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Record of Decision and Final Environmental Assessment for the Proposed Clay Butte Disposal Landfill

September 15, 2015

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Record of Decision

1. Background

1.1. Introduction

Clay Butte Environmental, LLC, (CBE) submitted an application to the Department of Environmental Quality (DEQ) for licensure of a Class II landfill to manage oilfield exploration and production wastes. The site is known as the Clay Butte Disposal Landfill. The application underwent deficiency reviews and revisions prior to DEQ determining that the application was complete and complied with the substantive requirements of the Solid Waste Management Act (SWMA). DEQ published a Draft Environmental Assessment (EA) on May 26, 2015.

1.2. Project Area Description

The proposed landfill is located in the southeast quarter of Section 25, Township 29 North, Range 55 East, Montana Principal Meridian, Roosevelt County, Montana (Figure 1.1). At the present time, the property is used intermittently for agriculture. The proposed landfill would be developed in fifteen separate phases with a total waste disposal capacity of 9,644,748 cubic yards (yds^3) over an expected 31-year life.

1.3. DEQ's Responsibilities and Purpose of the Record of Decision

The purpose of this record of decision (ROD) document is to set forth DEQ's decision on CBE's application for a license and reason for the decision. The ROD documents the alternatives considered, including a discussion of the advantages and disadvantages of the alternatives and DEQ's application of the decision criteria set forth in the SWMA.

DEQ administers the SWMA, Title 75, Chapter 10, Part 2, Montana Code Annotated (MCA) and its associated administrative rules. The Montana Environmental Policy Act (MEPA) requires an environmental review of actions taken by State agencies that may significantly affect the quality of the human environment. The environmental review, culminating in the issuance of the Final EA on September 11, 2015, was conducted to fulfill MEPA.

2. Public Involvement

2.1. Public Involvement

DEQ published the Draft EA on May 26, 2015, beginning a 30 day public comment period. On June 11, 2015, DEQ conducted a public meeting to inform the public of the proposed action and to seek public participation in the decision-making process. The meeting was held in the Culbertson Community Center and was attended by at least 57 people. DEQ received written comments from the public. The comment period on the Draft EA closed on June 25, 2015. DEQ responded to the comments in the Final EA issued on September 11, 2015.

2.2 Issues of Concern

The major issues identified include:

- Facility Location
- Public Notification and the MEPA Process
- Site Access and Transportation
- Surface Water and Ground Water Quality

3. **Alternatives Considered**

Alternatives evaluated in the EA include the No Action and the Proposed Action Alternative.

3.1. **No Action**

Under the No Action Alternative, DEQ would deny the new landfill application and the facility would not be developed if the application failed to meet the minimum requirements of the SWMA and could not continue to be processed as submitted. If denied, the site would not be developed and the impacts identified in the Final EA would not occur.

3.2. **Proposed Action**

The Proposed Action Alternative would allow construction and operation of the Clay Butte Disposal Landfill facility. The 143.2 acre site would be removed from agricultural crop production and would be developed to accommodate the landfill and other site structures necessary for operation and maintenance of the solid waste management facility.

4. **Decision and Rationale for Decision**

DEQ may deny an application for licensure of a solid waste management system if it fails to meet the requirements of the Solid Waste Management Act. DEQ may not withhold, deny, or impose conditions on any permit based on the provision of MEPA. However, MEPA allows a permit applicant and DEQ to mutually develop measures that may be incorporated into a license.

Pursuant to Section 75-10-221, MCA and the Administrative Rules of Montana (ARM) 17.50.513, DEQ determined CBE's application was complete and complied with the requirements of the SWMA. DEQ has selected the Proposed Action Alternative, authorizing CBE to construct and operate the Clay Butte Disposal Landfill.

CBE will be required to obtain the necessary approvals from the Montana Department of Transportation for any work completed in the highway right-of-way necessary to develop the site access point. CBE will be required to obtain, from DEQ Water Protection Bureau, a storm water construction permit prior to the commencement of site construction activities, and a storm water discharge permit once the site is constructed.

5. **Findings Required by Laws and Policies**

5.1. **Montana Environmental Policy Act (MEPA)**

MEPA requires State agencies to conduct an environmental review when making decision or planning activities that may have a significant impact on the environment. MEPA and the administrative rules promulgated under MEPA define the process to be followed when conducting an environmental review. The Draft and Final EA that DEQ prepared in regard to CBE's application for landfill licensure complies with the procedural requirements of MEPA.

5.2. **Solid Waste Management Act (SWMA)**

The Solid Waste Management Act recognizes that the health and welfare of Montana citizens is endangered by improperly operated solid waste management systems and by the improper and unregulated disposal of wastes. The SWMA and associated Administrative Rules control solid waste management systems to protect the public health and safety and to conserve natural resources whenever possible (Section 75-10-202, MCA). The basic objective of the Clay Butte Landfill facility licensure is to establish a solid waste management system that controls, on a continuing basis, the on-site treatment and disposal of solid wastes, the operation and maintenance of facility monitoring structures, and the final vegetative cover subsequent to any final use of the area.

The site will be constructed according to the approved facility design plan. All facility monitoring features will be in place prior to the placement of wastes in the landfill unit. Facility operations will be conducted according to the approved facility Operation and Maintenance (O&M) Plan. Groundwater monitoring will be performed twice per year during the operational life of the facility and during the 30-year post-closure care period. The facility will maintain a DEQ-approved financial assurance mechanism, funded prior to the placement of wastes, to cover the costs associated with facility closure and post-closure care.CBE will not depart from the approved facility design, O&M Plan, or Closure/Post-Closure Plan without previously obtaining from DEQ written approval for the proposed change.

6. **Appeal of DEQ's Decision**

This decision is subject to validation by the local health officer. According to Section 75-10-222, MCA, the license issued by DEQ under this section is not valid until signed by the local health officer having jurisdiction in the county in which the solid waste management system will be operated. The local health officer may refuse to validate a license issued only upon a finding that the requirements of the SWMS and associated administrative rules cannot be satisfied, Section 75-10-223, MCA. The applicant or any person aggrieved by the decision of the local health officer not to validate a license may appeal the decision to the Board of Environmental Review within 30 days after receiving written notice of the local health officer's decision. The hearing before the board must be held pursuant to the contested case provisions of the Montana Administrative Procedure Act.

FINAL ENVIRONMENTAL ASSESSMENT

Solid Waste Section Roles and Responsibilities -The Department of Environmental Quality's (DEQ) Solid Waste Section (SWS) is responsible for ensuring activities proposed under the Solid Waste Management Act, the Integrated Waste Management Act, the Septage Disposal Licensure Act, and the Motor Vehicle Disposal & Recycling Act are in compliance with current regulations. The SWS is a part of DEQ's Permitting and Compliance Division, Waste and Underground Tank Management Bureau. The Solid Waste Management Act (75-10-201, MCA) and the Administrative Rules of Montana (ARM), Title 17, Chapter 50 provide the necessary authority for the SWS to license and regulate solid waste management systems (SWMS) in the state of Montana.

1. Project Description

Mr. Steve Burns (applicant) doing business as Clay Butte Environmental, LLC, submitted a SWMS license application to DEQ's SWS for the licensure of a Class II landfill to manage oilfield exploration and production wastes. The proposed landfill is located in the southeast quarter of Section 25, Township 29 North, Range 55 East, Montana Principal Meridian, Roosevelt County, Montana (Figure 1.1). At the present time, the property is used intermittently for agriculture. The proposed landfill would be developed in fifteen separate phases with a total waste disposal capacity of 9,644,748 cubic yards (yds^3) over an expected 31-year life.

1.1. Purpose of the Environmental Assessment

In accordance with 75-1-102, MCA, the purpose of the Montana Environmental Policy Act (MEPA) is "to ensure that environmental attributes are fully considered by the legislature in enacting laws to fulfill constitutional obligations; and the public is informed of the anticipated impacts in Montana of potential state actions." An Environmental Assessment (EA) does not result in a certain decision, but rather serves to identify the potential effect of a state action within the confines of existing laws and rules governing such proposed activities so that agencies make balanced decisions. MEPA does not provide regulatory authority beyond the authority explicitly provided in existing statute.

The Solid Waste Management Act and associated administrative rules establish the minimum requirements for the design and operation of SWMSs. The EA is the mechanism that DEQ uses to: 1) Disclose whether a proposed site meets the minimum requirements for compliance with the current laws and rules; 2) Assist the public in understanding the state SWMS regulations as they pertain to licensing solid waste facilities; 3) Identify and discuss the potential environmental effects of the proposed site if it is approved and becomes operational; 4) Discuss actions taken by the applicant and the enforceable measures and conditions designed to mitigate the effects identified by DEQ during the review of the application; and 5) Seek public input to ensure DEQ has identified the substantive environmental impacts associated with the proposed landfill.

1.2. Benefits and Purpose of the Proposal

The safe licensed disposal of oilfield exploration and production (E&P) wastes provides the best option for avoiding the illegal disposal of such wastes in coulees, or other out-of-sight or remote areas. Onsite burial of E&P wastes at drilling locations has been a widely practiced and previously accepted method of disposal in past decades but is increasingly scrutinized by landowners and is viewed as a high liability disposal option by generators. At the present time, there are only four landfills in Montana that are approved to accept specific oilfield E&P wastes; two of which are municipal solid waste disposal facilities (one in southeastern Montana, the other in north central Montana); the other two are stand alone E&P waste disposal facilities in northeast and east central Montana. Licensure of this facility would provide oilfield exploration and service companies in the region an additional option for waste management in northeastern Montana. Licensure would also result in the creation of at least two additional full-time jobs in the area. During the construction phase for each cell, several temporary jobs would be created.

The main objective of the proposal is to provide an environmentally sound and legal option for the disposal of oilfield solid wastes to the oil and gas exploration and production companies in the area. Oil and gas E&P solid wastes would be hauled to the facility by the drilling company operators, oilfield service companies, and licensed haulers. The proposed facility would be a privately owned and operated landfill that would not be open to the public. By so doing, the potential rapid reduction in the capacity at publicly owned landfills in the region can also be averted.

1.3. Site Location

The proposed landfill is located off Montana Highway 16, approximately five miles north of Culbertson, Montana, on private property owned by Clay Butte Environmental, LLC. The landfill site is located in the southeast quarter of Section 25, Township 29 North, Range 55 East, Montana Principal Meridian, Roosevelt County, Montana (Figure 1.1). Of the 143.2 acres proposed for the solid waste management facility, only 76.5 acres would be used for active landfilling activities (Figure 1.2).

1.4. Site Geography – Topography, Vegetation, and Climate

The proposed landfill site is located in the Missouri Plateau Level IV ecoregion of the Northwestern Great Plains. The western and southwestern ecoregion boundary roughly coincides with the limits of continental glaciation. The area is characterized as mostly treeless with rolling hills and till or gravel covered benches that were modified by continental glaciation. Glacial till overlies sedimentary bedrock beneath the proposed site. Some areas in the region are subject to wind erosion, especially those areas that have been overgrazed.

The native vegetation is a mixed grass prairie consisting primarily of grama, needlegrass, and wheatgrass. Land use in the area is a mosaic of rangeland and farmland. Agriculture is found on the undissected gravel benches and in the alluvial soils of the area river valleys. Spring wheat, oats, hay, and barley are common crops in the area.

The climate is typical of mid-continental regions, with long severe winters and hot summers. The climate of the local area is summarized in Table 1.1 with the average total precipitation at 13.5 inches annually, with most of the precipitation occurring during the late spring and early summer months. The growing season averages 125 days.

1.5. Landfill Design, Construction, Closure, and Post-Closure Care

The design features and layout of the proposed Clay Butte Disposal Landfill are depicted in Figure 1.2. The proposed facility consists of several components that include the scale, maintenance building, facility access road, interior roads, disposal units, groundwater monitoring wells, leachate collection and leachate removal system, leachate pond, stabilization pit, and storm water control features.

1.5.1. Liner Design

According to Administrative Rules of Montana (ARM) 17.50.1204, a new Class II landfill unit must be designed to ensure that the concentration values of constituents identified in Table 1 of the rule are not exceeded at the relevant point of compliance; or, consists of the standard composite liner comprised of two components. The upper component must consist of a minimum 30-mil flexible membrane liner (FML), and the lower component must consist of at least a two-foot layer of compacted soil with a hydraulic conductivity of no more than 1×10^{-7} centimeters per second (cm/sec). For an FML component that consists of high density polyethylene (HDPE), the HDPE must be at least 60-mil thick and must be installed in direct and uniform contact with the compacted soil component. The applicant proposed the standard liner (Figure 1.3) as follows: the upper FML component would be a minimum 60-mil thick, HDPE liner that would be installed in direct and uniform contact with the lower component of compacted soil. The lower soil component would consist of a two-foot layer of compacted on-site soil with a saturated hydraulic conductivity (Ks) of no more than 1×10^{-7} cm/sec.

Hydraulic conductivity is a measure of the speed (rate or velocity) at which liquids flow through a material and depends upon how well the pores in the material are connected to transmit fluid. The 1×10^{-7} cm/sec hydraulic conductivity of the two-foot layer of compacted soil means that any liquids passing through the clay once saturated would pass through at a rate of 0.0000001 cm/sec (1.24157 inches per year).

HDPE is a very low permeability, flexible, synthetic membrane (geomembrane) that is often used to contain or control liquid and gas migration in an engineered project, structure, or system. HDPE pipe is commonly used to convey water or wastewater for municipal systems. For landfill construction, HDPE geomembrane liners are used as highly impermeable barriers to prevent the contamination of soil and groundwater from chemicals in the liquids that may be derived from the waste. A detailed liner performance demonstration is not required with the application for the proposed Clay Butte Landfill facility because the standard composite liner is proposed.

1.5.2. Landfill Unit Construction

The proposed liner system described above would be installed during landfill construction according to DEQ's approval and the manufacturer's guidelines for each component. Each component of the liner system would be tested for conformance with the design based on the DEQ-approved Construction Quality Assurance and Construction Quality Control (CQA/CQC) Plan.

The 76.5-acre landfill is comprised of fifteen cells (Figure 1.4); each cell within the landfill unit would be constructed in phases. Construction would progress from south to north within the 76.5-acre disposal footprint. As depicted in Figure 1.4, the base grade in each cell would be built in a herringbone pattern with a two-percent minimum slope towards each of the lateral leachate collection pipes that are centered within each cell. The liner perimeter side slopes would be constructed with 3:1 (Horizontal:Vertical) slopes. The average waste fill depth would be 115-feet. Maximum utilization of the designed landfill capacity would provide for the disposal of 8,901,502 yds^3 of waste when the daily and final cover soil volume is subtracted from the total fill volume (Table 1.2).

Excavation of the native soils to a maximum depth of 22-ft beneath the landfill footprint would result in the total removal of 1,191,122 yds^3 of soil that would be used to either construct the compacted soil component of the landfill or stormwater and leachate pond liners. During construction, the compacted soil layer component of the liner would be built up in six-inch lifts. Each lift would be wetted, compacted, and tested to ensure that it meets the compaction specifications before another six-inch lift is installed; the complete compacted surface of the two-foot thick soil barrier layer would be rolled and inspected for adequate smoothness before the HDPE geomembrane liner is installed. The HDPE geomembrane liner would then be placed in direct and uniform contact with the compacted soil layer with a three to six inch overlap on each side that would be heat fusion welded along each edge.

1.5.3. Leachate Collection, Leachate Removal, and Leachate Pond

A leachate collection and leachate removal system (LCRS) would be installed according to all DEQ approved project design plans and CQA/CQC requirements. The LCRS elements placed in the central swale of each cell would consist of the following components from top to bottom (Figure 1.5):

- 12-inch Leachate collection sand layer
- 12-inch Outer fine drainage aggregate filter
- 3-inch Inner coarse drainage aggregate filter
- 6-inch Perforated leachate collection pipe
- 16-oz Non-woven geotextile cushion

All leachate would be collected over the lined base of the entire landfill within the granular drainage layer and flow into a network of six-inch perforated HDPE leachate collection pipes that are bedded in gravel. Each pipe swale would be floored by a 16-oz nonwoven geotextile cushion in contact with double-textured HDPE geomembrane panels extending along the pipe axes. All of the lateral collection pipes slope to join six-inch perforated HDPE leachate headers that then convey leachate toward and into the leachate sump (Figures 1.4 and 1.6); the leachate sump drops at least four feet below the liner elevation at the northeastern edge of Cell 1. The drainage layer would provide a minimum hydraulic conductivity of $1x10^{-3}$ cm/sec. Each lateral collection pipe and header pipe would be joined to a solid riser pipe that is extended to the surface on the uphill side-slope berms to allow for cleanout access. The leachate sump removal system (Figures 1.6 and 1.7) consists of a dual, 18-inch, open-ended HDPE pipe manifold bedded in coarse aggregate surrounding a six-foot concrete manhole that rises vertically from the sump to exit at the surface of the final cover. The two opposing manifold collector pipes would penetrate the manhole within the sump to join and connect with an interior 18-inch solid HDPE riser pipe.

At the eastern perimeter of Cell 1, the sump riser pipe would be installed to exit the manhole and bent to lay upon the slope liner, extending upward to the lip of the east surface berm and entering a pump house. In the pump house, a submersible pump would access the pipe to remove leachate from the sump as necessary to comply with the maximum one-foot leachate depth allowed over the liner. All leachate pipe risers would be entirely covered by at least 12 inches of granular drainage material. The sump manhole also provides a backup system for access to the leachate sump if the leachate monitoring or pump systems installed in the side-slope riser develop problems or fail to work as designed.

The leachate that is removed from the sump via the pump house system would be conveyed by gravity to the leachate pond through a three-inch HDPE forcemain pipe that is sleeved by an outer six-inch HDPE carrier pipe. The carrier pipe would enter a manhole at the edge of the pond where potential leakage would be monitored, and the inner forcemain pipe would then exit the manhole to discharge into the leachate pond. Leachate would be managed in the leachate pond largely by evaporation, but may be applied over the lined active waste disposal areas (areas not under final or intermediate cover) for dust control if needed. This allows the pond to be emptied faster to assure that there is sufficient volume available at all times.

The leachate pond would be constructed with composite liner components from top to bottom as follows:

- 60-mil double-textured Linear Low-Density Polyethylene (LLDPE) liner
- Two-foot thick Compacted Clay Liner (CCL)

The flat bottom and maximum 3:1 (H:V) side slope composite liners for the leachate pond would be installed in a manner equivalent to the landfill base liner according to all DEQ approved project design plans and CQA/CQC requirements.

The 3.8-acre, 10-foot deep leachate pond is designed to store up to 8.864 million gallons (1.185 million cubic feet) of leachate pumped from the landfill, leaving two feet of freeboard (2.395 million gallon reserve). The leachate evaporation pond is sized for multiple extreme events, based on historic annual precipitation averages and maximums. If it becomes necessary, leachate may be recirculated back to the landfill unit and applied over the composite liner. The leachate pond has no outlet and leachate may not be released from the leachate pond or landfill.

During the first year of operation of the landfill, the leachate sump would be monitored for liquids at least quarterly. Any liquids collected in the sump would be sampled and analyzed for the following list of constituents:

- Dissolved RCRA Metals, including:
    - ❖ Arsenic, Cadmium, Chromium, Lead, Mercury, Selenium, Silver
- Benzene, Toluene, Ethylbenzene, and Xylene
- Extractable Petroleum Hydrocarbons
- Radionuclides, including:
    - ❖ Radium-226, Radium-228, Pb-210, U-238, Th-232

Leachate sump monitoring results would be submitted to DEQ on a quarterly basis.

1.5.4. Stabilization Building and Pit

A stabilization pit located inside a building would be used to process wastes that require additional solidification before disposal (Figure 1.7). The stabilization building includes an unloading pad and a mixing pit. The pit would include a system to mix the wastes with a drying agent such as fly ash, soil, scoria, cement, and/or other approved material. The unloading pad would be sloped towards the stabilization pit and consist of an eight-inch thick reinforced concrete slab 60 feet long by 20 feet wide bounded by a 12-inch mountable containment curb. The mixing pit would be constructed of eight-inch thick reinforced concrete floor and walls that would all be underlain by a secondary 60-mil HDPE geomembrane liner with a leak collection system (Figure 1.8). The leakage collection system would consist of a one-foot thick granular drainage layer and perforated drain tile with filter sock that discharges to a geomembrane sump at the southeast corner of the pit auger area. The pit would be 55-feet long and 16-feet wide at either end. The floor of the pit would slope upward from the center, with a maximum depth of eight feet below the building floor elevation at the central mixing trough. The bottom of the central mixing trough would be three feet wide by 16 feet long and contain a mixing auger (Figure 1.9). The pit base drops six feet from the base of the vertical end and side walls to the central trough along the rear margin opposite the dump access gate. The pit wall at the trough would be 11-ft tall and the other three walls would be five feet tall from top to bottom along the flat outer edge of the sloping base, to prevent splashing out of the lined area. In addition a four-foot tall splash wall would be installed along the top of the rear and side pit walls. The stabilization pit would be surrounded by safety railings and a central gate (Figure 1.10). The gate would only be open when materials are added to or removed from the pit. The railings would only be removed when needed for maintenance.

The perforated four-inch PVC leak collection pipe would transition to a solid riser pipe accessed at ground level and would serve as a leak detection monitoring system for the primary concrete liner and as an access point for pumping accumulated liquid from the secondary FML. The secondary FML lysimeter would be attached to the outside of the concrete liner along all sides of the stabilization pit above floor level. Tanks for storage of decanted liquids would also be installed above ground in the processing area of the building.

1.5.5. Scale and Office Building

As shown in Figure 1.2, the scale and office/maintenance building would be located on the northeast side of the site between the scale and maintenance building

1.5.6. Soil Stockpiles

The additional soils removed during excavation of each landfill unit would be stockpiled along the western perimeter, between the storm water ponds at the southern perimeter, and in the area of the subsequent unit and would be used as-needed for soil cover. Other best management practices (BMP's), or features that may include erosion control mats, screens, wattles, or berms, would be used to control erosion from these stockpiles as needed. All runoff from soil stockpiles would be routed to the storm water pond, but BMP's (e.g. revegetation) may allow clean runoff from these areas to also be routed off site.

1.5.7. Groundwater Monitoring Wells

The facility would perform groundwater monitoring on a semi-annual basis and would collect groundwater samples from a total of eight wells; four existing piezometers that would be converted to monitoring wells and four new wells that would be installed when the site is developed. The monitoring network would be completed with two-inch inner PVC pipe and screened to monitor potential releases from the landfill and leachate pond.

1.5.8. Final Closure

The final cover would be constructed in phases over the 31-yr landfill life with each cell closed as it reaches final grade in a progression that follows the sequence of cell construction (Tables 1.2 and 1.3). After all of the fifteen phased landfill cells have been filled to final grade, the final cover over the waste units would be tied together into a single continuous final cover (Figure 1.11). The maximum open area at any one point in time would be 20 acres. The overall barrier performance characteristics of the composite final cover must at least match those of the base composite liner system.

The proposed final cover design includes the following components from top to bottom:

- Six-inch topsoil growth layer
- 18-inch loamy frost protection layer
- Two-sided geocomposite drainage net
- 60-mil HDPE double-textured geomembrane (FML)
- Needle-punched geosynthetic clay liner (GCL) composite
- Six-inch soil cushion layer

The overall performance of the proposed lower GCL component of the final cover would exceed that of a compacted clay liner when utilized for landfill closure in locations where frost exposure and waste settlement have significant impacts on the cap stability. Consequently because it also includes the same upper FML component as in the base liner, an alternative liner demonstration is not required for the final cover. The GCL is also more easily repaired if necessary during post closure care.

During the phased closure of each landfill cell, the existing intermediate soil cover surface would be smoothed prior to installation of the final cap. The final cap would be constructed similarly to the base liner system. The upper HDPE geomembrane would be installed in direct and uniform contact with the lower GCL component of the cap to form a composite barrier. The landfill final cover would be installed according to the manufacturer's guidelines for each geosynthetic component, with all elements tested for conformance with the DEQ approved Closure Plan specifications and CQA/CQC requirements.

Based on the Closure Plan, the landfill final elevation would not exceed 175 feet above the surrounding grade. The composite final cover contours would attain maximum side slopes not to exceed a 5:1 (20%) grade. Side slope berms (four feet deep) for storm water control would be constructed to intercept runoff at 170-feet lateral intervals and route flow at 33 percent into riprap catch basins where runoff is captured by the downdrain network inlets. The downdrain system would consist of variously sized drop pipes exiting to 48-in manholes for dissipating energy before discharging flow through 24-in corrugated metal pipes to perimeter ditches. The perimeter ditches would route runoff from the facility to three sedimentation ponds (one north and two south of the footprint) and would carry the maximum 25-yr 24-hr storm flow at only 1% slope to better control erosion. The pond inlets and outlets would be constructed with riprap plunge pools thereby further minimizing erosion impacts.

The final cover topsoil would be fertilized and seeded with native grass species recommended by the United States Department of Agriculture's Natural Resources Conservation Service. Construction quality assurance and quality control would again be monitored during final cover construction according to all DEQ approved project plans.

1.5.9. Post-Closure Care

The Post-Closure Care Plan identifies the inspection, maintenance, and monitoring activities to be completed during the 30-year post-closure care period, and identifies the frequency for conducting these activities.

According to the Post-Closure Plan, detailed inspections of the closed landfill facility would be conducted quarterly during the post-closure care period and would include:

- Evaluation of the final cover for settlement, erosion and quality of vegetation;
- Inspection of leachate collection, monitoring, and evaporation systems for damage or degradation;
- Inspection of drainage control facilities (berms, ditches, catch basins, piping, manholes, outlets and ponds) for erosion, damage, blockage or accumulation of sediment;
- Condition and functionality of groundwater monitoring wells, and;
- General site conditions (gates, locks, fencing, survey monuments, etc.).

The leachate pump would be removed and inspected annually, and cleaned and repaired as necessary. The leachate collection pipes would also be cleaned annually. If damage or degradation to the final cover, drainage control facilities, monitoring systems or general site features is noted, maintenance would be completed by the owner on a timely basis. Such maintenance activities would be described in the Post-Closure Operations and Maintenance Manual, would follow manufacturers specifications as necessary, and meet all approved CQA/CQC procedures. The nature of the maintenance completed would be noted on the inspection form, which would be added to the operating record.

A report describing the inspections, conditions observed, corrective actions, maintenance activities, and monitoring activities performed in connection with the closed facility would be submitted to DEQ annually and entered into the operating record. Routine groundwater monitoring would be performed by the owner during the post-closure care period in accordance with the approved Groundwater Monitoring Plan as outlined in the DEQ-approved Sampling and Analysis Plan.

1.6. Landfill Operations

The facility would be licensed and operated as a private landfill. All facility operations must follow a DEQ-approved Operations and Maintenance (O&M) Plan. The facility must comply with applicable requirements of the Solid Waste Management Act and associated administrative rules, including the payment of fees and submittal of an annual application for renewal. Failure to operate the facility according to these requirements could result in enforcement actions, license revocation, or denial of an application for renewal.

1.6.1. Personnel

The applicant and the facility manager would be responsible for the day-to-day administration and operation of the landfill. The facility would initially be staffed by at least three full-time employees: an operations manager, a scale house attendant, and one equipment operator. Additional personnel would be added as needed. Site personnel would screen waste by inspecting incoming loads, reviewing analytical/characterization records for each waste load, track tonnages, operate landfill equipment, and apply the necessary soil cover. The landfill owner would provide regular training for these activities.

1.6.2. Operating Hours

The proposed facility would be open year round to support the disposal needs of its customers. The operating hours would be from 6:00 a.m. to 6:00 p.m. Monday through Saturday.

1.6.3. Access Control

The Clay Butte Disposal Landfill would be accessed through an existing southeast entrance that would be improved to accommodate the waste transport vehicles from Montana State Highway 16, about five miles north of Culbertson. Direct access into the facility would not occur from the McCabe Highway that is located northeast of the facility's north boundary. An improved gravel-surfaced road would be constructed from the entrance in the southeast that would parallel Highway 16. This gated entry road would lead directly to the scale and facility office/maintenance building where loads would then be directed for waste screening, stabilization, or disposal. Signs would be installed at the facility entrance to indicate the hours of operation, facility contact information, and the types of acceptable wastes. The site would be fenced and the gate would be locked when the facility is closed.

1.6.4. Acceptable Wastes

The Clay Butte Disposal Landfill would accept exempted, non-hazardous, solid waste generated by oil and gas exploration and production activities. These exempt wastes are regulated as solid waste. Non-hazardous petroleum hydrocarbon contaminated soils generated from spills, leaks, and tank removals would also be accepted. No hazardous wastes would be accepted for disposal. All incoming loads would be inspected and screened by the landfill operator according to the facility Waste Acceptance Plan. If hazardous wastes are discovered, the facility would reject the load, instruct the customer to dispose of it at an appropriate facility, and notify DEQ of the rejected load within 24-hours.

During transportation of wastes to the site, the vibration of the transport trailer on road surfaces may cause the heavy particles to settle to the bottom of the trailer and the finer particles to rise to the surface. This may result in the wastes taking on the physical appearance of mud. This finely segregated mud-like component would require additional solidification prior to disposal if such wastes contain visible liquids or fail the paint filter liquids test. Incoming wastes that may contain visible liquids or fail the paint filter liquids test would be routed to the the on-site stabilization pit for solidification with fly ash, soil, scoria, or other approved material, as needed, before being re-loaded and transported to the disposal area. The facility would maintain a stockpile of fly ash, soil, scoria, or other approved solidification material near the on-site stabilization building.

The oilfield wastes may include naturally-occurring radioactive materials (NORM) and technologically-enhanced, naturally-occurring radioactive materials (TENORM). These substances naturally contain one or more radioactive isotopes, also called radionuclides. These radionuclides occur naturally at low levels in soils and rocks. NORM is present in geologic formations from which oil and gas are produced. NORM is not nuclear waste. The material generally consists of the radionuclides uranium and thorium and their daughter products, including radium.

NORM can be concentrated by processes associated with the recovery of oil and gas. Oil and gas production processes often mobilize the NORM in formations into the produced fluids (oil, gas, and water). TENORM is material that can be concentrated in oil production wastes such as sludge, drilling mud, used water filtration sleeves, and pipe scale. TENORM radioactivity levels tend to be highest in water handling equipment.

Because NORM is usually associated with the water phase of produced fluids, as the produced water is extracted and fluid pressures and temperatures are reduced, the solubility of the NORM is changed and the radionuclides precipitate out of solution and deposit onto the walls of tubing, casing and surface processing equipment as scale. Production and processing equipment may contain elevated levels of NORM contaminated scale or sludge that can cause disposal problems when the equipment is taken off-line for maintenance, repair, or replacement.

DEQ's NORM fact sheet is included in Appendix A and provides additional information on NORM and TENORM basics. The facility is restricted to accepting and disposing of wastes containing a maximum NORM/TENORM concentration of 30 picocuries per gram (pCi/gm), and no more than 50,000 parts per million (ppm) total petroleum hydrocarbons. Adjustments to the acceptable limits for NORM/TENORM management at the facility will be made once the Montana solid waste regulations have been updated.

Hazardous wastes may not be disposed at the landfill. Presently, wastes containing NORM or TENORM activities exceeding the 30 pCi/gm concentration limit would also prohibited. The landfill operator would monitor each load of incoming wastes for radiation activity levels before disposal. If the results of radiation activity monitoring indicate that radiation levels in the waste delivered to the site exceeds 30 microrads per hour (MicroR/h), the waste load would be held in the onsite lined holding area and the waste characterization analytical report would be reviewed to determine if the 30 pCi/gm concentration limit for the NORM/TENORM waste has been exceeded. The facility operator would notify DEQ's Solid Waste Program within 24-hours when prohibited wastes are discovered at the facility or incoming loads are rejected during the on-site waste screening activities.

1.6.5. Landfill Equipment

Equipment to be used at the landfill includes:

- Dozers;
- Loaders; and
- Compactors.

1.6.6. Daily Landfill Operations

The facility would be accessed only by E&P waste generators and haulers. The facility would not be open to the general public. The landfill operator would inspect all incoming waste loads and associated waste characterization information to ensure all wastes meet the criteria for disposal. All incoming waste loads would be directed to the scale for weighing and then to a staging area for screening. In the staging area, facility personnel would conduct a load inspection to ensure there are no prohibited wastes or visible liquids, review the paperwork for completeness, and perform radiation monitoring on the load. After inspection and screening, vehicles would then be directed according to one of four possibilities: (i) rejected and sent offsite due to inadequate paperwork, excessive radiation levels, or discovery of hazardous or unapproved wastes; (ii) sent to the on-site lined holding area for further sampling or other validation based on knowledge or history; (iii) accepted and sent to the on-site stabilization area for processing to further solidify the load; or (iv) accepted for disposal in the active landfill cell. Empty vehicles would be directed back to the scale to weigh out before departing the facility. At the working face, the landfill operator would also inspect each load as it is unloaded to ensure prohibited wastes are not deposited. Any non-acceptable waste discovered by the equipment operators at the working face would be set aside and either tarped or loaded directly into on-site roll-off bins. Such wastes would then be removed from the site by a qualified consultant for proper disposal within seven days of receipt.

After liner construction, a protective layer of at least four feet of medium to fine-grained waste would be spread and compacted over the liner in two-foot lifts, outward from the entrance of each waste disposal cell. Once this protective layer has been placed, additional incoming wastes would then be stacked from this protective layer upwards and would merge laterally with wastes in adjacent units during fill operations. Intermediate cover consisting of at least eight-inches of compacted suitable cover material would be placed on any areas exposed to the elements for 120 days or longer, and upon reaching final grade. Final cover would be placed as soon as is practical on areas which have reached final grade. Waste filter socks, plastic pit liners, sorbent pads, and other blowable wastes would be disposed of in a separate area within the disposal unit. These wastes would be covered with at least six-inches of soil or drill cuttings at the end of the day when they are received.

1.6.7. Stabilization Pit Processing

The stabilization pit would be used to process incoming wastes that contain visible free liquids or those that do not pass the paint filter liquids test. Recoverable free liquids would be decanted from the solid portion of waste loads containing free liquids. Decanted liquids would be stored in a fluids tank onsite, and characterized before being disposed in the leachate pond or sent to a licensed wastewater treatment facility for disposal.

Transport trailers containing solid wastes requiring additional solidification would deposit the waste load directly into the pit. The solidifying agent(s) would then be added to the waste in the pit and mixed using the auger and a backhoe. When the waste material has been stabilized to the point that it passes the paint filter liquids test, it would be excavated from the pit, loaded back into a transport trailer, and hauled to the landfill area for disposal.

Any precipitation captured on the floor of the stabilization building would be directed to a sump, that would then be pumped as necessary into a vacuum truck and disposed in the leachate pond.

1.6.8. Waste Disposal Capacity

The proposed landfill would be developed in fifteen phases, each phase consisting of one landfill cell. The total waste landfill capacity is 9,644,748 yds^3. The design capacity of each landfill cell is provided in Table1.2. The total projected landfill life is 31 years.

1.6.9. Soils Excavation and Budget

Excavation for construction of the landfill units would progress as adjacent landfill cells are filled. Table 1.3 provides the details of the proposed soil balance for landfill construction. In total, the proposed landfill would have a total constructed liner area of 76.5 acres.

1.6.10. Severe Weather Operations

Temporary berms and ditches would be provided to divert run-off away from the working faces and from areas where vehicles would be operating. Temporary access roads to the working face would be maintained to keep them passable and minimize disruptions due to periods of wet weather. Waste hauling trucks would not enter the lined cell if surface conditions cannot support their weight or provide adequate traction. The site manager would halt facility operations if weather conditions make normal operation impossible. When a temporary site shutdown is necessary and the facility is unable to accept waste, the facility entrance gate would be closed and locked. Since the receipt of incoming wastes would be scheduled in advance, the facility would notify the waste haulers that the site is temporarily closed. The 2,000 foot long access road between the highway entrance and the scale would provide ample room to park prescheduled loads that could not be notified of a temporary site closure. Trucks would not be parked on Highway 16.

When ambient temperatures are below freezing, the placement and compaction of the waste would be performed rapidly to avoid freezing of unloaded material. During freezing weather, waste would be placed in thin layers of approximately six inches to allow for rapid compaction of the material. Snow removal at the working face of the cell would avoid waste placement on top of snow. Any snow that contacts waste would be held as leachate within the lined area. Finally, as site elevations increase due to disposal activities in the landfill units, the landfill would install snow fencing near the windward side of the facility access road and Highway 16.

1.6.11. Litter Control

A minimum of six inches of daily cover is required over empty bags, filter socks, plastic pit liners, sorbent pads, or other blowable wastes disposed at the facility. These blowable wastes would be placed in a separate area within the active disposal unit and covered at the end of the working day.

1.6.12. Leachate Control

Leachate would be captured in the leachate collection system and removed as described in the design section. The facility would maintain records of the depth, volume, and analytical results of leachate generated. The leachate sump contains a pump that would cycle on and off automatically to pump the leachate via the forcemain pipe to the leachate evaporation pond. Once operating, the leachate management system would ensure that the head on the liner would be maintained at less than 12 inches (30 centimeters), and the freeboard in the evaporation pond would be at least two feet.

Leachate would be managed in the leachate pond largely by evaporation, but may be applied over the lined active waste disposal areas (areas not under final or intermediate cover) for dust control if needed. This allows the pond to be emptied faster to assure that there is sufficient volume available at all times.

1.6.13. Storm water control

The facility would follow erosion, drainage control, and sediment Best Management Practices (BMP's) to control storm water run-on and run-off. As described in the design section, the facility includes surface water management features that are designed to prevent infiltration into the waste and direct water to storm water ponds that would contain sediment and control the rate of discharge off-site while controlling erosion.

Once constructed, these features would function without operator control, but would require inspection and maintenance.

The facility design includes berms and swales to divert and prevent storm water runoff from entering the active portion of the landfill from upgradient areas. The disposal area is surrounded by a perimeter berm that would prevent storm water runoff from contacting the waste. Each cell would also be constructed with a runoff containment berm along the sides where the perimeter berm is not yet in place. The runoff containment berm is design to keep leachate inside the cell while preventing storm water from other areas from entering the cell. As each cell is constructed, berms, ditches and other measures to prevent water from entering the cell, and to minimize erosion, would be provided. The locations of the temporary berms would be adjusted as filling progresses. Waste lifts would be sloped toward the contact-runoff containment area within each cell to minimize storm water ponding on the waste and to prevent discharge of contact-runoff out of the lined area. Storm water that contacts waste is considered leachate; all leachate would be captured by the leachate collection system.

The three storm water detention ponds (Page 3, Figure 1.2) are designed to collect and retain a total 13,066,184 gallons of water and sediments generated by runoff after a storm event. The capacity of the ponds and the capacity of the perimeter ditches are designed to carry more than the volume generated by the 25-yr 24-hr storm, up to the 100-yr 24-hr storm event. The storm water that accumulates outside the active portion of the landfill would be directed to the storm water detention pond via on-site constructed swales and ditches. Short-term erosion control (e.g., mulch, silt fence, straw bales, etc.) would be provided to prevent erosion in these control features. Culverts would be installed where necessary for road crossings or to allow for other operational functions. A General Construction Storm Water Permit would be obtained from DEQ's Water Protection Bureau prior to landfill construction activities. A Storm Water Discharge Permit would be obtained prior to a discharge from the storm water pond during the operational life of the facility.

During and after construction of cells or final cover, or upon temporary closure of waste disposal areas, slopes would be graded to drain and then seeded to provide long-term erosion control. Short-term erosion control (e.g., mulch, silt fence, straw bales, etc.) would be provided to prevent erosion of topsoil on stockpiles and covered areas until adequate vegetation has been established. All erosion control materials would be repaired or replaced as necessary based on the weekly inspections. Silt should be removed from silt fences/hay bales as needed to maintain functionality. Areas protected by riprap would be inspected after heavy storm events. Areas where damage to the riprap has occurred would be repaired as soon as possible after a damaging storm event. Catch basins and culverts must allow water to flow freely. Any material clogging or blocking the flow must be removed. Erosion damage must be repaired in a timely manner.

The BMP's, including the establishment and maintenance of vegetation on closed areas as well as on the soil stockpiles, would be implemented as necessary. Areas receiving final cover would be contoured for positive drainage so that surface runoff would be routed away from the active disposal area. Runoff from fully re-vegetated and closed areas of the landfill final cover may discharge naturally off-site.

1.6.14. Groundwater Monitoring

The facility would be required to conduct groundwater monitoring twice per year, during high and low groundwater conditions, by sampling the wells in a DEQ-approved multi-level groundwater monitoring network. The multi-level groundwater monitoring well network for the proposed landfill consists of eleven monitoring wells designated as P-4, P-6, P-10, P-11S (shallow), P-11D (deep), P-12S, P-12D, P-13, P-14S, P-14D, and P-15 (Figure 3.1). Monitoring wells P-10, P-11S, and P-11D are located hydraulically upgradient of the landfill and would provide background groundwater quality data for the site. Monitoring wells P-4, P-6, P-12S, P-12D, P-13, P-14S, P-14D, and P-15 are all located downgradient of the landfill area and would be used to monitor the downgradient groundwater quality in a general easterly direction. Monitoring wells P-12S and P-12D are located downgradient of the leachate collection sump and the two south stormwater collection ponds. Monitoring wells P-14S and P-14D are located downgradient of the leachate collection pond and north stormwater detention pond. These wells would be used to identify any changes in groundwater quality that may be attributable to the ponds.

1.6.15. Contingency Planning

The facility operator would notify DEQ's Solid Waste Program within 24-hours when prohibited wastes are discovered at the facility or incoming loads are rejected during the on-site waste screening activities. Flammable wastes are prohibited at the landfill. Emergency contacts and procedures are provided in the O&M Plan to address typical reponse actions for events such as severe rainfall, leachate spill, grass fire, explosion, leachate pump failure, or vandalism.

1.6.16. Financial Assurance

In accordance with ARM 17.50.540, all Class II landfills must provide and maintain a Financial Assurance (FA) mechanism to cover costs associated with facility closure and post-closure care. Financial assurance ensures that work associated with facility closure and post-closure care is completed in the event the operator cannot or would not do so on his own accord. Financial assurance is required for the Clay Butte Disposal Landfill.

The amount of FA required is based upon the proposed maximum costs associated with third-party closure of the maximum exposed landfill area and the performance of post-closure care activities. The current total cost for FA is $2,401,315, and includes projected closure costs of $1,619,297 and $782,018 for the 30-year post-closure care period.

The minimum annual payment required to cover the cost of closure and post-closure care of the projected largest open area of 20 acres is $187,160 per year over the first ten years. A yearly payment of $25,230 is required annually thereafter based on projected 21-yr remaining life until closure. The proposed FA mechanism is a trust fund that would be funded in the amount of $187,160 prior to placement of first waste. DEQ would be the fund beneficiary and control all release of money from the trust fund. The facility would update the FA cost estimates and make payments to the trust fund yearly to ensure that the trust fund is adequately funded.

2. Alternative Considered

The following provides a description of reasonable alternatives whenever alternatives are reasonably available and prudent to consider: A decision by DEQ is triggered when the applicant upholds the request for licensure of the proposed activity at the proposed location. The applicants however, may at any time choose to withdraw the application. This would result in DEQ selecting the "no action" alternative, because a DEQ decision would not be necessary. If the applicant withdraws the application, the applicant could seek to locate a similar facility elsewhere.

2.1. Alternative A

The No Action alternative. Under this alternative, DEQ would deny the new landfill application and the facility would not be developed if the application failed to meet the minimum requirements of the Solid Waste Management Act and could not continue to be processed as submitted. If denied, the impacts addressed in Section 3.0 would not occur. The applicant has the option to locate, investigate, and apply for licensure of another site.

2.2. Alternative B

The Proposed Action alternative. This alternative would be implemented and DEQ would approve the application and issue a new license establishing the Clay Butte Disposal Landfill facility if the application is complete and meets the minimum requirements of the Solid Waste Management Act.

3. Evaluation of Potential Effects

Tables 3.1 and 3.4 identify and evaluate the potential effects that may occur to human health and the environment if the landfill is approved. The discussion of the potential impacts only includes those resources potentially affected. If there is no effect on a resource, it may not be mentioned in the appendix.

Direct and indirect impacts are those that occur in or near the proposed project area and may extend over time. Often, the distinction between direct and indirect effects is difficult to define and for the purposes of this discussion, direct and indirect impacts are combined.

3.1. Analysis of Table 3.1 – Potential Impactas to the Physical Environment

This section evaluates the potential environmental effects that may occur on the physical environment if the proposed facility is approved. The number on each of the underlined resource headings corresponds to a resource listed in the tables. Generally, only those resources potentially affected by the proposal are discussed. Therefore, if there is no effect on a resource, it may not be discussed.

3.1.1. *1.0 - Terrestrial and Aquatic Life and Habitats*

The site for the proposed Clay Butte Disposal Landfill is located in the steppe, or shortgrass prairie, ecosystem of northeastern Montana. The steppe ecosystem consists of numerous species of mainly native short grasses that typically grow in sparsely distributed bunches. Scattered shrubs and low trees may populate the steppe, but all gradations of plant cover are also present, from semidesert (only 10-30% cover) to plains woodland, especially in drainages. Land use in the area is a mosaic of mostly farmland.

Wildlife forage and habitat nearby is largely limited to introduced grass species found in the area, with little native rangeland and indigenous grass species available except where conserved on public lands. Transient populations of grazing large game include scattered pronghorn antelope, mule deer, white-tailed deer, and elk. Wandering predators like the coyote and red fox may occasionally inhabit any surrounding drainages. Permanent residence by burrowing small mammals like hares, jackrabbits, rodents or reptiles like turtles and snakes is unlikely on the cropland. Sporadic and temporary residence by various avian species including waterfowl, crows, ravens, and opportunist raptors like eagles, merlins, falcons, and burrowing owls are more likely.

A search by the Montana Natural Heritage Program found records of one threatened animal species in Township 29 North, Range 55 East:

Species Subgroup	Scientific Name	Common Name	Family Scientific Name	Family Common Name
Birds (Aves)	Grus ame ricana	Whooping crane	Gruidae	Cranes

Sage grouse were not identified as a species of concern in Township 29 North, Range 55 East. According to the Montana Bird Distribution Committee, the migration route of the Whooping Crane includes a portion of the northeastern corner of Montana. Migration occurs during the Spring as early as April, and during the Fall as late as October. The Whooping Crane has no year-round range in Montana. During migration, the species is most likely to to be present in wetlands, but may also be found during migration in marshes, shallow lakes, lagoons, salt flats, grain and stubble fields. There are no wetlands or other permanent surface water features occuring on the proposed site. Further, recorded observations of the whooping crane have not occurred on or in the immediate vicinity of the site in the past 20+ years. Therefore, there is no anticipated impact to the migration route from construction and operation of the landfill.

The primary impact anticipated due to the construction and operation of the landfill would be the displacement of terrestrial species that may currently occupy the site. The displacement of wildlife habitat from construction of the facility may alter wildlife movement but would not be considered critical because it is not a unique or rare wildlife environment. The tract is currently dominated by wheat cropland and introduced crop species. However, the impacts from landfill construction and operation on wildlife habitat would be minor due to the abundance of surrounding similar habitats in the vicinity to accommodate any terrestrial or avian species that may be forced to relocate. Further, compliance with good operational practices and the lack of any significant putrescible wastes would eliminate scavenging gulls, crows, ravens, or birds of prey. The attraction of nuisance insects and disease vectors, such as mosquitoes and flies, would likewise be eliminated.

After landfill closure, the area would be re-seeded to native plant species typical of the surrounding grassland habitat. Terrestrial species may repopulate the area after facility closure. The final site condition may even be considered beneficial relative to disturbance related to activities associated with crop production.

There are no wetlands or permanent surface water bodies located on the proposed site. Therefore, there would be no impact to aquatic species. Following construction, lacustrine and riparian habitats may develop as a result of water in the storm water detention ponds. When that occurs, aquatic species or waterfowl might temporarily occupy the ponds. However, water in the storm water ponds would evaporate, so any species relying on water being in the pond would relocate as the pond dries up.

3.1.2. *2.0 - Water Quality, Quantity, and Distribution*

3.1.2.1. Surface Water

Surface water runoff, also known as storm water runoff, is the flow of water that occurs when the excess water generated by rainfall, snowfall, or the melting of snow flows over the land surface. This flow would occur when the soil is saturated or frozen, when precipitation falls more quickly that the soil can absorb it, or when a combination of both of these conditions exists. Storm water runoff can cause erosion and may transport sediments some distance from the source depending upon the intensity of the runoff, vegetative cover, soil characteristics, and topography.

The proposed Clay Butte Disposal Landfill facility design includes general site grading and the construction of storm water diversion ditches and berms, conveyance piping, and stormwater detention ponds to control storm water. The storm water control system maintains the existing natural drainage patterns for the site perimeter, directing storm water discharges outside the landfill to the existing natural drainage areas. The design includes the construction of three storm water sedimentation ponds which are designed to collect and retain a total 13,066,184 gallons of water and sediments generated by runoff after a storm event. The storm water management system is designed to collect and convey runoff from the final cover and site perimeter areas to storm water sedimentation ponds located on the southwest, southeast, and northwest sides of the facility. The ponds would function to contain a surge of storm water generated from an intense rainfall or snowmelt event, retain the suspended sediments that would otherwise be contained in storm water runoff that would occur naturally from such an event, and then control the release of the collected water slowly to minimize the downstream impact of storm-induced flooding. As required by the regulations, the system of ponds and berms is designed to accommodate runoff from the 25-year, 24-hour rainfall with adequate freeboard on pond inlets and berms. The system would also accommodate runoff from the 100-year, 24-hour storm event without overtopping the storm water ponds or berms. If a discharge from any of the storm water detention ponds is necessary, a General Industrial Storm Water Discharge permit would be obtained from DEQ's Water Protection Bureau. Each pond is designed with a gated outlet valve and wier to control flows out of the pond. If a discharge occurs, the discharge permit requires that the storm water be sampled for total suspended solids and iron to ensure that the waters that are released are not depositing sediment downstream.

The storm water that accumulates outside the active portion of the landfill in the northwest corner and along the west side of the waste disposal units would be directed to the storm water detention ponds via on-site constructed swales and ditches. Culverts would be installed where necessary for road crossings or to allow for other operational functions. A General Construction Storm Water Permit would be obtained from DEQ's Water Protection Bureau prior to landfill construction activities.

The facility design also includes berms and swales to divert and prevent storm water runoff from entering the active portion of the landfill from upgradient areas according to the requirements of ARM 17.50.1109. The disposal area is surrounded by a perimeter berm that would divert runoff from the waste. The storm water collected on the open liner that does not contact waste and the runoff from intermediate cover areas on interim slopes in the active disposal unit would be pumped to the storm water detention ponds. The locations of the temporary berms in the active landfill unit would be adjusted as the landfilling activities progress. Storm water that contacts waste is considered leachate; all leachate would be captured by the leachate collection system.

The proposed Clay Butte Disposal Landfill is located approximately 6.5 miles north of the Missouri River. The Missouri River is mapped on the United States Geological Survey (USGS) McCabe West 1:24,000 quadrangle map south of the facility boundary. There are several ephemeral drainages located to the north and east of the site. Surface water flow occurs in these drainages only during periods of heavy rainfall or rapid snowmelt. There are no natural springs known within the immediate vicinity of the proposed landfill facility.

Due to the small watershed of the downgradient intermittent drainage, the low precipitation the area receives, and the proposed storm water controls, impacts to surface water from the construction and operation of the facility are expected to be minor. The controlled release of storm water from the storm water detention pond would not contain the suspended sediment load that currently likely occurs during heavy precipitation or snowmelt events.

3.1.2.2. Groundwater

Throughout northeastern Montana, groundwater typically occurs along the basal contact of glacial till and the underlying Tertiary sediments. On occasion, groundwater resources are found within sand and gravel lenses as perched isolated pockets. Sandstones and coals within the Fort Union formation contain important aquifers that are utilized for drinking water supplies in the area. These aquifers are usually confined above and below by low permeability siltstones and claystones and can therefore be artesian.

A locally perched water table is present beneath the proposed facility at a depth of approximately 7 to 25 feet below ground surface (bgs). The depth of this perched water table varies due to the variablility of the surface elevation of the site; the highest elevation is found on the west side of the site at 2,235 feet above mean sea level (amsl), while on the east side the elevation is nearly 45-55 feet lower at 2,180 to 2,190 feet. The perched groundwater exhibits some semi-confined characteristics from the overlying glacial till and is confined below by clay and claystone of the Lebo Member of the Fort Union formation. Based upon the drill cores collected during the hydrogeological site characterization activities, the perched groundwater table is estimated to be less than 10 feet thick.

The facility would be required to conduct groundwater monitoring twice per year, during high and low groundwater conditions, by sampling the wells in a DEQ-approved multi-level groundwater-monitoring network, to ensure that the liner and leachate collection system are performing as designed. Groundwater monitoring would be performed during the active life of the facility and the 30-year post-closure care period. The first pre-construction baseline sampling event would be conducted prior to initiation of landfill construction activities; a second baseline sampling event would be conducted prior to acceptance of waste at the facility. Routine groundwater monitoring would then be conducted quarterly during the first year of landfill operation, and then on a semi-annual basis thereafter. Groundwater monitoring at the facility would ensure any unexpected groundwater contamination is detected and remedied. Remedial activities would be approved by DEQ and would be based upon the nature and extent of contaminants detected. Any necessary corrective action required as a result of groundwater monitoring, would be performed until groundwater quality returns to baseline conditions. If groundwater remedial activities are occurring at the time of facility closure, all such activities would be completed before final facility closure approval is granted.

There are few water supply wells located near the proposed landfill. The locally utilized potable groundwater resource is encountered beneath the facility at depths from 35 to 120 feet below the ground surface in sandstone and coal units within the Lebo Member and Tullock Sandstone of the Fort Union formation. Based on a search of the Montana Bureau of Mines and Geology (MBMG) Ground Water Information Center (GWIC) database of recorded existing wells within a 1.5-mile radius of the facility, there are seven domestic water supply wells, three stock wells, and 35 wells used for monitoring by the Montana Salinity Control Association. (Figure 3.2 and Table 3.2). According to the MBMG's GWIC database, reported well yields range from three to 25 gallons per minute. The GWIC-recorded wells nearest the site include a stockwell located approximately one-half mile south of the facility's southwest corner, and one domestic well approximately one-half mile north of the facility's northeast property corner. The deeper drinking water source aquifer in the area is considered to have a low sensitivity to potential contamination from impacts resulting from landfill activities. Sensitivity is defined as the relative ease that contaminants can migrate to drinking water source aquifer through the natural materials. The low sensitivity rating is due to the fact that the deep drinking water aquifer is a confined aquifer and is protected by more than 100 feet of dry, relatively impermeable glacial till, claystones, mudstones, and sandstones that are typical of the Fort Union formation in the area of the facility property.

A 14-inch diameter potable, pressurized, water pipeline owned by the Dry Prairie Rural Water Authority is located in an easement on the west side of Highway 16. The pipeline was constructed to supply water from Culbertson to rural water users north of Culbertson. It is located approximately 245-ft from the southeast corner of the lined landfill unit boundary, above the shallow local groundwater aquifer that would be monitored at the site. The groundwater flow direction for the shallow aquifer in the vicinity of the facility is generally towards the east. Monitoring well 12-S, completed in the shallow aquifer and located between the lined disposal unit and the pipeline, would be monitored on a semi-annual basis for changes in groundwater quality attributable to the landfill operations. The SWS consulted DEQ's Public Water & Subdivisions Bureau (PWSB) regarding the location of the water pipeline relative to the landfill disposal unit. The PWSB indicated that the landfill disposal unit design features and facility monitoring activities will be adequately protective of the Dry Prairie water main. With the groundwater flow direction from the landfill and toward the water main, and the placement of monitoring wells between the landfill and the main, it appears that in the event of a liner leak there will be adequate warning to implement corrective actions or remediation before any contamination reaches the water main.

The landfill would manage oilfield solid wastes; no bulk liquids or sludge wastes would be accepted for disposal. The waste is relatively dry and would be spread and compacted in the landfill with ordinary earthmoving equipment such as dozers and loaders. As discussed in Landfill Operations in Section 1.0, incoming wastes that do not pass the paint filter liquids test would be stabilized with drying agents in the Stabilization Building before being placed in the landill for disposal. The rainfall that comes in direct contact with the waste during the open operating phase of each unit is considered leachate and would be fully contained within the lined area of the landfill. The landfill includes a leachate collection system for the collection and removal of the liquid that contacts the waste in the lined landfill area. This liquid would be pumped out of the landfill into a lined leachate evaporation pond, as discussed in Landfill Design in Section 1.0. The landfill would be constructed in relatively small phases. As each disposal unit reaches its final fill height, it would be capped with a geomembrane liner that is then overlain by a vegetated soil cover to prevent the infiltration of rainwater into the landfill unit.

Based on the facility design and operational controls to control and manage leachate, the distance between the lined landfill and the water pipeline, the pressurized condition of the water pipeline, the predicted low levels of leachate production, and the characteristics of the glacial till and depth to groundwater beneath the facility, the expected impacts to the water pipeline and to groundwater from facility activities are expected to be minor.

3.1.3. *3.0 - Geology*

Northeastern Montana geology generally consists of alluvium and glacial deposits that overlie the bedrock of the Fort Union Formation. Alluvium is derived from unconsolidated sediments that have been eroded and redeposited by water in a non-marine setting and is made up of a variety of fine to coarse-grained sand, silt, clay, and gravel. The alluvium is primarily present at the surface in deep, steep sided drainages.

The continental glaciers that extended into northeastern Montana left behind deposits of glacial sediments known as glacial till and glacial outwash. Glacial till is the unsorted sediment left behind by the ice, while outwash are the sediments deposited by running water coming off the melting glacier. In some places, the glacial sediments deposited by the melting ice buried the older stream valleys in the area. Dense glacial till makes up the upper five to 70 feet of sediments beneath the site.

The glacial deposits are underlain by discontinuous beds of poorly cemented sandstone, shale, clay, and coal of the Fort Union Formation. In Eastern Montana, the Fort Union Formation has been subdivided into (from oldest to youngest) the Tullock, Lebo and Tongue River Members. The bedrock in this part of northeastern Montana lies on the western flank of the Williston Basin, which a large-scale geologic structure centered near Williston, North Dakota.

The proposed Clay Butte Disposal Landfill site is underlain by approximately 50-70 feet of the dense glacial till belonging to the Lebo Member of the Fort Union formation. This dense layer of glacial till is composed of light brown lean clay with some sand and interbedded silt. A well-defined seven to ten-foot layer of lignite coal lies beneath the glacial till.

3.1.3.1. Landfill Stability

The proposed site is located at the extreme western margin of the Williston Basin, a basin created by tectonic buckling of previously flat lying strata. The strongest local evidence of earthquake activity is observed in the Weldon-Brockton-Froid Fault zone that trends in a northeasterly direction and extends into northwestern North Dakota. This fault zone is located approximately six miles northwest of the facility and is not expected to impact the facility. The regulations prohibit the operation of a landfill within 200 feet of a fault that has had displacement during the Holocene period (within the last 10,000 years) unless a demonstration has been made that shows the landfill is designed to withstand any future movement on the fault. Because the site is not located within 200 feet of a fault meeting the criteria, additional landfill design elements related to seismic activity are not required.

The anticipated impacts to the geology at the site from the excavation of the native soils and glacial till materials are minor. The excavated materials would be stockpiled on site and used as needed for the construction of berms, landfill liner elements, landfill cover materials, and roads.

3.1.4. ***4.0 - Soil Quality, Stability, and Moisture***

The region is comprised of alluvial and glacial deposits underlain by the Tertiary Fort Union Formation. Soils in the vicinity are mostly the Williams Loams.

The soils typically associated with the glacial till parent materials are silty clay type soils and are generally thin and poorly developed. The natural soils at the proposed site include the Williams loam, and the Williams-Zahill loams. These soils were developed from the glacial tills and alluvium derived from shale and siltstone. The Williams loam is the dominant soil type at the proposed site; the Williams-Zahill loams are the secondary soil type. Key soil properties are summarized in Table 3.2; Figure 3.3 provides a map of the soil types. Although the Williams soils typically produce deep organic horizons, these natural soils, dominant at the site, are poorly developed and contain a higher clay content with a shallow organic soil horizon.

Thirty-eight soil borings were drilled at the site using a continuous coring rotosonic drilling method. This method allows for the collection of a continuous sample from each boring as the drilling is advanced. Of the 38 soil borings drilled, ten were drilled to a minimum of 70 feet below ground surface. The remaining soil borings were drilled to the depth representing the elevation immediately below the base of landfill unit. In addition to the soil borings, 15 temporary piezometers or monitoring wells were installed. The results of the on-site characterization efforts indicate that the glacial till is uniform across the proposed landfill footprint, and is comprised of the materials as summarized below.

Soil cores collected were submitted for laboratory testing to measure the average vertical hydraulic conductivity. Laboratory test results indicate that the soils above the Fort Union bedrock are generally a low percentage of gravel: 1.7-5.5%; Sand: 27.2-37.2%; Silt and clay: 60.0-68.4%. The Fort Union bedrock test results indicate a low percentage of gravel: 0-8.2%; Sand: 0.01-68.9% and Silt and Clay: 22.9-99.9%. The measured hydraulic conductivities provided by the laboratory analysis of the four of the soil borings, ranged from 1.2×10^{-8} cm/sec to 7.2×10^{-8} cm/sec. This range is typical for glacial till and silts.

The results of the site hydrogeological and soils characterization activities indicate that the natural soils beneath the foundation of the landfill have relatively high strength and low compressibility characteristics. Since these natural foundation soil are above the saturated uppermost aquifer, most of the settlement/heave is elastic and would occur as loads are applied or removed. The maximum range of heave during landfill construction is expected to be in the range of one to three inches, or less. Primary and secondary settlements are only of significance in fine-grained soils below the saturated zone and are therefore not likely to occur at the site.

During the construction and operations of the landfill, the native soils and underlying subsurface materials in the fill area would be removed and stockpiled on site for the construction of the liner cushion soil layer and storm water diversion berms. The stockpiled soil may also be utilized as quarterly and final cover soil. Following closure of the landfill, the segregated top soil would be re-placed over the final cover, and then revegetated to restore the site to pre-landfilling conditions.

3.1.5. *5.0 - Vegetation Cover, Quantity, and Quality*

The common native species are a mixed grass prairie consisting primarily of grama, needlegrass, wheatgrass, and blue stem on public lands. Trees and shrubs are mostly found in coulees and largely consist of cottonwood, Russian olive, chokecherry, snowberry, and buffaloberry. Agriculture is common on both the undissected uplands and on the alluvial soils of the area river valleys. Spring wheat, barley, and peas are the most common crops in the local area, but wheat has dominated recent production on the cropland of the proposed site.

A search by the Montana Natural Heritage Program found no records of plant species of concern in the area surrounding the site. During construction and operation, crops and most plant species would be removed from the proposed 76.5-acre disposal unit. The topsoil removed during site development would be used to construct stockpiles along the western edge and between the storm water ponds on the southern edge of the site within the proposed licensed boundary. These stockpiles would be seeded to temporarily prevent erosion of the soils by water and wind. Some soils removed during excavation of each landfill unit may be stockpiled in the area of the subsequent unit and would be used as-needed for daily, intermediate, or final soil cover.

As portions of the landfill are filled to their final grade, they would be covered with an earthen final cover and topsoil. This cap and other disturbed areas would then be re-seeded with native plant species appropriate to the area as recommended by the Natural Resource Conservation Service at the time of closure. The variation of native plant species in reseeded areas would be enhanced as natural succession progresses during the 30-year post-closure period.

Revegetation of the disturbed areas upon closure would return the site to grass land suitable for wildlife habitat and livestock grazing. In order to assure the integrity of the landfill cover revegetation process, grazing would initially be restricted to allow the cover vegetation to become fully established. Grazing on the final cover would later be monitored to prevent overgrazing. The most common local noxious weeds are primarily thistle (both Canadian and Russian), kochia, field bindweed, and possibly leafy spurge. Noxious weeds throughout the facility would be controlled by spraying with effective herbicides, an approach that has been successful for years in the tilled areas where the facility would be located.

Because the property has historically been used as farmland, the overall permanent impacts of the landfill construction, operation, and closure activities on any original prairie vegetation would be relatively minor.

3.1.6. *6.0 – Aesthetics*

The terrain in the immediate vicinity of the site is characteristic of the overall rural landscape in the area. The terrain is flat to gently rolling, with vegetation types typical of dryland farming and grazing. The topographic diversity of the site is not accentuated. The dominant color of the land is tawny brown, except for the few months in late spring and early summer when there is enough moisture and plant growth to cover the land in varying shades of green. Construction and operation of the facility would change in the immediate area from cropland/pasture to a landfill. This change would occur within the licensed boundary over the projected life of the facility. The facility is not located on a prominent topographic feature but will be visible from Highway 16 and from the residence to the north and to the south of the site. Soil stockpiles, visible on the north, south, and west edges of the facility property, would provide some shielding of the view from the nearby residences. Security lights on buildings would be visible at night.

As waste disposal activities progress above the current site elevation, the perimeter side slopes will be constructed at 3:1 (Horizontal:Vertical) slopes. The facility would install snow fences near the windward side of the facility access road and Highway 16 as elevations are expanded above the current site elevation to ensure snow drifts resulting from changes in the site topography do not accumulate on Highway 16. The snow fence design and placement would be submitted to the Montana Department of Transportation's local district office for review prior to placement.

3.1.7. *7.0 - Air Quality*

Air quality concerns related to landfills are frequently associated with fugitive dust emissions from landfill traffic, construction activities, and day-to-day facility operations. Traffic within the facility due to these activities would cause an increase in the levels of airborne dust during the dry months of the year relative to the current farming activities in the area. As this occurs, dust control measures on the interior roads, such as applying a dust palliative or water, would lessen the impact. Construction of new landfill cells would cause an increase in internal landfill traffic which would result in an increase in airborne dust during the period of excavation and construction. Since the construction periods would be short in relation to the operating life of the facility, these effects would be minor. If dust from construction becomes a problem, dust control measures, such as wetting the surface before working on it, would be initiated as is typical for large earthwork activities, such as road construction. Normal operational traffic on the site could cause a minor increase of suspended dust particles in the air during the summer months. Fugitive dusts generated from disposal activities would be mitigated by adequate dust control measures on the interior roads and applying a dust palliative or water to the waste materials before disposal. The excavation and placement of cover material could increase the dust in the air. If it becomes a problem, the cover material would be wetted prior to its placement so that the net effect would be minor. All long-term soil stockpiles would be seeded to prevent wind or water erosion and airborne dust.

3.2. Analysis of Table 3.3 – Potential Impacts on Human Environment

This section evaluates the potential environmental effects that may occur on the human environment if the proposed facility is approved. The number on each of the underlined resource headings corresponds to a resource listed in the tables. Generally, only those resources potentially affected by the proposal are discussed. Therefore, if there is no effect on a resource, it may not be discussed.

3.2.1. *2.0 - Cultural Uniqueness and Diversity*

A cultural resource file search was conducted for Section 25, T29N, R55E. The results of the file search indicated that there have been no previously recorded sites within the area. The State Historic Preservation Office (SHPO) considers any structure over fifty years of age to be historic; structures over fifty years of age have not been identified on the property. Based upon previous ground disturbances in the area associated with agricultural activities, the SHPO determined that there is a low likelihood cultural properties would be impacted. Therefore, a cultural resource inventory is unwarranted. However, if cultural resources are inadvertently discovered during the construction of this project, the SHPO requests that they be contacted and the site be investigated for additional cultural resources.

3.2.2. *6.0 - Quantity and Distribution of Employment*

During the construction of the landfill, there could be a minor increase in local employment due to the need for contractors, site operators, and other relevant facility support personnel. Licensure of the facility would result in the creation of at least two additional full-time jobs in the area.

3.2.3. *7.0 - Local and State Tax Base and Tax Revenue*

Since there would likely be additional workers hired during the construction phases of the proposed landfill, the construction of the proposed facility could have a minor positive effect on the local tax base and revenue.

3.2.4. *8.0 - Demand for Government Services*

The potential impact of the proposed facility licensure is expected to be minor. The Roosevelt County Environmental Health Department and DEQ's Solid Waste Section would perform inspections of the site both during and after construction, a typical routine activity for all proposed and licensed facilities. During the construction phases, there may be a slight increase in traffic on the roads leading to the landfill. However, the impact to local law enforcement and road maintenance crews is expected to be minor because there would only be a small number of additional contractors involved over a fairly short time period.

Once the facility is operational, the Roosevelt County Sanitarian and DEQ's Solid Waste Section would be responsible for performing inspections and providing compliance assistance. The County and State road department maintenance crews may be required to perform additional road maintenance after licensure.

The Roosevelt County Sanitarian, the Montana Department of Transportation's (MDT) Motor Carrier Services Division, and DEQ's Solid Waste Section and Enforcement Division may be called upon to respond to complaints and spills on County roads and State highways. Spills of any size may be reported to the Roosevelt County Sanitarian. Spills that exceed 25 gallons must be reported to DEQ's Spill Hotline. The clean-up of spills that occur during transportation would be overseen by the Roosevelt County Sanitarian and/or DEQ's Enforcement Division, and must be completed in accordance with the state and/or federal requirements. Individual haulers and hauling contractors are fully responsible for expenses and proper clean-up related to accidental spills caused from hauling materials to and from the facility.

3.2.5. *9.0 - Industrial, Commercial, and Agricultural Activities and Production*

Construction and operation of the proposed facility would cause a minor to moderate increase in the industrial and commercial activity in the area due to the need for contractors and associated materials, and machinery repairs.

Agricultural activities in the area consist predominantly of small grain production, pasture, and livestock grazing. According to the applicant, the land at the proposed facility was last planted with wheat in 2013. Vast expanses of agricultural and rangeland surround the proposed site; however, none of the land in the vicinity of the proposed location is designated as either 'Prime Farmland If Irrigated' or 'Farmland of Statewide Importance'. Therefore, the 143.2 acres removed from crop production associated with this facility would have almost no effect on local crop production activities and rangeland surrounding the site.

3.2.6. *12.0 – Transportation*

The Clay Butte Disposal Landfill would be accessed through an existing southeast entrance that would be improved to accommodate incoming waste transport vehicles from Montana State Highway 16. Direct access into the facility would not occur from the McCabe Highway that is located northeast of the facility's north boundary. An improved gravel-surfaced road would be constructed from the entrance in the southeast that would parallel Highway 16. The facility owner must follow the MDT process for access to the facility within the right-of-way. No work within the right-of-way would be allowed without permission before obtaining the necessary MDT permits. Further, the approach design must take into account the largest vehicle anticipated to use the approach and therefore would be designed to prevent vehicles encroaching onto oncoming traffic lanes.

While vehicles could use the McCabe Highway to access Montana State Highway 16, it is anticipated that vehicles would instead follow a more direct route to the facility using Highway 16. Highway 16 is currently used for normal vehicle traffic as well as local area farmers and ranchers and trucking companies to transport truckloads of crops, livestock, and other goods. Traffic on these roads would increase once the facility has opened, but the road currently supports loaded commercial and agricultural vehicles. The Federal Department of Transportation and MDT have weight limits for transportation on Federal and State highways and roads. The Roosevelt County Road Department has jurisdiction over local county roads, including the establishment of speed and load limits.

All loaded commercial and agricultural transport vehicles are subject to the established loaded limits regardless of the goods or commodities being hauled.

The additional traffic resulting from operation of the facility may result in more frequent road maintenance activities. The increased traffic would cause additional wear and tear on the highway, resulting in a potentially minor increase in the frequency of road maintenance activities conducted by the Montana Department of Transportation and the Roosevelt County Road Department.

4. Conclusions and Recommendations

A listing and appropriate evaluation of mitigation, stipulations and other controls enforceable by the agency or another government agency:

The proposed licensure of the Clay Butte Disposal Landfill facility would meet the minimum requirements of the Montana Solid Waste Management Act and administrative rules regulating solid waste disposal. Adherence to the regulations, the approved facility design and construction requirements, the approved facility Operation and Maintenance Plan, and the approved facility closure and post-closure care requirements would mitigate the potential for harmful releases and impacts to human health and the environment by the proposed facility.

4.1 Findings

Because the facility will be designed, operated, and monitored according to the solid waste regulations, DEQ has determined that the proposed facility would have a minor impact on the physical and human environment. The site would be fenced, access would be controlled at all times, and all landfill activities would be performed according to the DEQ-approved Operation and Maintenance Plan. Site activities would be verified by periodic inspections performed by DEQ personnel to ensure that the potential risk of adverse effects on human health and the environment resulting from operation of the facility are minimized. The DEQ-approved Operation and Maintenance Plan includes conditions and limitations to ensure the facility operations are conducted in compliance with all applicable rules and regulations.

4.2 Regulatory Restrictions

The Montana Private Property Assessment Act requires state agencies to evaluate any regulatory restrictions proposed to be imposed on the proponent's use of private property (Sections 2-10-102 through 105, MCA). DEQ's selection of an alternative is designed to make the project meet minimum environmental standards that have been proposed and agreed to by the applicant. Thus, the conditions should not constitute a compensable taking of private property.

Alternatives and mitigation measures are designed to further protect environmental, cultural, visual, and social resources, but they add to the cost of the project. Alternatives and mitigation measures required by federal or state laws and regulations to meet minimum environmental standards do not need to be evaluated for extra costs to the proponent.

4.3 Other agencies which may have overlapping jurisdiction

Montana Department of Transportation
Montana Department of Environmental Quality
Roosevelt County

4.4 Individuals or groups contributing to this EA

Carlson-McCain
Montana Bureau of Mines and Geology
Montana Natural Heritage Program
Montana State Historic Preservation Office
U.S. Department of Agriculture - Natural Resource Conservation Service
U.S. Geological Survey

4.5 EA prepared by

Mary Louise Hendrickson, Tim Stepp, John Collins, and Fred Collins – Montana DEQ, Solid Waste Section

Date: September 15, 2015

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ATTACHMENT A - FIGURES

Figure 1.1: Location of Proposed Site *(Source: Google Earth Map, 2015)*

Figure 1.2: Landfill Site Plan
(Source: Carlson McCain, Clay Butte Disposal Landfill Application, 2014)

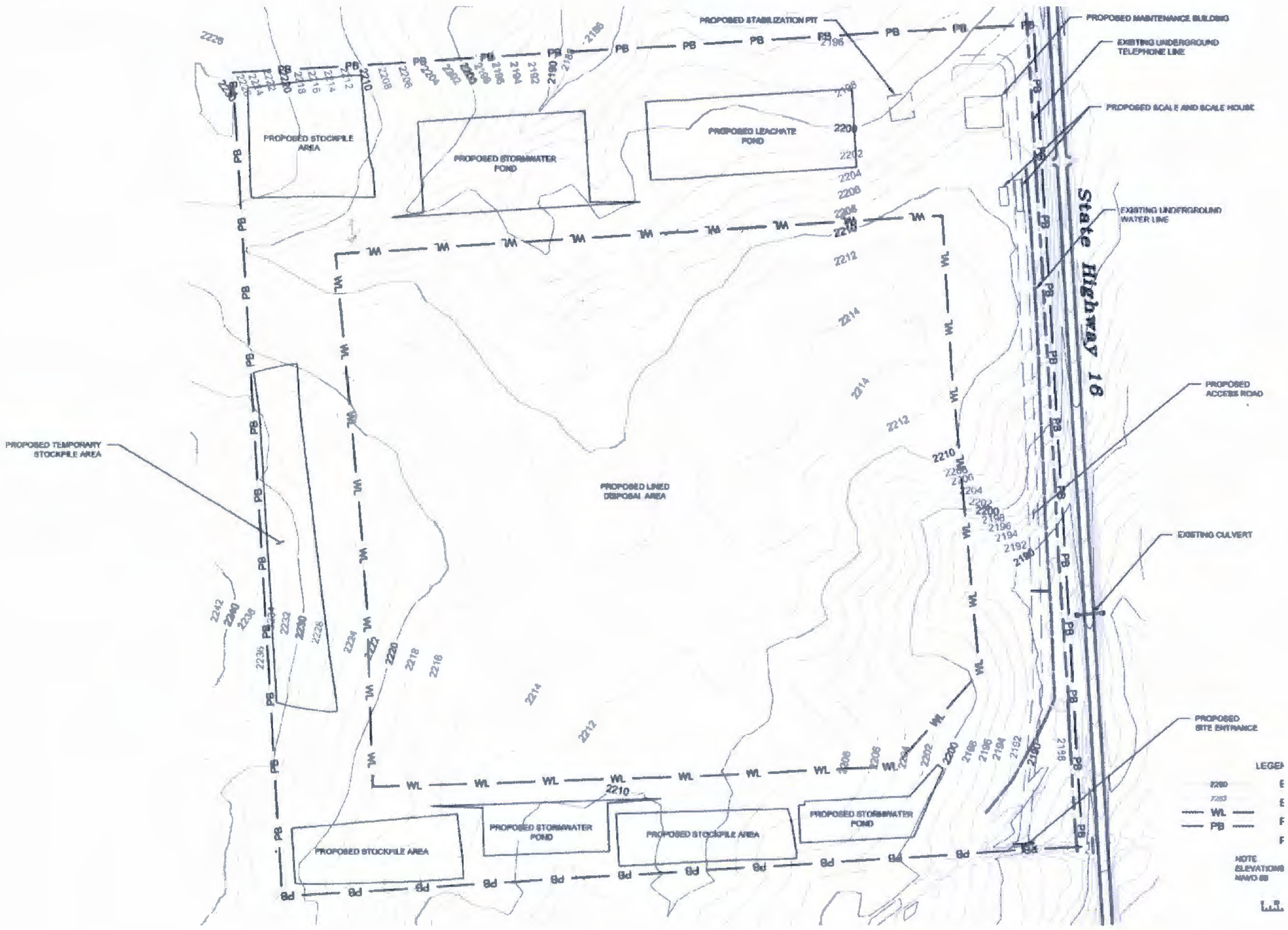


Figure 1.3: Standard Composite Liner Detail
(Source: Carlson McCain, Clay Butte Disposal Landfill Application, 2014)

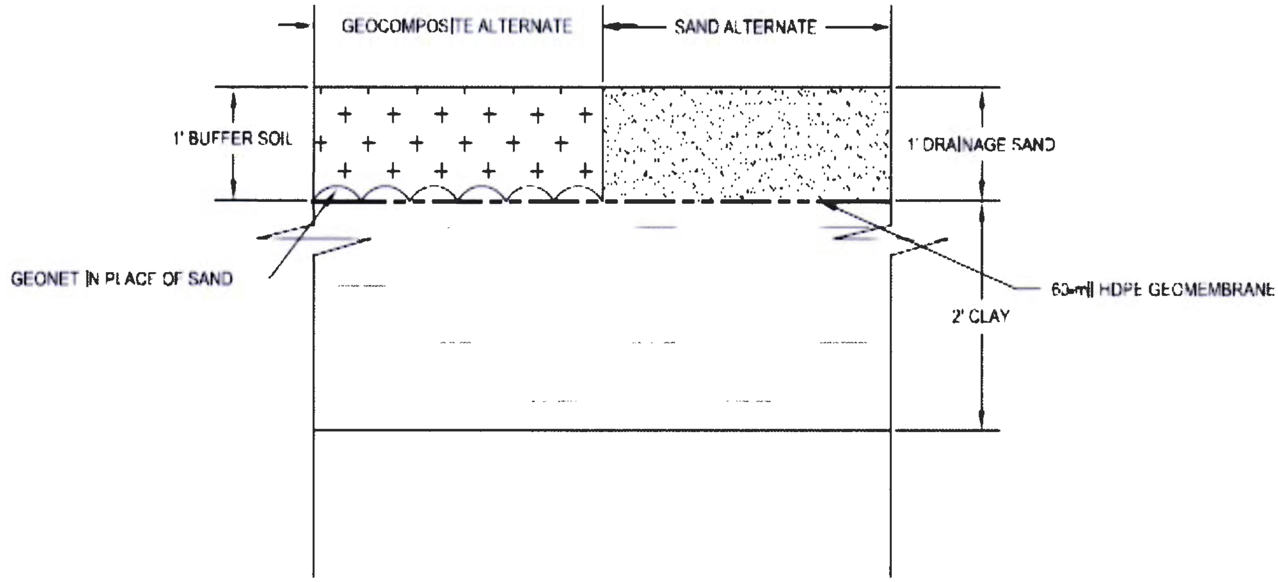


Figure 1.4: Landfill Base Grade Plan
(Source: Carlson McCain, Clay Butte Disposal Landfill Application, 2014)

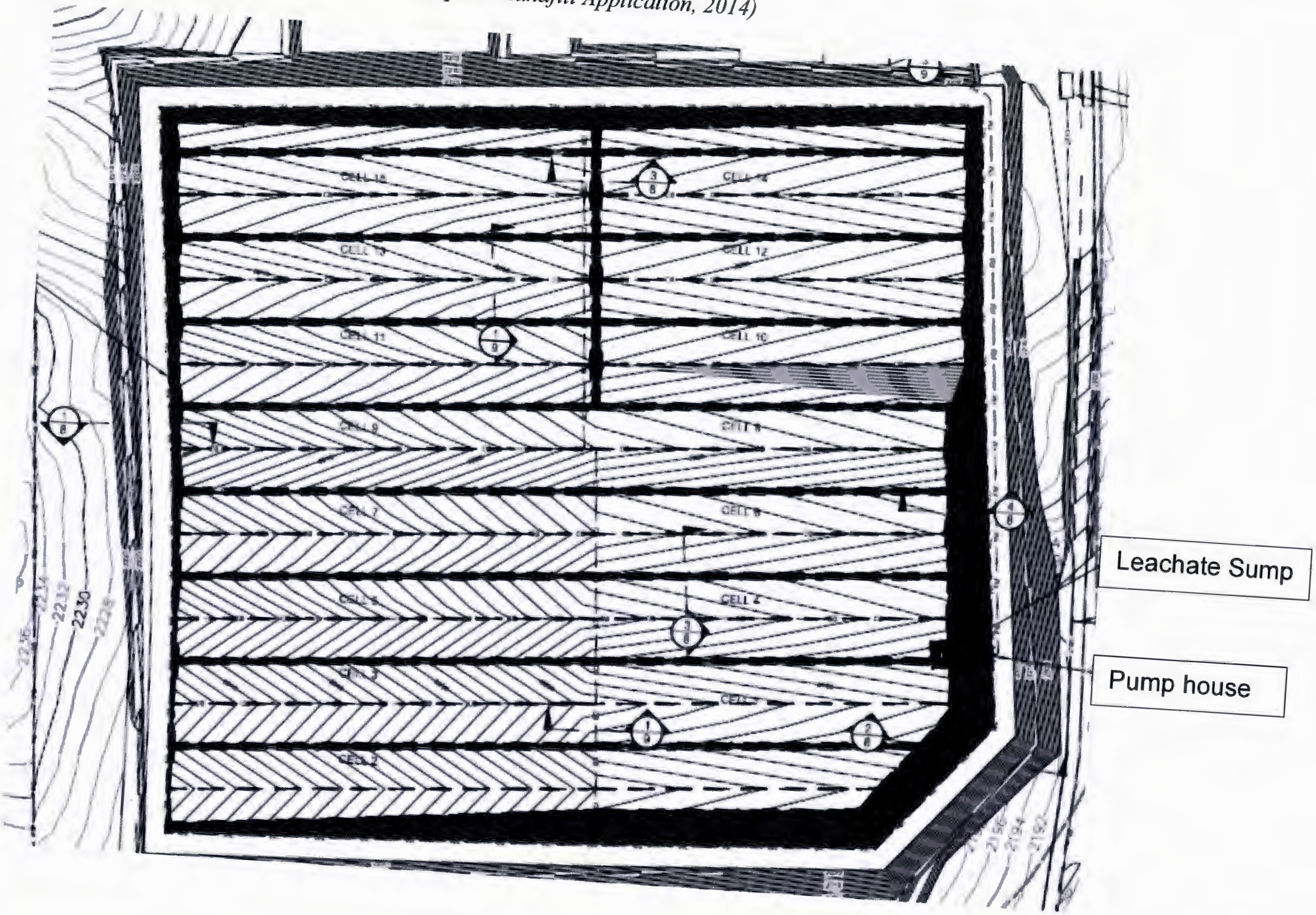


Figure 1.5: Typical Section – Leachate Collection System Design
(Source: Carlson McCain, Clay Butte Disposal Landfill Application, 2014)

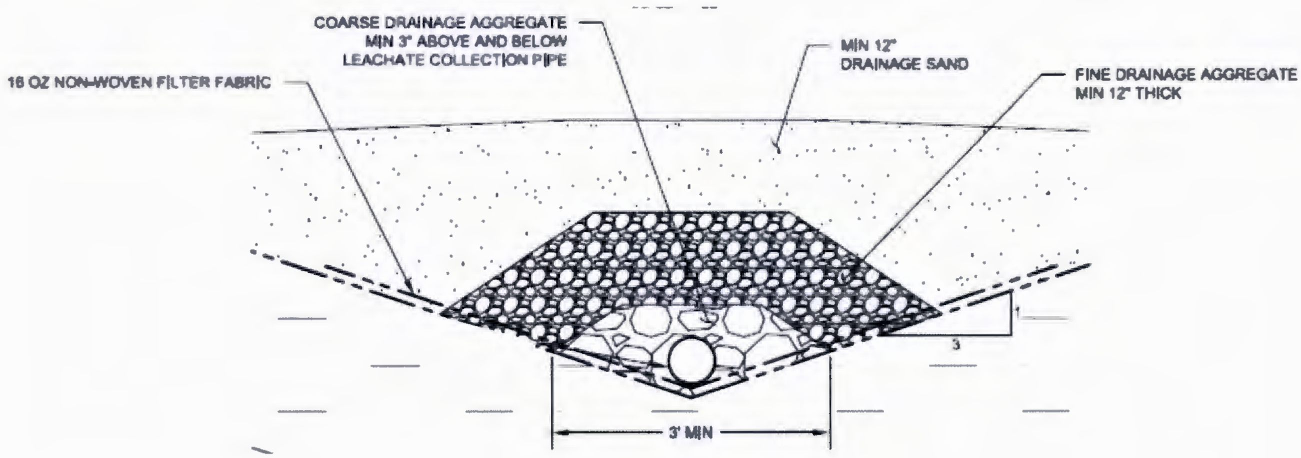


Figure 1.6: Typical Section – Leachate Collection Sump Design
(Source: Carlson McCain, Clay Butte Disposal Landfill Application, 2014)

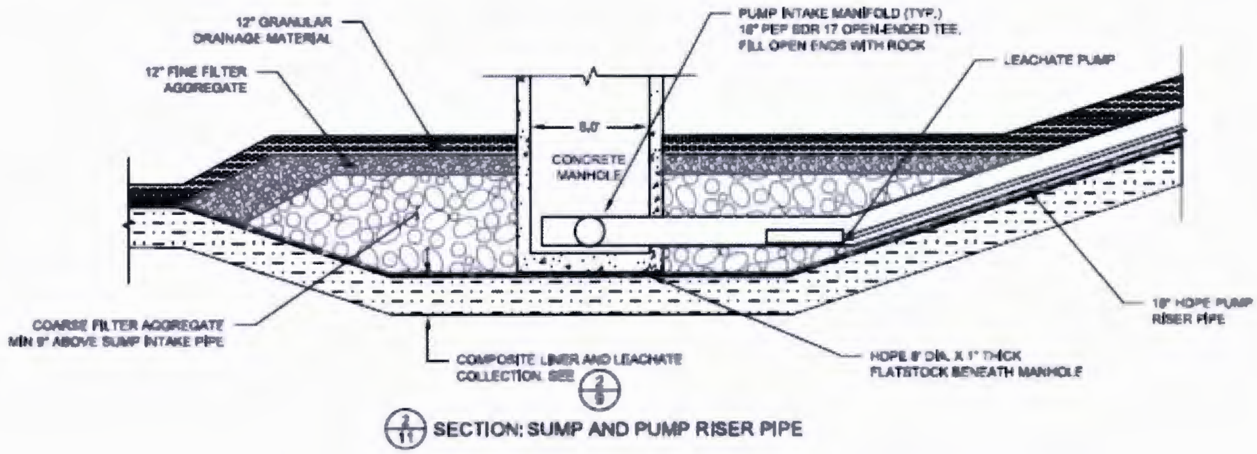


Figure 1.7: Proposed Stabilization Building Plan
(Source: Carlson McCain, Clay Butte Disposal Landfill Application, 2014)

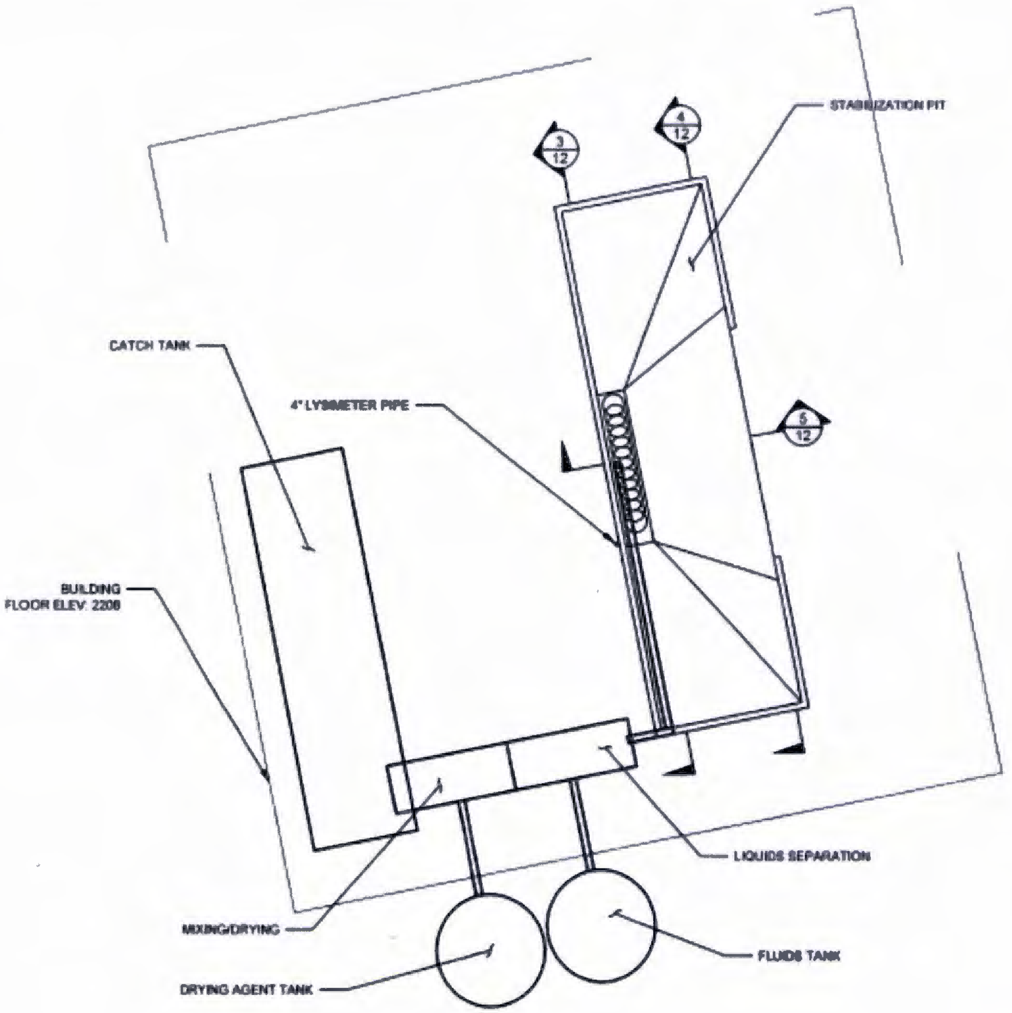


Figure 1.8: Proposed Stabilization Pit – Rear View Showing Design Details
(Source: Carlson McCain, Clay Butte Disposal Landfill Application, 2014)

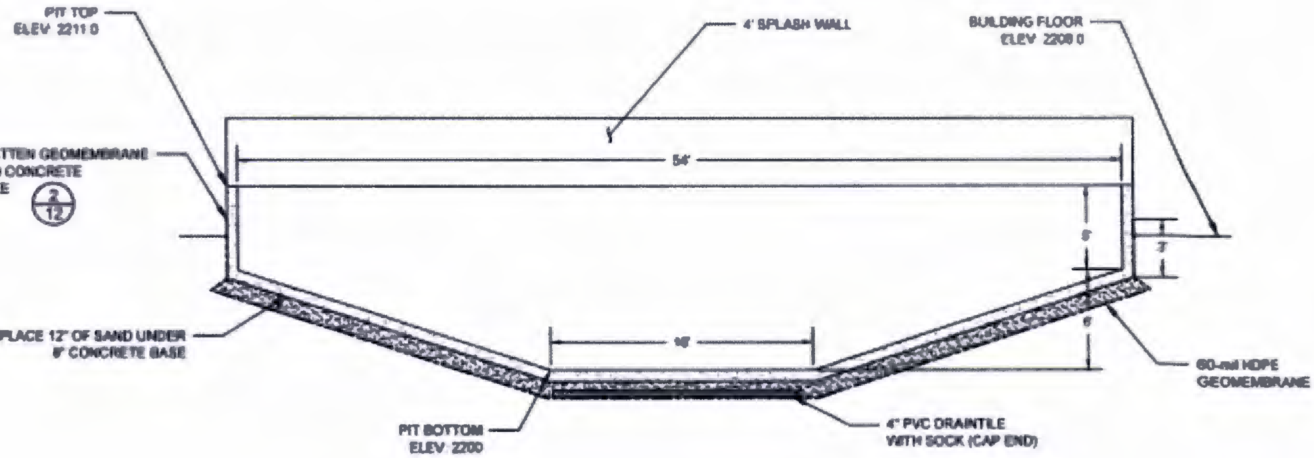


Figure 1.9: Proposed Stabilization Pit – Cross Section Showing Mixing Auger and Design Details
(Source: Carlson McCain, Clay Butte Disposal Landfill Application, 2014)

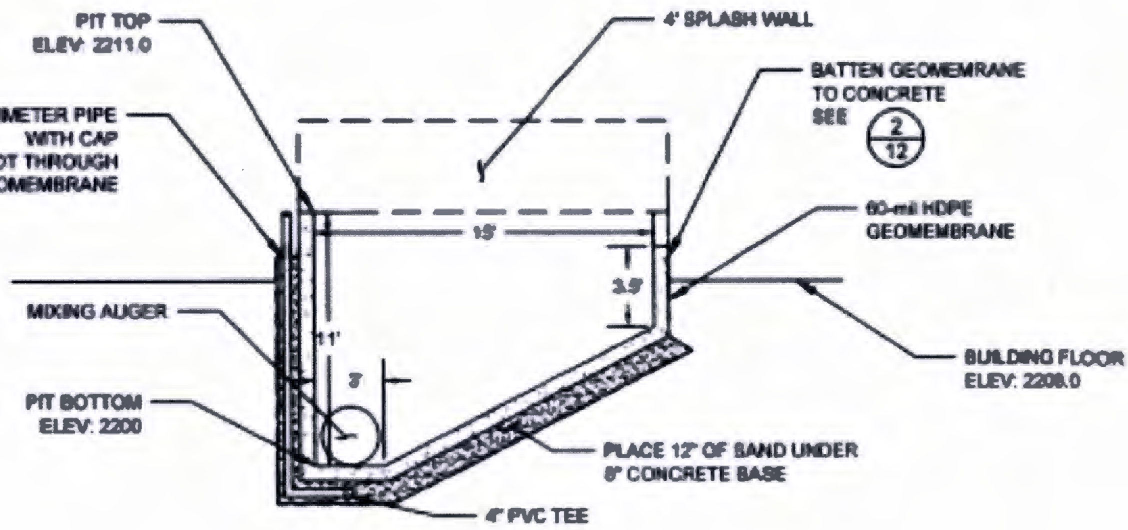


Figure 1.10: Proposed Stabilization Pit – Front View Showing Gates and Railing

(Source: Carlson McCain, Clay Butte Disposal Landfill Application, 2014)

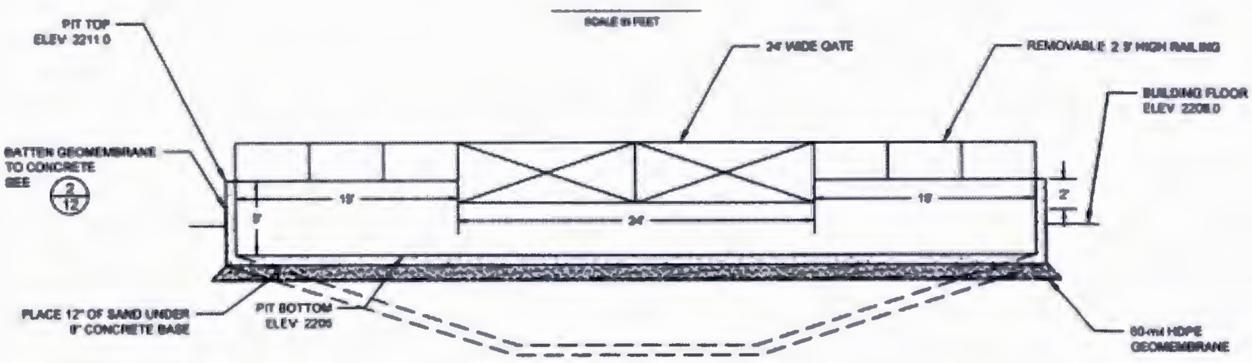


Figure 1.11: Final Contour Plan

(Source: Carlson McCain, Clay Butte Disposal Landfill Application, 2014)

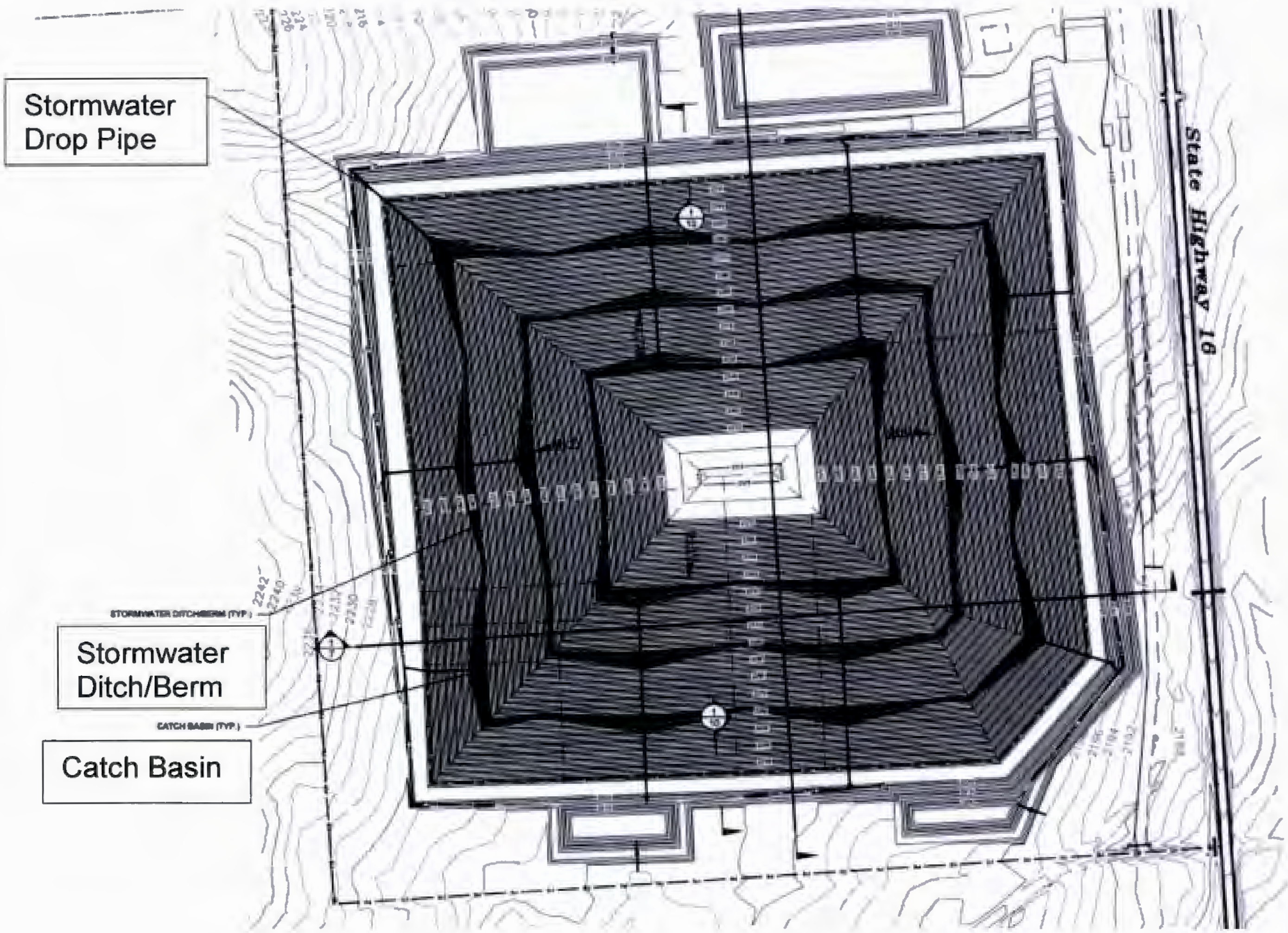


Figure 3.1: Proposed Groundwater Monitoring System
(Source: Carlson McCain, Clay Butte Disposal Landfill Application, 2014)

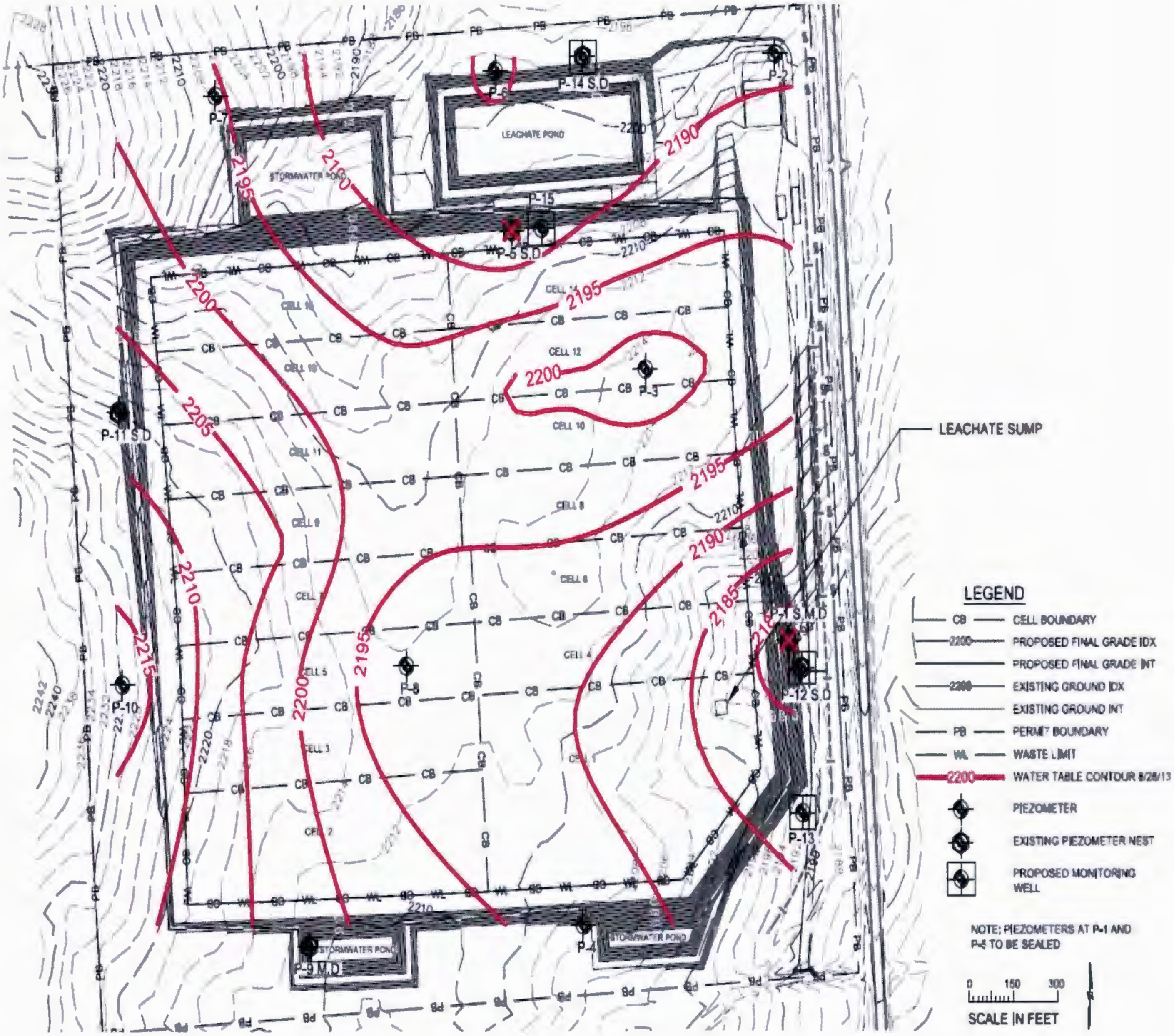


Figure 3.2: Location of MBMG recorded wells within 1-mile of the proposed Clay Butte Disposal Landfill

(Source: Carlson McCain, Clay Butte Disposal Landfill Application, 2014)

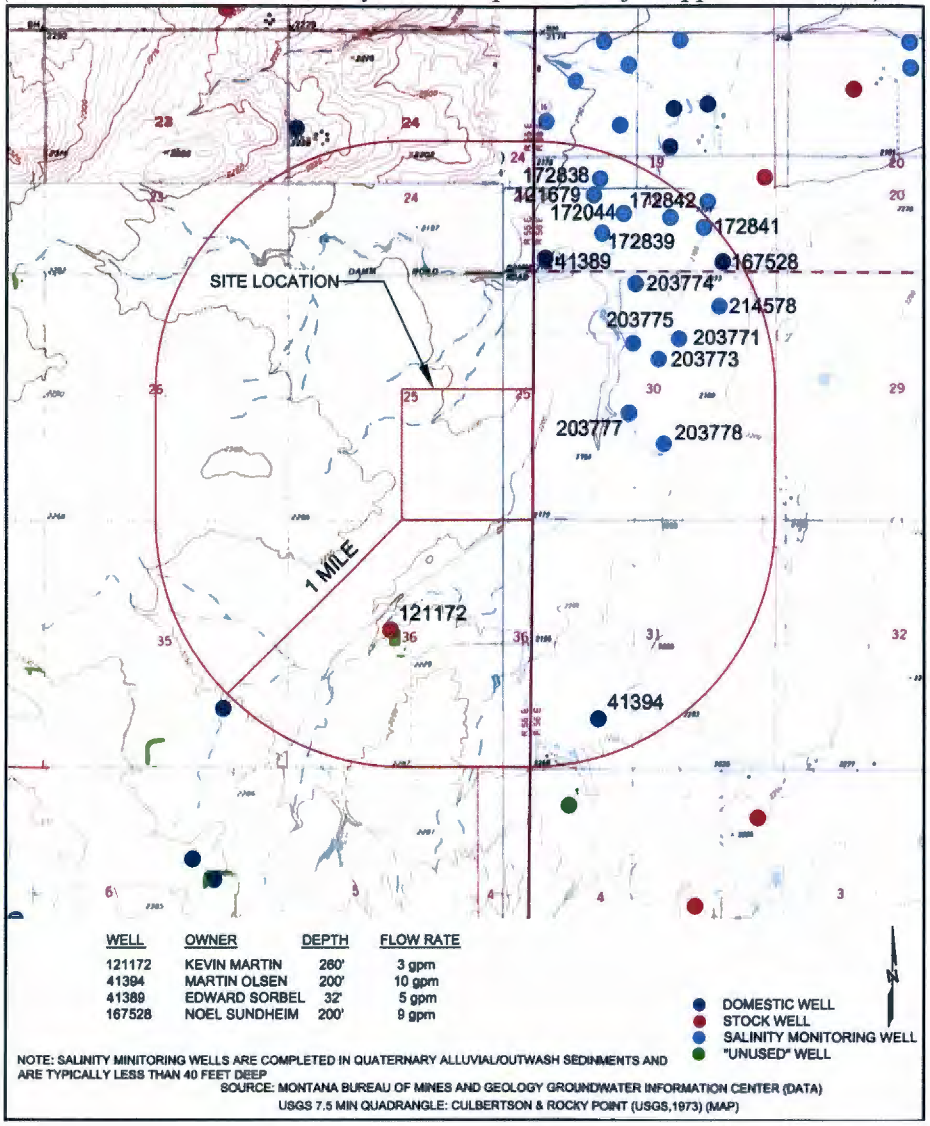
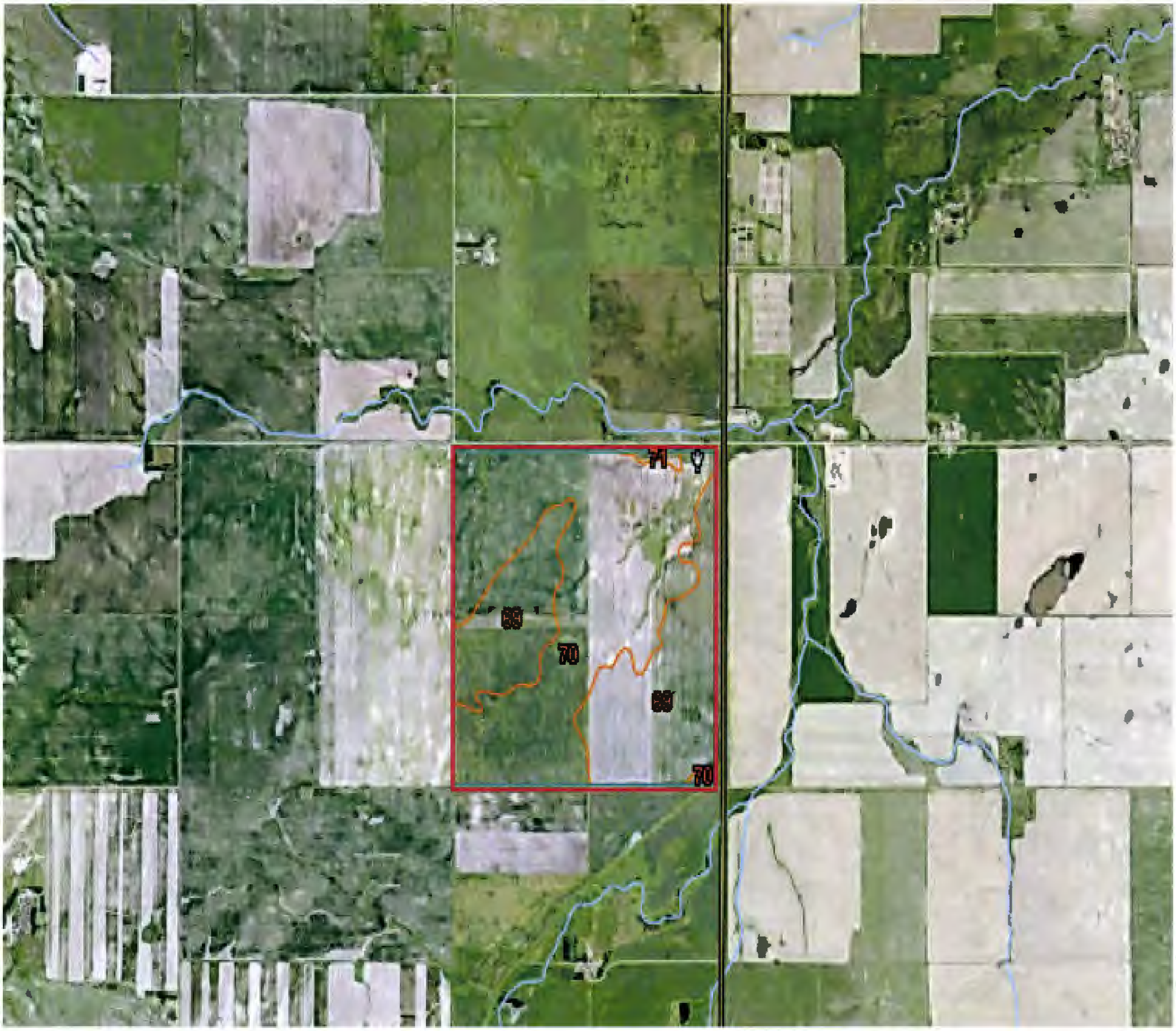


Figure 3.3: Map of Soil Types
(proposed Clay Butte Disposal Landfill site outlined in red)
(Source: USDA-NRCS, Web Soil Survey, Roosevelt County, Montana)



ATTACHMENT B - TABLES

Table 1.1: Culbertson Weather Station Climate Summary
(Source: NOAA Climate Data Summaries; Western Regional Climate Center, Desert Research Institute)

CULBERTSON, MONTANA (242122)													
Monthly Climate Summary													
Period of Record : 12/1/1900 to 3/31/2013													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	**Annual**
Avg. Max. Temperature (°F)	21.4	27.3	40.1	58	69.6	77.4	85.7	84.6	72.8	59.5	40.1	27.1	**55.3**
Avg. Min. Temperature (°F)	-1.8	3.6	15.8	29.1	40	49.1	54.1	51.5	41.2	30.3	16.4	4.4	**27.8**
Avg. Total Precipitation (in.)	0.36	0.27	0.45	0.98	2.04	2.99	2.11	1.43	1.26	0.82	0.42	0.35	**13.49**
Avg. Total Snow Fall (in.)	5.3	3	3.2	1.2	0.3	0	0	0	0.1	1.2	3	5.1	**22.2**
Avg. Snow Depth (in.)	5	5	3	0	0	0	0	0	0	0	1	3	**1**

Table 1.2: Site Development Sequence and Capacity
(Source: Carlson McCain, Clay Butte Disposal Landfill Application, 2014)

Phase	**Cell Volume (yds^3)**	**Cumulative Volume (yds^3)**	**Liner Area (acres)**	**Cumulative Liner Area (acres)**	**Final Cover Area (acres)**	**Cumulative Final Cover Area (acres)**	**Open Area (acres)**
Cell 1	675,041	675,041	10.75	10.75	0	0	10.75
Cell 2	342,245	1,017,286	7.41	18.16	5.11	5.11	13.06
Cell 3	465,598	1,482,884	4.63	22.79	4.85	9.96	12.84
Cell 4	492,507	1,975,391	4.30	27.09	3.79	13.75	13.35
Cell 5	625,610	2,601,001	4.61	31.70	2.70	16.45	15.26
Cell 6	553,472	3,154,473	4.27	35.97	4.07	20.51	15.46
Cell 7	784,623	3,939,096	4.62	40.59	2.93	23.44	17.15
Cell 8	622,686	4,561,782	4.37	44.96	4.42	27.86	17.10
Cell 9	875,334	5,437,116	4.49	49.45	3.41	31.28	18.18
Cell 10	562,624	5,999,740	4.34	53.79	4.54	35.81	17.98
Cell 11	975,916	6,975,656	4.55	58.34	3.17	38.99	19.35
Cell 12	553,956	7,529,612	4.34	62.67	5.21	44.19	18.48
Cell 13	990,350	8,519,962	4.58	67.25	3.20	47.39	19.86
Cell 14	473,488	8,993,450	4.50	71.75	6.56	53.96	17.80
Cell 15	651,298	9,644,748	4.77	76.52	8.60	62.56	13.96
Final	N/A	9,644,748	N/A	76.52	13.96	76.52	0.00

Table 1.3: Site Earthwork Summary and Soil Balance
(Source: Carlson McCain, Clay Butte Disposal Landfill Application, 2014)

Construction Event	Liner Area (ac.)	Liner Clay Req'd (cy)	Cap Area (ac.)	Topsoil Req'd (cy)	Subsoil Req'd (cy)	Excavation to Subgrade (cy)	Random Fill Req'd (cy)	Phase Topsoil Available (cy)	Phase Subsoil Available (cy)	Borrowed Subsoil (cy)	Overall Subsoil Balance (cy)	Topsoil Stockpile (cy)	Subsoil Stockpile (cy)
Cell 1 Liner/Pond 1	10.75	41,903				208,808	245,622	25,789	-104,505	104,505	-104,505	25,789	0
Leachate Pond/Entrance Road	3.61	14,082				0	0	0	-14,082	14,082	-118,587	25,789	0
Cell 2 Liner/Pond 3	7.41	28,871				80,573	37,220	9,497	4,985	-4,985	-113,602	35,285	0
Cell 1 Cap			5.11	4,431	15,288					15,288	-128,890	30,854	0
Cell 3 Liner	4.63	18,036				70,867	33	4,128	48,670	-48,669	-80,221	34,982	0
Cell 2 Cap			4.85	4,206	14,510					14,509	-94,730	30,777	0
Cell 4 Liner	4.30	16,741				97,186	6,618	3,466	70,361	-70,361	-24,369	34,243	0
Cell 3 Cap			3.79	3,287	11,339					11,339	-35,708	30,956	0
Cell 5 Liner/Pond 2	4.61	17,976				117,185	86,447	13,483	-722	721	-36,429	44,439	0
Cell 4 Cap			2.70	2,341	8,078					8,078	-44,507	42,098	0
Cell 6 Liner	4.27	16,627				99,894	3,662	3,442	76,163	-44,507	0	45,540	31,656
Cell 5 Cap			4.07	3,529	12,176					0	0	42,011	19,479
Cell 7 Liner	4.62	17,994				74,267	0	3,726	52,547	0	0	45,736	72,027
Cell 6 Cap			2.93	2,541	8,766					0	0	43,196	63,261
Cell 8 Liner	4.37	17,015				100,294	1,132	3,523	78,624	0	0	46,719	141,885
Cell 7 Cap			4.42	3,833	13,223					0	0	42,886	128,662
Cell 9 Liner	4.49	17,505				64,673	0	3,644	43,524	0	0	46,529	172,186
Cell 8 Cap			3.41	2,957	10,202					0	0	43,572	161,984
Cell 10 Liner	4.34	16,911				73,498	680	3,501	52,405	0	0	47,074	214,390
Cell 9 Cap			4.54	3,937	13,582					0	0	43,137	200,807
Cell 11 Liner	4.55	17,720				54,675	3	3,669	33,283	0	0	46,806	234,090
Cell 10 Cap			3.17	2,749	9,484					0	0	44,057	224,606
Cell 12 Liner/Perimeter Stormwater Swale	4.34	16,892				63,465	521	3,497	42,555	0	0	47,554	267,161
Cell 11 Cap			5.21	4,518	15,587					0	0	43,036	251,574
Cell 13 Liner	4.58	17,842				36,728	330	3,694	14,862	0	0	46,730	266,436
Cell 12 Cap			3.2	2,775	9,574					0	0	43,955	256,863
Cell 14 Liner	4.50	17,522				37,614	49,106	5,409	-34,423	0	0	49,365	222,439
Cell 13 Cap			6.56	5,689	19,626					0	0	43,676	202,814
Cell 15 Liner	4.77	18,568				11,395	18,475	3,844	-29,492	0	0	47,520	173,322
Cell 14 Cap			8.6	6,937	25,729					0	0	40,583	147,593
Cell 15 Cap			13.96	11,261	41,764					0	0	29,322	105,829
Totals	80.13	312,205	76.52	64,990	228,927	1,191,122	449,849	94,313	334,755				
Final Stockpile Volume												29,322	105,829
Max.Stockpile Volume												49,365	267,161

TABLE 3.1 - IMPACTS TO THE PHYSICAL ENVIRONMENT

PHYSICAL ENVIRONMENT		Present	Not Present	Unknown	Attached
1.0	Terrestrial and Aquatic Life and Habitats	✔			✔
2.0	Water Quality, Quantity, and Distribution	✔			✔
3.0	Geology	✔			✔
4.0	Soil Quality, Stability, and Moisture	✔			✔
5.0	Vegetation Cover, Quantity, and Quality	✔			✔
6.0	Aesthetics	✔			✔
7.0	Air Quality	✔			✔
8.0	Unique, Endangered, Fragile, or Limited Environmental Resources		✔		
9.0	Historical and Archaeological Sites		✔		
10.0	Demands on Environmental Resources on Land, Water, Air or Energy		✔		

Table 3.2: Summary of Soil Properties
(Source: USDA-NRCS, Web Soil Survey, Roosevelt County, Montana)

Soil Type	Map Key	Depth profile	Drainag e	Permeability	Available Water Capacity	Erosion Hazard	Soil Compaction Resistance
Williams loam	69	0 to 7 inches: Loam. 7 to 60 inches: Clay loam	Well Drained	Moderately Low – Moderately High	High	Medium	Low Resistance
Williams-Zahill loams	70	0 to 7 inches: Loam. 7 to 60 inches: Clay loam	Well Drained	Moderately Low – Moderately High	High	Medium	Low Resistance
Zahill loam	71	0 to 7 inches: Loam. 7 to 60 inches: Clay loam	Well Drained	Moderately Low – Moderately High	High	Medium	Low Resistance

TABLE 3.3 - IMPACTS TO THE HUMAN ENVIRONMENT

HUMAN ENVIRONMENT	Present	Not Present	Unknown	Attached
1.0 SOCIAL STRUCTURES & MORES		✔		
2.0 CULTURAL UNIQUENESS & DIVERSITY		✔		✔
3.0 DENSITY & DISTRIBUTION OF POPULATION & HOUSING		✔		
4.0 HUMAN HEALTH & SAFETY		✔		
5.0 COMMUNITY & PERSONAL INCOME		✔		
6.0 QUANTITY & DISTRIBUTION OF EMPLOYMENT	✔			✔
7.0 LOCAL & STATE TAX BASE REVENUES	✔			✔
8.0 DEMAND FOR GOVERNMENT SERVICES	✔			✔
9.0 INDUSTRIAL, COMMERCIAL, & AGRICULTURAL ACTIVITIES & PRODUCTION	✔			✔
10.0 ACCESS TO & QUALITY OF RECREATIONAL & WILDERNESS ACTIVITIES		✔		
11.0 LOCALLY ADOPTED ENVIRONMENTAL PLANS & GOALS		✔		
12.0 TRANSPORTATION	✔			✔

APPENDIX C - NORM Fact Sheet

![DEQ Montana Department of Environmental Quality]

PERMITTING AND COMPLIANCE DIVISION
WASTE AND UNDERGROUND TANK MANAGEMENT BUREAU
SOLID WASTE SECTION

Naturally Occurring Radioactive Material (NORM) Fact Sheet

What is NORM?

NORM stands for "naturally occurring radioactive material"—in other words, a substance that naturally contains one or more radioactive isotopes, also called *radionuclides*. These radionuclides occur naturally at low levels in soils and rocks. NORM is present in geologic formations from which oil and gas are produced. NORM is not nuclear waste. The material generally consists of the radionuclides uranium and thorium and their daughter products, including radium.

NORM can be concentrated by processes associated with the recovery of oil and gas. Oil and gas production processes often mobilize the NORM in formations into the produced fluids (oil, gas, and water). Technologically Enhanced NORM (TENORM) is material that can be concentrated in oil production wastes such as sludge, drilling mud, used water filtration sleeves, and pipe scale. TENORM radioactivity levels tend to be highest in water- handling equipment.

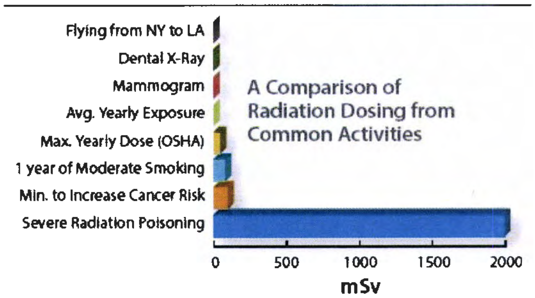
Because NORM is usually associated with the water phase of produced fluids, as the produced water is extracted and fluid pressures and temperatures are reduced, the solubility of the NORM is changed and the radionuclides precipitate out of solution and deposit onto the walls of tubing, casing and surface processing equipment as scale. Production and processing equipment may contain elevated levels of NORM contaminated scale or sludge that can cause disposal problems when the equipment is taken off-line for maintenance, repair, or replacement.

Radiation Fundamentals

Radiation is energy emitted by matter in the form of rays or high-speed particles. Radiation is all around us. There is a natural background radiation level throughout the universe. Radioactive materials in Earth's crust also contribute to terrestrial background radiation.

Radiation is either ionizing or nonionizing, depending on how it affects matter. Nonionizing radiation (light, heat, radio waves) transfers energy to materials through which it passes but does not break molecular bonds. Ionizing radiation (x-rays, gamma rays, high-energy particles) cuts bonds that hold molecules together, thus leaving molecular pieces, known as ions, in its wake. These ions may cause changes in living tissues or may change the physical properties of nonliving materials.

Radiation measurement is a confusing mix of terms and concepts. Radiation levels are measured in terms of total activity (emitted from source material), dosage (radiation absorbed), or exposure (e.g., millisievert [mSv]). Although dosage is often the most meaningful in public health discussions, most state rulings on NORM disposal regulate levels of radioactivity per unit weight.



source: University of North Dakoto, Energy & Environmental Research Center

What Level of Radioactivity Is Hazardous?

To understand how much radiation is dangerous, we need to focus on equivalent dose numbers. Equivalent dosages accumulate over time of exposure, so intensity and duration are equal factors. More of either increases the risk of adverse health effects. A nuclear reactor core may trap huge amounts of total radioactivity, but because of engineered shielding between the reactor core and personnel operating the nuclear power plant, the personnel do not absorb hazardous levels of radioactivity. When the personnel must enter a zone of higher radioactivity, their exposure time is strictly limited. Comparing radioactivity with equivalent doses is like comparing apples and oranges.

Generally speaking, NORM/TENORM must be inhaled or ingested to pose a radiation health risk. This is because a vast majority of radiation emitted from NORM/TENORM is in the form of alpha particles. Alpha particles, emitted during alpha decay, are made of two neutrons and two protons. Their structure is similar to a helium nucleus. Most alpha particles created by alpha decay do not have high penetration, compared to other particles. Even a sheet of paper can stop them. Alpha particles pose little threat externally because even air can stop them if the wall of air between the radioactive source and the object is wide enough. Skin also stops alpha particles from entering the body. Because these wastes are typically landfilled or otherwise buried, there is little risk from external exposure.

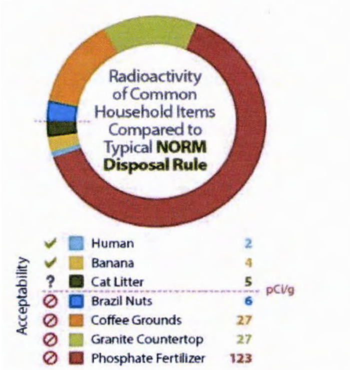
Further protecting yourself from external exposure to alpha radiation is easy, since alpha particles are unable to penetrate the outer dead layers of skin or clothing. However, tissue that is not protected by the outer layer of dead cells, such as eyes or open wounds, must be carefully protected. The exposure pathways of concern are inhalation or ingestion of alpha emitters, which continue to emit alpha particles. Alpha emitting radionuclides that are inhaled or ingested release alpha particles directly to sensitive living tissues. As their high energy transfers directly to the tissue, it causes damage that may lead to cancer.

Since radium is present at low levels in the natural environment, everyone has some minor exposure to it. However, individuals may be exposed to higher levels of radium if they live in an area where there is an elevated level of radium in the surrounding rock and soil. Private well water in such areas can also be an added source of radium.

The concentration of radium in drinking water is generally low, but there are specific geographic regions in the United States where higher concentrations of radium occur in water due to geologic sources. Limited information is available about the amounts of radium that are typically present in food and air, but they are very low.

Radium is a naturally-occurring radioactive metal. Its most common isotopes are radium-226, radium 224, and radium-228. Radium is a radionuclide formed by the decay of uranium and thorium in the environment. In the natural environment, it occurs at low levels in virtually all rock, soil, water, plants, and animals. In areas where uranium (or thorium) occurs in high levels in rock, radium is often also found in high levels. In the NORM associated with the oil and gas industry, radium-226 is typically present in the form of radium/barite sulfate. Radium/barium sulfate is a relatively insoluble material with a solubility limit of $2x10^{-6}$ g/L.

The most significant way people come in contact with alpha emitters is in their home, school, or place of business. Radon, is a heavy gas and tends to collect in low-lying areas such as basements. Testing for radon in your home and taking any corrective action necessary is the most effective way to protect you and your family from alpha emitters.



source: University of North Dakota, Energy & Environmental Research

How Is NORM Regulated?

NORM was not subject to regulatory control under the Atomic Energy Act of 1954 or the Low Level Radioactive Waste Policy Act. NORM is not nuclear waste. Wastes containing NORM are not regulated by federal agencies. Instead, it has been left to states to regulate handling of NORM. Currently, 15 states specifically regulate NORM, while other states more generally regulate radioactive wastes. Of course, the language of these NORM regulations varies, but many states have similar regulations limiting disposal of NORM- containing waste in municipal landfills. The table to the right suggests a comparison between common landfill wastes and their radioactivity levels. It is not suggested that these wastes fall under NORM disposal rules, but it does present an interesting comparison.

How Is NORM Disposed Of?

Disposal protocols differ greatly across states and across oil and gas producers. Generally, NORM-contaminated equipment is tagged, sent to a decontamination service, decontaminated, and then shipped to a landfill.

Alternately, some companies opt to send low-level contaminated material directly to licensed NORM disposal sites. Occasionally, companies unwittingly transport NORM-contaminated waste to local landfills not approved to accept this waste. Most oil patch landfills have their own radioactivity-monitoring protocol in place to prevent this.

Sources:
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U.S. Environmental Protection Agency, *Exemption of Oil and Gas Exploration and Production Wastes from Federal Hazardous Waste Regulations*, http://www.epa.gov/osw/nonhaz/industrial/special/oil/oil-gas.pdf

U.S. Geological Survey, USGS Fact Sheet FS-142-99, *Naturally Occurring Radioactive Materials (NORM) in Produced Water and Oil-Field Equipment – An Issue for the Energy Industry*, September, 1999

U.S. Department of Energy, National Petroleum Technology Office, *An Assessment of the Disposal of Petroleum Industry NORM in Nonhazardous Landfills*, September, 1999

World Nuclear Association, *Naturally-Occurring Radioactive Materials (NORM)*, March, 2009

International Atomic Energy Agency, Safety Report Series No. 34, *Radiation Protection and the Management of Radioactive Waste in the Oil and Gas Industry*, November, 2003

APPENDIX D - Response to Public Comments

The following represent substantive comments that were received by DEQ from May 26, 2015 to June 24, 2015 for the Clay Butte Landfill Draft Environmental Assessment (EA). DEQ categorized and summarized all substantive comments received, and responded below. All comments are on file at DEQ.

FACILITY LOCATION

Comment: *The site should be located elsewhere.*
Response: The site location was selected by the applicant. DEQ does not have authority to select site locations. DEQ's evaluation of solid waste management system applications is based upon the characteristics of the site proposed as it relates to the proposed facility design and operation.

Comment: *There are over 20 residences within a mile of the site.*
Response: DEQ regulates over 145 solid waste management systems statewide. Many of the large Class II landfills are located near residential subdivisions and neighborhoods with more than 20 residences. There are no state regulations that prohibit the location of solid waste management systems near residences. There are no local restrictions that prohibit the location of the facility at the site the applicant selected.

PUBLIC NOTIFICATION AND THE MEPA PROCESS

Comment: *DEQ provided inadequate notification of the public meeting and Draft EA to adjacent landowners and interested persons.*
Response: MEPA does not establish specific public notification requirements for EAs. Notification of the availability of public document's is discretionary. DEQ mailed the Draft EA to the abutting and adjacent landowners of record within one mile of the proposed site on May 26, 2015. The Draft EA that was sent to abutting and adjacent landowners included the notification of the public meeting. The Draft EA was also published on DEQ's website on May 26, 2015. The public notice was sent to the newspaper of record in Roosevelt County – the Wolf Point Herald – for publication in the June 2, 2015 edition of the Culbertson Searchlight. The Culbertson Searchlight is owned and operated by the Wolf Point Herald. The public notice was also posted in the Culbertson City office as well as the Culbertson Post Office. DEQ also issued a press release to the Fort Peck Journal, the Associated Press, the Billings Gazette, and the Miles City Star. A public meeting that was attended by at lease 57 people was held in the Culbertson Community Center on June 11, 2015.

Comment: *DEQ should conduct an EIS.*
Response: According to ARM 17.4.608, impacts may be adverse, beneficial, or both. If none of the adverse effects of the impact are significant, an EIS is not required.

DEQ has considered the factors set forth in ARM 17.4.608 and has determined that the impacts associated with licensure of the proposed facility would not be significant. The facility is projected to operate for 31 years and would perform any necessary site maintenance and monitoring activities during the required 30-year post closure period. Construction and operation of the facility would result in the disturbance of the 143.2-acre parcel. The native soil and glacial till materials would be stockpiled on site and used to construct berms, landfill liner components, landfill cover, and in on-site road construction. If DEQ approves licensure of the facility, the ground disturbance is certain to occur and would be permanent.

The site would be stripped of the current vegetation and the 143.2-acre site would be removed from agricultural crop production. The property is surrounded by vast expanses of agricultural crop lands, so the removal of the 143.2 acres from crop production is not considered significant.

A search by the Montana Natural Heritage Program found no records of plant species of concern in the area. During construction and operation, crops and most plant species would be removed from the site.

There were no critical, protected, or unique habitat features identified on the site. While any wildlife currently occupying the site may be forced to relocate, the amount of habitat lost as a result of construction and operation of the facility is small compared to the vast expanses of similar habitat in the area. One threatened animal species was identified by the Montana Natural Heritage Program - the Whooping Crane. The Whooping Crane has no year-round range in Montana, but only occupies portions of northeastern Montana during migration. The species is most likely to occur in wetlands, but may also be found during migration in marshes, shallow lakes, lagoons, salt flats, grain and stubble fields. While Whooping Cranes may be found in grain and stubble fields during migration, the type of habitat is common in the area. Further, recorded observations of the whooping crane have not occurred on or in the immediate vicinity of the site in the past 20+ years. Therefore, no significant impacts to wildlife would occur from construction, operation, and closure of the landfill.

The landfill disposal unit is designed to contain the waste with a compacted clay liner overlain by a 60-mil high-density polyethylene liner. The liner design ensures that operation of the landfill would not result in contamination of the uppermost aquifer. In addition, the landfill design includes general site grading and the construction of storm water diversion ditches, berms, and lined detention ponds to control storm water, and berms and a lined leachate retention pond to control leachate. Once operational, the facility would perform groundwater monitoring at least twice per year. All leachate would be retained in the lined leachate pond. All storm water would be detained in one of three storm water ponds so that solids are settled before any storm water is released from a controlled event. The quality of the storm water released during a controlled event from the facility is expected to be better than the quality of storm water that currently occurs naturally from the undeveloped site. Thus, there would be no significant impacts to groundwater and a minor positive impact to surface water as a result of construction and operation of the facility.

Construction and operation of the facility would result in a change to the current site topography. Changes in topography may result in the accumulation of snow drifts around the facility and on Highway 16 during periods of heavy snow, or blowing and drifting snow events. The landfill would install snow fences near the windward side of the facility access road and Highway 16 to ensure snow drifts resulting from changes in the site topography do not accumulate on Highway 16. Traffic on Highway 16 would increase from construction and operation of the facility. According to MDT's 2007 Transportation Regional Economic Development Study for the Theodore Roosevelt Expressway (TRE), State Highway 16 is a major north-south thoroughfare for eastern Montana and the region surrounding it, connecting Interstate-90 with Canada. The TRE is currently used for normal vehicle traffic as well as local area farmers and ranchers and trucking companies to transport truckloads of crops, livestock, and other goods. Traffic on these roads would increase once the facility has opened, but the road currently supports loaded commercial and agricultural vehicles.

Average Annual Daily Traffic (AADT) counts since the recent Bakken oil boom have almost doubled from 2008 through 2012. The impact Since the The Federal Department of Transportation and MDT have weight limits for transportation on Federal and State highways and roads. The Roosevelt County Road Department has jurisdiction over local county roads, including the establishment of speed and load limits. All loaded commercial and agricultural transport vehicles are subject to the established loaded limits regardless of the goods or commodities being hauled.

DEQ's determination that licensure of the proposed facility does not result in significant impacts does not set a precedent that would commit DEQ to future actions, nor does it conflict with local, state, or federal laws, requirements, or formal plans. DEQ finds that construction, operation, and post-closure care of the proposed Clay Butte Disposal Landfill would not significantly affect the quality of the human environment both within and surrounding the local area. The proposed project would be reasonably expected to have minor impacts on terrestrial life, vegetation and other aspects of the physical and human environment relative to the current use of the site. However, none of the impacts are significant. Therefore, an EA is the appropriate document to address the potentially minor impacts of the proposed licensure of the Clay Butte Disposal Landfill.

DEQ has considered the factors set forth in ARM 17.4.608 and has determined that the impacts associated with licensure of the proposed facility would not be significant. Therefore, an EIS was not conducted.

SITE ACCESS AND TRANSPORTATION

Comment: *The vehicles transporting waste to the facility will use the McCabe Highway, a County-maintained road. The road will require additional maintenance as a result of the additional traffic from waste containing vehicles.*
Response: Trucks transporting waste to the facility could use the McCabe Highway. Vehicle traffic using the McCabe Highway will impact the road resulting in the need to perform road maintenance. DEQ does not have the authority to establish routes or prohibit trucks from using city, county, state, or federal roads or highways. The McCabe Highway does not provide direct access to the facility, but provides access to Highway 16; the site would be accessed from Highway 16. Access into the site from Highway 16 would be from a developed entrance located in the southeast corner of the facility on the west side of the highway.

Comment: *The facility will cause an increase in truck traffic in the area.*
Response: Data collected from an MDT traffic count station on Highway 16 at Milepost 81 over the last 20 years provides the average number of vehicles passing the station location on any given day of the year, reported as an average annual daily total (AADT). The data shows that the AADT rose from an average of 590 total vehicles per day in 1995 to an average of 1,340 vehicles per day in 2013. The AADT during 2014 was 970 total vehicles per day. The addition of 5 to 30 trucks per day will result in a minor increase in traffic in the area.

Comment: *The increase in truck traffic will require additional road maintenance that should be paid by the applicant, not the local taxpayers.*
Response: While the increase in truck traffic destined for the landfill may impact the surface of the road, the road surface currently supports loaded agricultural and commercial semi-trucks and trailers. The roads in the area that would be used to access the site by loaded semi-trucks and trailers are the

same roads that are currently used routinely by similarly loaded farm and ranch trucks and trailers. Maintenance costs for roads are funded by state fuel taxes. DEQ consulted MDT to provide an accurate response to the question of how costs of road maintenance are assessed. The costs associated with maintenance of the secondary state highway are not externalized onto nearby landowners. According to MDT, every time fuel is put into a vehicle, motorcycle, truck or airplane, the price per gallon of fuel includes fuel taxes. These fuel taxes are collected and placed in a highway revenue account in the state special revenue fund to the credit of MDT. The funds are then allocated by MDT from the special revenue fund to the cities, towns, counties, and consolidated city-county governments for construction, reconstruction, maintenance, and repair of rural roads and city or town streets or alleys. Therefore, any necessary maintenance resulting from the wear and tear of additional traffic would be funded by the state fuel taxes that are included in the price of fuel used in cars and trucks across the state, and are not the sole responsibility of the local area taxpayers.

Comment: *The owner must follow the Montana Department of Transportation (MDT) process for access. Further, no work within the MDT right-of-way will be allowed without permission. Finally, the approach design must take into account the largest vehicle anticipated to use the approach and therefore be designed to prevent vehicles encroaching into oncoming traffic lanes.*
Response: DEQ will forward this information to the applicant.

SURFACE WATER AND GROUND WATER

Comment:*The EA did not address the likelihood of a serious flood.*
Response: As outlined in the surface water discussion in Section 3.0, The facility design includes the construction of three storm water detention ponds. The ponds would function to contain a surge of storm water generated from an intense rainfall or snowmelt event, retain the suspended sediments that would otherwise be contained in storm water runoff that would occur naturally from such an event, and then control the release of the collected water slowly to minimize the downstream impact of storm-induced flooding. The system of ponds and berms is designed to accommodate runoff from the 25-year, 24-hour rainfall with adequate freeboard on pond inlets and berms. The system would also accommodate runoff from the 100-year, 24-hour storm event without overtopping the storm water ponds or berms. All leachate would be contained within the lined disposal unit and the lined leachate pond.

Comment: *The applicant should monitor groundwater more frequently than semiannually.*
Response: The regulations require solid waste management systems perform groundwater monitoring during periods of high and low groundwater.

OTHER

Comment: *The Roosevelt County Sanitarian will be charged with performing inspections, providing compliance assistance, and dealing with any spills on the facility or outside the facility during transportation.*
Response: DEQ regulates the operations associated with licensed solid waste management systems in Montana. Local county environmental health personnel may provide assistance as necessary to respond to spills outside the facility. However, activities associated with facility operations, including inspections and onsite spills, are the responsibility of DEQ.

Comment: *Property values will decline in the vicinity of the site.*
Response: DEQ has no evidence of decreased property values associated with licensure of solid waste management systems in the state. DEQ currently regulates over 145 solid waste management facilities in the state, 34 of which are licensed Class II landfills or landfarms.

Comment: *The level of radioactivity in the waste is hazardous and a hazard to people living near the facility.*
Response: The level of natural radioactivity occurring in the waste is not hazardous. Wastes containing NORM/TENORM are not regulated by federal agencies, including the Nuclear Regulatory Commission. The waste is not subject to regulatory control of the Atomic Energy Act of 1954 or the Low Level Radioactive Waste Policy Act. NORM/TENORM is not nuclear waste nor is it hazardous waste. The radioactivity in NORM/TENORM waste is a result of radium formed from the decay of uranium and thorium in the environment. Radium is a naturally-occurring radioactive metal. In the natural environment, it occurs at low levels in virtually all rock, soil, water, plants, and animals. Since radium is present at low levels in the natural environment, everyone has some minor exposure to it.

For NORM/TENORM to pose a radiation health risk, it must be inhaled or ingested. This is because a vast majority of radiation emitted from NORM/TENORM is in the form of alpha particles. Alpha particles pose little threat externally because they lose their energy quickly. As a result, they only have a short range in air, and travel only a few inches from the source.

Comment: *The landfill will change the topography of the area and cause large snow drifts on Highway 16.*
Response: As waste disposal activities are expanded above the current site elevation, the applicant would install snow fences near the windward side of the facility access road and Highway 16 to ensure snow drifts resulting from changes in the site topography do not accumulate on Highway 16. The snow fence design and placement will be submitted to the Montana Department of Transportation's local district office for review prior to placement.

Comment: *The landfill applicants have not filed a 310 permit application.*
Response: Montana's Natural Streambed and Land Preservation Act requires persons proposing to work in or modify the bed or banks of a perennial stream to first obtain a 310 Permit. There is no perennial stream on site; a 310 Permit is not required.

Comment: *Landfill activities will create wind blown dust.*
Response: The facility would use dust palliatives on interior roads to control fugitive dust created as a result of facility activities, including the haul from the gated facility access to the site scale. In addition, wastes would be wetted, when necessary, so that disposal activities do not result in the generation of fugitive dusts.

Comment: *The facility will accept out of state wastes for disposal and at limits higher than what is allowed in North Dakota.*
Response: The state of Montana does not prohibit the acceptance and disposal of wastes generated outside state borders. The facility would be able to accept wastes from out of state as long as those wastes did not exceed the specific waste disposal limits established for the facility.

Comment: *Trucks transporting wastes to the facility may exceed legal load limits.*
Response: The MDT's Motor Carrier Services (MCS) Division regulates and enforces the vehicle weight and dimension laws on Montana's highway system. Trucks transporting waste to the facility are subject to the State and Federal commercial vehicle laws, rules, and regulations administered by MCS that establish the maximum load limits for commercial vehicles.

Comment: *Birds that land on the leachate pond will be impacted by the leachate.*
Response: DEQ's observations of landfill leachate ponds across the state have not identified problems associated with birds using them. At the Clay Butte site, the combination of the area climate and dry nature of the wastes will reduce the likelihood that significant amounts of leachate are generated. Most leachate generated will be the result of precipitation that falls on and infiltrates the waste. While the leachate pond may contain liquids, the low liquid level in the pond will evaporate more quickly and will likely not be an attraction to birds in the area. As a result, this greatly reduces the potential exposure risk to wildlife. If an unforeseen problem develops, the facility will be required to correct the situation.

Comment: *The facility is 9-times larger than the currently licensed facility near Lindsey and should require a more thorough analysis.*
Response: The DEQ's evaluation of the site is based upon the site characteristics, the facility design, projected capacity, waste management operations, and waste characteristics. The results of the environmental analysis indicated that the impacts associated with licensure of the facility would not be significant.

Comment: *The wastes contain VOCs with unpleasant odors and chemicals.*
Response: The wastes disposed of at the facility will contain both volatile and semi-volatile constituents that have odors. These constituents are found in the liquid (moist) portion of the waste as a dissolved component. As the waste is exposed to the air, when it's brought to the surface, stirred up by handling, and then disposed, the volatile components will dissipate more during evaporation. On the other hand, the semi-volatile constituents do not readily vaporize, but are longer chain hydrocarbons that require higher temperatures to drive them off. As a result, these semi-volatile compounds contribute more to odors typical of crude oil. While the wastes disposed of at the facility contain organic compounds, the concentrations of these compounds will not exceed the limits acceptable for disposal at the facility.