

revised 11/05

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# STATE OF COLORADO

Bill Owens, Governor  
Douglas H. Benevento, Executive Director

Dedicated to protecting and improving the health and environment of the people of Colorado

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Colorado Department  
of Public Health  
and Environment

DIST.	LTR	ENR
BERARDINI, J.H.	X	X
BOGNAR, E.S.	X	X
BROOKS, L.	X	X
CROCKETT, G. A.	X	X
DECK, C. A.	X	X
DEGENHART, K. R.	X	X
FERRERA, D. W.	X	X
GIACOMINI, J. J.		
SILPIN, H.		
LINDSAY, D. C.	X	X
NESTA, S.	X	X
SHELTON, D. C.	X	X
FUOR, N. R.	X	X
ALSTROM, J.	X	X
ZAHM, C.	X	X

November 22, 2005

Mr. John Rampe  
Director, Closure Project Management  
U.S. Department of Energy  
Rocky Flats Project Office (RFPO)  
12101 Airway Way, Unit A  
Broomfield, CO 80021-2583

RE: Applicability of Part 2 Siting Requirements (6 CCR 1007-2) to the Present Landfill

Dear Mr. Rampe:

The Colorado Department of Public Health and Environment required an analysis of the applicability of the State's Part 2 Siting Requirements to the Present Landfill in our letter to Mr. Joe Legare on May 9, 2005. The attached review has been submitted by the Department of Energy in fulfillment of that requirement. We have determined that the analysis is acceptable and request that it be placed into the Administrative Record.

If you have any questions please contact me at 303-692-3358.

Sincerely,

*Carl Spreng*

COR. CONTROL	X	X
ADMIN. RECORD	X	X

Carl Spreng  
RFCA Project Coordinator  
Colorado Department of Public  
Health and Environment

Reviewed for Addressee  
Corres. Control RFP

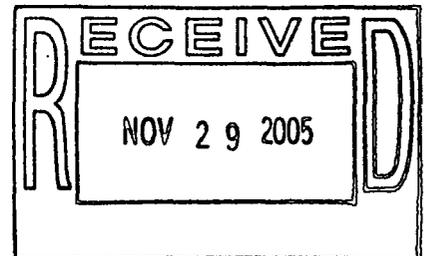
11/29/05 leg  
Date By

Ref. Ltr. #

OE ORDER #

5400-1

cc: Carol Deck, K-H  
Mark Aguilar, EPA  
Susan Chaki, CDPHE  
Dan Miller, AGO  
Mark Sattelberg, USF&WS  
Administrative Record



ADMIN RECORD

1/10

## APPLICABILITY OF PART 2 SITING REQUIREMENTS (6 CCR 1007-2) TO THE DESIGN OF THE PRESENT LANDFILL

Requirements that should be compared to the Present Landfill design, according to CDPHE guidance, are highlighted in yellow; requirements that need not be considered are highlighted in ■.

DOE's responses are presented in *bold italics* at the end of each section.

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### RULES AND REGULATIONS PERTAINING TO SOLID AND HAZARDOUS WASTES PART 2 - REQUIREMENTS FOR SITING OF HAZARDOUS WASTE DISPOSAL SITES

*Parts 2.1 through 2.3 and 2.6 through 2.9 of the Siting Regulations need not be discussed here because they do not relate to the substantive design requirements or function of a landfill. These sections have the following titles:*

■ Scope and Availability  
■ Definitions  
■ Application Requirements for Certificates of Designation  
■ [reserved]  
■ [reserved]  
■ Violations and Penalties  
■ Basis and Purpose

#### **2.4 Minimum Design Performance Criteria for Off-Site Hazardous Waste Disposal Sites and On-Site Hazardous Waste Landfills.**

2.4.1 Sites intended for use as landfills, surface impoundments and land treatment facilities subject to these regulations shall be located and designed in manner that the design performance will assure long-term protection of human health and the environment.

2.4.2 Hazardous waste disposal sites shall be designed to prevent adverse effects on groundwater quality, considering:

- a) The volume and physical and chemical characteristics of the waste in the facility, including its potential for migration through any liners provided in the design and the surrounding soils or bedrock strata;
- b) The hydrogeological characteristics of the facility and the surrounding land and other site specific factors which are basic to preventing adverse effects on groundwater quality;
- c) The quantity, quality, and directions of flow of groundwater;
- d) The proximity of existing and planned groundwater users and the withdrawal rates of such uses;

***N/A: There are no existing or planned groundwater users.***

- e) The existing quality of groundwater, including other sources of contamination and their cumulative impact on the groundwater;
- f) The potential for health risks caused by human exposure to waste constituents;
- g) The potential damage to wildlife, crops, vegetation, and physical structures caused by exposure to waste constituents; and
- h) The persistence and permanence of the potential adverse effects.

*These requirements have been met by submitting an Interim Measures/Interim Remedial Action decision document and/or by various design documents, which have been previously approved by CDPHE. See, especially, Appendix C to the IM/IRA, "Integrated Hydrologic Model for the Present Landfill" and Appendix D, "Water Quality Assessment for the Present Landfill."*

*In addition, the landfill has been covered with a permanent multi-layer RCRA Subtitle C-compliant cap to prevent contact with the waste and to reduce the infiltration of stormwater into the waste. The landfill seep at the eastern toe of the landfill is representative of the groundwater in the landfill and has been shown to exhibit very little impact from the landfill waste. However, as a part of the landfill closure, the seep is treated by a passive treatment system designed to meet existing surface water standards. Since these standards are designed to consider and be protective of human health as well as agriculture, fish and aquatic life, damage to wildlife, crops, vegetation, or physical structures will be prevented. Seep waters will continue to be treated until the RFCA parties agree that treatment is no longer necessary. Monitoring will continue as long as seep waters continue to emanate from the landfill, pursuant to the IM/IRA and NPDES requirements.*

*The Groundwater IM/IRA evaluated groundwater quality in the vicinity of the Present Landfill. It concluded that an additional accelerated action was not required because the objectives of preventing the transport of contaminants were already being met by the landfill cover and the existing groundwater treatment system. The IM/IRA also concluded that groundwater monitoring at the Present Landfill over the last 18 years has shown that the landfill is not impacting downgradient groundwater quality. Groundwater monitoring will be accomplished by monitoring three upgradient and three downgradient groundwater monitoring wells according to the IM/IRA and the Integrated Monitoring Program (IMP).*

2.4.3 Hazardous waste disposal sites shall be designed to prevent adverse effects on surface water quality, considering:

- a) The volume and physical and chemical characteristics of the waste in the facility;
- b) The hydrogeological characteristics of the facility and surrounding land and other site specific factors which are basic to preventing adverse effects on surface water quality, including the topography of the area around the facility and any engineering features to influence surface water flow patterns that may be appropriate;
- c) The quantity, quality, and directions of flow of surface water;
- d) The patterns of precipitation in the region and potential impacts on disposal locations, including removal of wastes;
- e) The proximity of the facility to surface waters;

- f) The existing and planned uses of nearby surface waters and any water quality standards established for those surface waters;
- g) The existing quality of surface water, including other sources of contamination and their cumulative impact on surface water;
- h) The potential for health risks caused by human exposure to waste constituents;
- i) The potential damage to wildlife, crops, vegetation and physical structures caused by exposure to waste constituents; and
- j) The persistence and permanence of the potential adverse effects.

*These requirements have been met by submitting an Interim Measures/Interim Remedial Action decision document and/or by various design documents, which have been previously approved by CDPHE. See, especially, Appendix C to the IM/IRA, "Integrated Hydrologic Model for the Present Landfill" and Appendix D, "Water Quality Assessment for the Present Landfill."*

*In addition, the landfill has been covered with a permanent multi-layer RCRA Subtitle C-compliant cap to prevent contact with the waste and to reduce the infiltration of stormwater into the waste. The landfill seep at the eastern toe of the landfill is representative of the groundwater in the landfill and has been shown to exhibit very little impact from the landfill waste. However, as a part of the landfill closure, the seep is treated by a passive treatment system designed to meet existing surface water standards. Since these standards are designed to consider and be protective of human health as well as agriculture, fish and aquatic life, damage to wildlife, crops, vegetation, or physical structures will be prevented.*

*The design of the landfill cover also controls the surface water runoff and runoff with channels that surround the landfill. Surface water from the landfill cover is directed into the perimeter channels and potential surface water runoff is captured by the same perimeter channels. The perimeter channels direct this captured surface water flow away from the landfill boundary and discharges into the natural drainage system that drains the overall area of the landfill.*

2.4.4 Hazardous waste disposal sites shall be designed to prevent adverse effects on air quality, considering:

- a) The volume and physical and chemical characteristics of the waste in the facility, including its potential for volatilization and wind dispersal;
- b) The existing quality of the air, including other sources of contamination and their cumulative impact on air quality;
- c) The potential for health risks caused by human exposure to waste constituents;
- d) The prevailing wind patterns in the region and other site specific factors that may influence or cause adverse effects on air quality;
- e) The potential damage to wildlife, crops, vegetation, and physical structures caused by exposure to waste constituents; and
- f) The persistence and permanence of the potential adverse effects.

*These requirements have been met by submitting an Interim Measures/Interim Remedial Action decision document and/or by various design documents,*

which have been previously approved by CDPHE. See, especially, the LANDGEM and Subpart WNW modeling supporting documents.

2.4.5 Hazardous waste disposal sites shall be designed to prevent long-term adverse effects on public health and the environment due to migration of waste constituents in the surface and subsurface environment, considering:

- a) The volume and physical and chemical characteristics of the waste in the facility, including its potential for migration through soil;
- b) The geologic characteristics of the facility and surrounding land and other site specific factors that may effect the potential for migration of waste constituents into surface and subsurface physical structures;
- c) The potential for migration of waste constituents into the root zone of food-chain and other vegetation;
- d) The potential for health risks caused by human exposure to waste constituents;
- e) The potential damage to wildlife, crops, vegetation, and physical structures caused by exposure to waste constituents; and
- f) The persistence and permanence of the potential adverse effects.

*These requirements have been met by submitting an Interim Measures/Interim Remedial Action decision document and/or by various design documents, which have been previously approved by CDPHE. See, especially, Appendix C to the IM/IRA, "Integrated Hydrologic Model for the Present Landfill" and Appendix D, "Water Quality Assessment for the Present Landfill."*

*In addition, the landfill has been covered with a permanent multi-layer RCRA Subtitle C-compliant cap to prevent contact with the waste and to reduce the infiltration of stormwater into the waste. The landfill seep at the eastern toe of the landfill is representative of the groundwater in the landfill and has been shown to exhibit very little impact from the landfill waste. However, as a part of the landfill closure, the seep is treated by a passive treatment system designed to meet existing surface water standards. Since these standards are designed to consider and be protective of human health as well as agriculture, fish and aquatic life, damage to wildlife, crops, vegetation, or physical structures will be prevented.*

*The design of the landfill cover also controls the surface water runoff and runoff with channels that surround the landfill. Surface water from the landfill cover is directed into the perimeter channels and potential surface water runoff is captured by the same perimeter channels. The perimeter channels direct this captured surface water flow away from the landfill boundary and discharges into the natural drainage system that drains the overall area of the landfill.*

2.4.6 The function and physical integrity of any liner emplaced in hazardous waste disposal sites to accomplish the design performance of the site shall be protected.

**N/A: The Present Landfill does not have a liner.**

2.4.7 Any leachate and runoff control system shall be designed with sufficient capacity such that the design performance will comply with paragraphs 2.4.1, 2.4.2, 2.4.3, 2.4.4 and 2.4.5 of these regulations, considering:

- a) The volume and types of leachate or contaminated runoff produced at the facility;
- b) The climatic and hydrogeological conditions of the area; and
- c) The available alternatives for managing any leachate or contaminated runoff produced.

*These requirements have been met by submitting an Interim Measures/Interim Remedial Action decision document and/or by various design documents, which have been previously approved by CDPHE. See, especially, design documents related to the seep treatment system and the cover as it pertains to runoff controls.*

*The perimeter channels that manage runoff and runoff at the landfill have been designed to handle the 100 year- 24 hour storm event. The seep treatment system is design to passively treat a flow of up to 10 gpm. The current flow of the seep is 0.34 gpm, and has historically averaged about 3.0 gpm before the landfill cover was installed.*

2.4.8 The design of a hazardous waste disposal site and facility shall include a method for closure that will provide reasonable assurance of long-term compliance with paragraphs 2.4.1, 2.4.2, 2.4.4, 2.4.5, and 2.4.7 of these regulations, considering:

- a) The types and amounts of waste in the facility, including the amount of free liquids;
- b) The mobility and expected rates of migration of emplaced wastes;
- c) The site location, topography, and surrounding land use;
- d) Climatic conditions in the area;
- e) The thickness, porosity and permeability of the cover proposed to be used, the slope and length of run of the slope, the final surface contours of the completed cover, and the types and durability of vegetation proposed to be placed on the cover;
- f) Geological and soil profiles and the surface and subsurface hydrology of the site; and
- g) The maintenance of any post-closure groundwater monitoring system and any leachate and runoff control system.

*These requirements have been met by submitting an Interim Measures/Interim Remedial Action decision document and/or by various design documents, which have been previously approved by CDPHE.*

*In addition, the landfill has been covered with a permanent multi-layer RCRA Subtitle C-compliant cap to prevent contact with the waste and to reduce the infiltration of stormwater into the waste. The landfill seep at the eastern toe of the landfill is representative of the groundwater in the landfill and has been shown to exhibit very little impact from the landfill waste. However, as a part of the landfill closure, the seep is treated by a passive treatment system designed to meet existing surface water standards. The seep treatment system discharge will be monitored in accordance with the approved IM/IRA. Groundwater monitoring will be*

accomplished by monitoring three upgradient and three downgradient groundwater monitoring wells according to the IM/IRA and the IMP.

The design of the landfill cover also controls the surface water runoff and runoff with channels that surround the landfill. Surface water from the landfill cover is directed into the perimeter channels and potential surface water runoff is captured by the same perimeter channels. The perimeter channels direct this captured surface water flow away from the landfill boundary and discharges into the natural drainage system that drains the overall area of the landfill.

2.4.9 The design of a hazardous waste landfill, surface impoundment, or land treatment facility shall include systems for monitoring ground water, surface water, and providing quality control of materials in construction. Such systems shall be sufficient to demonstrate via professionally accepted methods (e.g., those of the American Society of Testing Materials) that the design performance requirements of these regulations are satisfied.

These requirements have been met by submitting an Interim Measures/Interim Remedial Action decision document and/or by various design documents, which have been previously approved by CDPHE. See, especially, design documents related to the seep treatment system and descriptions of surface water and ground water monitoring found in the IM/IRA and the IMP.

The design of the landfill cover, as previously described, was prepared by a licensed professional engineer. The design included a construction quality control/quality assurance plan. The quality control during construction was provided by a certified laboratory and trained personnel. The quality control during construction was provided by a third party independent firm. The construction certification report has been prepared by the independent quality control firm for review and approval by the CDPHE.

Groundwater monitoring will be accomplished by monitoring three upgradient and three downgradient groundwater monitoring wells. The seep treatment system discharge will also be monitored. Monitoring will be in accordance with the approved IM/IRA.

2.4.10 The design of a hazardous waste disposal landfill, surface impoundment, or land treatment facility shall include procedures to be followed during construction, including supervision and certification by a professional geologist or professional engineer, to demonstrate that the facility is constructed in accordance with the design as approved.

Pursuant to the IM/IRA, the landfill cover was certified by a Professional Engineer when construction was complete.

The design of the landfill cover, as previously described, was prepared by a licensed professional engineer. The design included a construction quality control/quality assurance plan. The quality control during construction was provided by a certified laboratory and trained personnel. The quality control during construction was provided by a third party

**independent firm. The construction certification report has been prepared by the independent quality control firm for review and approval by the CDPHE.**

**2.5 Requirements for Siting and Design of Off-Site Hazardous Waste Disposal Sites and On-Site Hazardous Waste Landfills.**

**2.5.1 The siting and design of each site for disposal of hazardous waste shall demonstrate that the minimum design performance criteria contained in Section 2.4 of these regulations will be satisfied after site construction and implementation of the proposed design.**

**Please refer to the responses provided in section 2.4.**

**█ The proposed design, and design performance of a hazardous waste disposal site shall satisfy or satisfactorily mitigate the following conditions:**

- █ Under normal climatic conditions odor-threshold concentration levels established in State air pollution regulations will not be exceeded;**
- █ Proposed access routes shall be reasonably safe based on minimizing public exposure to transportation incidents, and a finding that such routes can be shown to meet or exceed classification standards for State roads;**
- █ Adequate fire protection is provided on a 24-hour day basis by an organized fire department or equivalent such service is provided by the owner/operator of the site;**
- █ Adequate security to provided for the site and its operations on a 24-hour daily basis by security personnel and/or adequate security barriers to the site and its operations;**
- █ The proper materials will be available in adequate supply for constructing liners of disposal cells and for providing a compacted impermeable cover to prevent any seepage into the completed fill upon closure; and**
- █ Adequate professional competence and resources exist to design and construct the site, to operate the site for its approved period of operation, and to provide for closure and post-closure care to guarantee long-term protection of public health and the environment.**

**No response required because these requirements apply to operating disposal sites.**

**2.5.3 The geological and hydrological conditions of a site in which hazardous wastes are to be disposed shall be such that reasonable assurance is provided that such wastes are isolated within the designated disposal area of the site and away from natural environmental pathways that could expose the public for 1,000 years, or some demonstrated shorter period in which the wastes are transformed to an innocuous condition. Such assurance is to be based on the following considerations:**

- a) Geomorphic conditions either will not vary significantly from the present state or will occur to a predictable degree, which can be accommodated in the facility design;
- b) The immediate area of the site is in strata of minimal groundwater flow;
- c) The geologic strata surrounding the site combined with engineered barriers included in the design shall provide a minimum permeability of 10<sup>-7</sup> cm/sec or equivalent of sufficient thickness between the disposal location and the nearest domestically or agriculturally useable aquifer to isolate any materials to be disposed therein;
- d) The juxtaposition of the site and any free flowing or standing natural surface waters shall be such that disposal locations will not impact nor be impacted by such surface waters;
- e) The terrain is such that good drainage exists for movement of precipitation away from the disposal area, and such that water and wind erosion will be minimal; and
- f) The geochemical characteristics of the geologic strata at the site are compatible with the waste categories proposed to be disposed at the site especially in terms of providing high adsorption, absorption, or chemical fixation of any wastes that may migrate from the immediate areas where disposed.

*These requirements are specific to locating and siting new disposal sites. The Present Landfill is an existing facility that began operations in 1968 and ceased accepting waste in 1995. Descriptions of the geologic and hydrologic conditions at the Present Landfill are found in the IM/IRA, in both the body of the document and in Appendices C and D, which has been approved by CDPHE.*

*The waste material consists primarily of solid waste and construction debris, and no hazardous constituents were placed in the landfill after 1986. As described in the IM/IRA, potential exposure pathways to the waste located in the Present Landfill are direct contact with the waste and exposure to the leachate. The cover and institutional controls will prevent direct contact. The term "innocuous" is not defined in the regulations or anywhere in RCRA. However, the term is defined in the American Heritage Dictionary as "having no adverse effect; harmless." Constituents in the leachate, even before entering the treatment system, are at or below surface water standards and, therefore, should be considered to be "innocuous." Please refer to section 2.6.4 and Appendix D of the IM/IRA for further discussion of the evaluation of water quality.*

*The design of the landfill cover, as previously described, was prepared by a licensed professional engineer. The design included a construction quality control/quality assurance plan. The quality control during construction was provided by a certified laboratory and trained personnel. The quality control during construction was provided by a third-party independent firm. The construction certification report has been prepared by the independent quality control firm for review and approval by the CDPHE.*

*In addition, the design included calculations of slope stability in both static and seismic conditions. The design in meets the required factors of safety in both of these conditions.*

██████ The design of a hazardous waste disposal site shall, unless it is demonstrated to be unnecessary, include a liner the performance of which will comply with paragraphs 2.4.1, 2.4.2, 2.4.3, and 2.4.5 of these regulations, considering:

- ██████ The physical and chemical characteristics of the waste in the facility, including any treatment of wastes to promote the immobilization of hazardous substances;
- ██████ The pressure head of leachate on the liner under worst case conditions;
- ██████ The permeability of the liner material at specified compaction density and moisture content where earthen materials are used;
- ██████ The potential chemical reactions between the wastes and the liner material that could affect the integrity of the liner;
- ██████ The physical and chemical properties of the soil underlying the facility that supports any emplaced liner; and
- ██████ The potential for damage to the liner system that could occur during installation or planned use.

*No response required; the Present Landfill does not have a liner.*

2.5.5 The design of each hazardous waste disposal site shall include a leachate and runoff control system which will provide compliance with Section 2.4 of these regulations, considering:

- a) The physical and chemical characteristics of the waste in the facility;
- b) Climatic conditions in the area, including precipitation events;
- c) The volume of leachate or contaminated runoff that could be produced at the facility; and
- d) The available options for managing any leachate or contaminated runoff that is collected at the facility.

*These requirements have been met by submitting an Interim Measures/Interim Remedial Action decision document and/or by various design documents, which have been previously approved by CDPHE. See, especially, design documents related to the seep treatment system and the cover as it pertains to runoff controls.*

*See responses included in Section 2.4.*

██████ The location of any facility for disposal or preparation for disposal of hazardous wastes shall be within a distance controlled by the owner/operator by an acceptable means to prevent adverse effects on the public health should unexpected discharges of hazardous waste occur.

*No response required; this requirement relates to location and siting and the Present Landfill is an existing facility that began operations in 1968.*