	N/A	N/A
Waterborne Releases from Disposal Cells	0.25 (25)	N/A	N/A
Radionuclide Leaching and Migration – Drinking Water	0.25 (25)	N/A	N/A
Release Through Biotic Pathways	0.25 (25)	N/A	N/A

^a All Performance Objectives are reduced through application of the ALARA process.

Parameter Sensitivity and Modeling Uncertainty

Although the subjects of parameter sensitivity and modeling uncertainty have been extensively studied, in the context of evaluating waste acceptance criteria they must be used cautiously. This is because of the lack of data for most situations and the amount of judgment required in selecting parameters and models relevant to the type of waste, environmental setting, and conditions being modeled. In a regulatory setting, the general rule of thumb is to select simple, conservative models, with minimal data requirements to assure that the results will not under predict the doses or risks that could result. This approach, by necessity, will bias the results towards a conservative outcome. The true uncertainty in this situation is the uncertainty in the decisions that are made, not necessarily the numerical modeling output. However, it is still important to attempt to understand the relationship between model input and output to maintain confidence that decisions that are made are defensible.

Evaluation of the scenario results must consider both the sensitivity of the results to the parameter input selections, as well as the potential uncertainty of the overall results. The overall uncertainty considers both the uncertainty in the conceptual model (i.e., do the scenarios selected represent reality), and the uncertainty introduced through assumptions and data selection. For the license application, the approach used was to follow multiple lines of reasoning. This meant using different conceptual models, exposure scenarios, parameter selections, and computer approaches for developing a range of potential waste acceptance criteria, then using judgment to select the final waste acceptance criteria. Although it may be impossible to quantify the mathematical uncertainty for a given situation, it is possible to determine if independent modeling approaches produce similar results, thereby giving confidence in the results and the decisions that are made. Therefore, the focus here is not on the numerical differences that could be produced using alternative parameters and assumptions, but rather on convergence of the results using different scenarios, models, and assumptions.

For the truck driver and the Deer Trail landfill worker scenarios considered in this analysis, the dominant exposure pathway was external exposure to penetrating radiation (i.e., photons from Ra-226 plus its decay chain progeny). This was because most of the individuals were not exposed to other pathways (i.e., inhalation) to any significant degree since most of them do not come into direct contact with the waste. For external exposure, only a few parameters are important in the dose assessment. These are: source concentration (defined for the specific type of TENORM waste), exposure geometry, exposure duration, and shielding conditions. A summary of the potential sensitivity across the identified parameters indicates:

- Source Concentration. Although this could vary from 0-74 Bq/g (0 – 2,000 pCi/g), this was used as the model output instead of an input condition.
- Exposure Geometry. For the potential conditions encountered for TENORM waste, the exposure geometries varied from a single waste container, to a large volume source representing waste in the landfill. The worker proximity to the waste varied from a fraction of a meter, to several meters depending on the scenario. For a unit concentration, the exposure rates from the different geometries considered varied over about one order of magnitude.

- Exposure Duration. The exposure durations considered for this study were based on conditions representing work conditions for the various job categories identified, with a maximum of 2,000 h/y. For the scenarios considered in this study, the exposure durations varied by about a factor of three.
- Shielding Conditions. The shielding conditions considered in this study varied from no shielding, to a fraction of a centimeter of steel representing waste containers and truck frames. The shielding conditions accounted for a variation of dose rate over about one order of magnitude.

The model results for waste acceptance criteria based on Ra-226 plus its decay chain progeny are summarized across all scenarios and models in Table II. As shown in this table, there is excellent agreement across the scenarios and models, within a factor of two. Agreement across several scenarios and models for photon emitters reflects the simplicity of modeling the external exposure pathway, where source geometry and exposure duration are the dominant assumptions

Table II. Summary of Estimated Waste Acceptance Criteria for Ra-226 Plus its Progeny

Scenario	Model	Result – Bq/g (pCi/g) Ra-226
Truck Driver	TSD-Dose	30 (800)
Receipt and Sampling Workers	TSD-Dose	18 (500)
Workers in the Disposal Cell	RESRAD	15 (400)
Workers Exposed to Containers	MicroShield®	15 (400)

that controls the resulting doses and screening levels. This agreement also provides confidence in the selection of waste acceptance criteria within the range identified by the modeling results.

Based on the preceding analysis, several conclusions can be reached regarding NORM/TENORM waste acceptance criteria at the Deer Trail landfill:

- Long-term post disposal conditions and the resulting public radiation doses for the site are not limiting in determining waste acceptance criteria; the site could receive enough NORM/TENORM waste to fill the entire landfill, at the limit defined as radioactive waste in Colorado of less than 74 Bq/g (2,000 pCi/g), without creating significant public radiation doses, and without contaminating the ground water.
- Based on the calculations in the safety analysis report, the waste acceptance criteria could be between about 15 to 30 Bq/g (400 to 800 pCi/g) of ²²⁶Ra. Considering the experience at the other landfills, and for conservatism, receipt of waste at an average concentration level of 15 Bq/g (400 pCi/g) of Ra-226, measured on a per shipment basis, was used in the license application.
- It is noted that the proposed limit is for Ra-226 and its short-lived progeny that emit photons (important for external exposure) is intended to maintain low dose rates for facility workers within the 74 Bq/g (2,000 pCi/g) used to define radioactive waste in Colorado.

In addition, the current worker protection program at the Deer Trail landfill will be modified under the radioactive materials license with the following considerations:

- All current procedures associated with monitoring for radioactive materials be modified based on the new waste acceptance criteria.
- CHDT has developed a radiation protection program, with the adoption of new Standard Operating Procedures, and the establishment of a dosimetry program that will quantify background radiation exposures, radiation exposures associated with various locations within the landfill operation (including the waste receipt/weighing station, sample analysis hood, and locations in and around the waste cells), and for individual workers who come into close proximity to the NORM/TENORM waste.

CURRENT STATUS

The radioactive materials license application was completed and sent to CDPHE for review on January 31, 2005. On June 8, 2005, the Rocky Mountain Low Level Waste Compact approved the disposal of radium-contaminated waste from a Denver Superfund site at Deer Trail. The specific waste in question was identified as radioactive waste designated by Colorado as requiring disposal under the rules of the regional compact. On August 26, 2005, the CDPHE issued the final draft radioactive materials license for disposal of NORM/TENORM waste at Deer Trail for a 60-day public comment period. The comment period ended on October 26, 2005. The final license was issued on December 21, 2005. Once Clean Harbors has successfully demonstrated that all of the license conditions are met, the site will be able to receive waste. CHDT has begun identifying clients with NORM/TENORM waste consistent with the waste acceptance criteria cited in the license for disposal at the Deer Trail landfill.

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