POST CLOSURE PLAN

I. GENERAL REQUIREMENTS

I.A. Post-Closure Period

The post-closure care period will commence at the date of certification of closure and continue for a period of 30 years unless extended by the Department.

Within 60 days after the completion of the post closure care period for each hazardous waste disposal unit, the Permittee and an independent registered Professional Engineer will submit to the Department a certification that the post-closure care activities were in accordance with the Post-Closure Plan. In addition, this certification will include documentation of any previous or on-going incidents, both sudden and non-sudden, that could affect human health and the environment.

I.B. Survey Plat

Within 60 days after completion of closure the Permittee will submit the survey plat and all other information required by 264.116.

I.C. Notice in Deed

Within 60 days of certification of closure of the first hazardous waste disposal unit the Permittee will file the notice to deed as required by Part 264.119.

II. GROUNDWATER MONITORING

The groundwater monitoring requirements specified in the Facility's Groundwater Monitoring Plan will be conducted during the post-closure period. These requirements include procedures for both wells and the secure cells permanent sump.

III. SECURE CELL LEACHATE COLLECTION AND LEAK DETECTION SUMPS

III.A. Number of Systems

There will be 7 Leachate Collection Systems, 7 Leak Detection Systems, and 7 Secure Disposal Cell Permanent Sumps located at the Facility during post-closure. This number is calculated on the basis of one type of each system per secure cell for Secure Disposal Cells numbered 1 through 7.

III.B. Frequency of Monitoring

All of the Leachate Collection Systems and Leak Detection Systems will be inspected semiannually during the post-closure period.

III.C. Volumes Collected

Although the quantities of leachate generated from Secure Disposal Cells at the Facility will be minimal, it is expected that the average yield from all collection systems will be approximately 40 gallons per acre of cap per year in the first year of the post-closure period. It is expected that this number will decrease 10 percent each year thereafter. Based on this projection, approximately 14,245 gallons of leachate will be collected in the post-closure period.

At final closure there will be 65 acres of landfill cap; therefore, in year one, 2,590 gallons of leachate will be collected.

IV. INSPECTION/MAINTENANCE REQUIREMENTS

The inspection schedule provided herein as Appendix 1 will be implemented during the post-closure period. A summary of the structures and facilities that will be inspected during post-closure and the anticipated maintenance activities is presented below.

IV.A. Facility Inspections

IV.A.1. Security devices

An 8-ft chain link fence will be maintained around the perimeter of the Facility. The fence will be topped with barbed wire. All locks and gates along the perimeter fence will be maintained.

Warning signs will be provided and maintained approximately every 200 ft along the perimeter fence during the post closure care period. The legend will read “Danger - Unauthorized Personnel Keep Out” and “Caution – Radioactive Materials.”

If during the post-closure care period there are any signs of unauthorized entry, the Adams County Sheriff's Office and the Department will be immediately notified. In addition, the general inspection schedule frequency will be increased to monthly, for the next quarter.

IV.A.2. Site vegetation

Cover vegetation and surrounding on-site and adjacent off-site vegetation will be inspected for continuity, burrowing animals, presence of species detrimental to cover integrity, and evidence of vegetative stress. In addition, vegetated areas will be inspected for evidence of settling, ponding, or leachate penetration.

IV.A.3. Buildings/Structures

Any remaining buildings or structures will be inspected for security, structural integrity, and rodents.

IV.A.4. Run-off control structures

The slopes and drainage ditches will be inspected for evidence of erosion, obstruction or discoloration.

IV.A.5. General maintenance

The Facility will be inspected for general maintenance items such as mowing, reseeding, mulching, soil replacement, and fertilization.

IV.A.6. Groundwater monitoring wells

Groundwater monitoring wells will be inspected for security (locking caps) and evidence of physical damage to the protective casing or surface grouting on a semi-annual basis during sampling.

All groundwater monitoring wells will have caps and remain locked except when sampling.

IV.A.7. Final cover

Final cover will be inspected for evidence of cracking, subsidence and ponding of rainwater, erosion, presence of burrowing animals of deep-rooted vegetation, continuity of vegetation, evidence of discoloration or leachate penetration. Monuments indicating the exact location of each Secure Disposal Cell will also be inspected.

IV.A.8. Secure Cell Leachate Collection and Leak Detection System

All Leachate Collection and Leak Detection Systems will be inspected to determine the integrity of the riser pipe and existence/level of liquid in the riser pipe during the semi-annual sampling. The Secure Cell Leachate Collection and Leak Detection Systems will be inspected on a regular basis as described in the Inspection Schedule (Appendix 1). Specific inspection requirements are provided below:

IV.A.8.a. Liquid levels in the Leak Detection System of each Secure Disposal Cell shall be noted and recorded. If the liquid level is greater than 1 foot, then the liquid shall be removed until the level is less than 1 ft. The volume of liquid removed shall be recorded. A representative sample of the liquid shall be analyzed for those F039 waste constituents specified in 40 CFR and/or 6 CCR 1007-3, §268.40.

The average daily inflow into the Leak Detection System sump shall be determined by dividing the volume necessary to reduce the level to below 1 ft by the total number of days since the system was last at a level of 1 ft or less. The average daily inflow rate shall be recorded and shall be compared to the applicable Response or Action Leakage Rate specified within the Facility's Contingency Plan.

IV.A.8.b. Inspectors shall check and record the level of liquid in the Secure Disposal Cell Leachate Collection System. If more than one foot is present the sump shall be pumped and the volume pumped shall be recorded. Analysis of a representative sample of the leachate to the Contaminated Water Storage Tanks shall be in accordance for those F039 waste constituents specified in 40 CFR and/or 6 CCR 1007-3, §268.40.

IV.A.8.c. If more than 1 ft of hydraulic head is present in any Leachate Collection/Leak Detection Sump, the frequency for inspection and liquid removal for that Secure Disposal Cell will be increased to monthly until less than 1 ft is produced during any 1 month period.

IV.A.8.d. All liquids removed from the Leachate Collection System(s) and Leak Detection System(s) will either be treated in the on-site waste water treatment system or be disposed of at a permitted hazardous

waste facility.

IV.A.9. Cover elevation reference points

The final cover elevation reference points consisting of surveyed monuments will be inspected for structural integrity. These reference points will be periodically surveyed during the post-closure period to assess the degree of subsidence and/or differential settlement that may occur during post-closure.

IV.A.10. Frequency of Inspections

Inspections will be conducted according to the frequencies specified in Appendix 1.

IV.B. **Maintaining Cover and/or Vegetation**

IV.B.1. Cover Maintenance Activities and Schedule

The majority of the routine maintenance activities are directed at maintaining the integrity of the cover and vegetation and controlling erosion. At a minimum, maintenance activities at the Facility will consist of application of clay soil as necessary to fill erosion channels followed by topsoil and revegetation. It is expected that the level of maintenance activity required will be greatest immediately following closure, and will tend to diminish as cover vegetation becomes established. To detect cover erosion before substantial damage occurs, post-closure inspections are scheduled at more frequent intervals immediately following closure than later in the post-closure period.

In addition to possible erosion damage to the final cover, subsidence and/or differential settling within the Secure Disposal Cells may lead to some minor ponding of stormwater on the cover as well as minor cracking of the cover. Remedial activity for areas in which ponding occurs will consist of application of clay soil in compacted layers, followed by grading to provide proper drainage, and application of topsoil and revegetation.

Remedial activity associated with minor cracking of the cover is identical with that employed to repair erosion channels. As with erosion, it is expected that the greatest potential for ponding and cracking will exist immediately following site closure. For this reason, post-closure inspections are scheduled more frequently

immediately following closure than later in the post-closure period.

IV.B.2. Mowing Schedule

The type of final cover vegetation utilized at the Highway 36 Facility is Blue Grama, Western Wheatgrass and Buffalo grass. To prevent the establishment of deep-rooted species that may jeopardize the integrity of the final cover, all final cover vegetation will be mowed semi-annually or when the vegetation is 8 inches tall throughout the post-closure period.

IV.B.3. Reseeding and Mulching Schedule

As a result of cover maintenance activities and localized failures of cover vegetation, it is expected that periodic reseeding and mulching will be required to maintain uniform vegetation. If large areas (approximately 1/2 acre or larger) require reseeding and mulching, the process will be performed by a hydromulch unit supplied by a contractor. In this instance, the contractor will select Blue Grama, Western Wheatgrass, or Buffalo grass, fertilizer, and mulch. If small areas require reseeding and mulching, the process will be performed by laborers. In this instance, seed consisting of shallow root system plants will be employed. A balanced fertilizer and straw mulch will be employed to assist in establishing vegetation.

IV.B.4. Soil Replacement

Soil replacement will be performed using equipment and labor from a contractor. It is anticipated that for the routine soil replacement activities, clay soil will be borrowed from natural on-site deposits and/or purchased off-site. The soil will then be placed, compacted, and graded using a bulldozer or tracked loader.

IV.B.5. Fertilizing Schedule

A balanced nitrogen and phosphate based fertilizer will be applied at the time of original seeding and also during all revegetation periods. Ten times during the post-closure period, all areas other than the freshly seeded or revegetated areas will be fertilized to promote growth of the existing vegetation.

IV.B.6. Sprinkling Schedule

Climatological data for the Adams County area indicates that evaporation exceeds annual precipitation and that droughts are common. For these reasons, sprinkling

of vegetated areas is planned on an as-needed basis at the present time. This activity will be performed by contract.

IV.B.7. Rodent Control Program

Through regularly scheduled site inspections, burrowing animals may be detected on the Facility's property. If so, any damage to facility structures such as drainage channels or final grading patterns will be repaired by replacement and compaction of the damaged area with clay soil. Persistent problems with these animals may lead to trapping the animals and transporting them off-site.

IV.C. Erosion Control

IV.C.1. Maintenance of Drainage and Diversion Systems:

Site drainage ditches serve to intercept surface water runoff and direct it to outfall ditches or natural drainage pathways.

Since the drainage ditches will occasionally be exposed to significant volumes of runoff moving at comparatively high velocities, it is anticipated that periodic maintenance will be required to repair erosion damage. Additional maintenance will be required on a periodic basis to remove accumulations of sediment and debris that are carried into the ditches by runoff.

Maintenance of eroded portions of the drainage ditches will consist of replacement and compaction of the eroded area with clay soil. Depending on the size of the eroded area, the soil will be either manually compacted and graded, or compacted and graded by a small bulldozer.

Maintenance of portions of the drainage ditches in which accumulations of debris or sediment occur will consist of removal of debris followed by removal of accumulated sediment either manually or using a "Gradall." The greatest amount of drainage ditch maintenance is expected to be required during the first 2 years while final cover vegetation is becoming established. During this period of time the amounts of sediment and debris which accumulate in the ditches will be greater than in later stages following establishment of cover vegetation. For the first 2 years, it is anticipated that drainage ditches will require maintenance twice annually. After the first 2 years, annual maintenance will be adequate.

IV.C.2. Cover Replacement

Clay soil utilized for erosion repair on final cover and drainage ditches will be excavated from natural on-site deposits and/or purchased from off-site sources on an as-needed basis. All soil utilized for cover repair will be of a quality consistent with the original cover material it is designed to replace.

IV.D. Groundwater Monitoring System Maintenance

IV.D.1. Replacement Wells

During the life of the Facility, should it be decided that a well requires replacement, the well casing will be removed and the borehole will be back grouted to the surface. A new well will be installed at the same depth directly adjacent to the old well. The replacement wells will be constructed as described in the Facility's Groundwater Monitoring Plan.

It is estimated that up to 25 percent of the number of responsive monitor wells could require replacement during the 30-year post-closure period. Given that the number of responsive wells is estimated to be 17, this would result in replacement of approximately 4 wells during the post-closure period.

IV.D.2. Routine Maintenance

Annual maintenance of groundwater monitoring wells will consist of development to remove finely divided sediment which may accumulate in the screened interval and well casing, and replacement of eroded grouting and damaged or missing surface protection and security devices. Well development will involve compressed air purging of wells (using an oil-less compressor or filtered discharge) until the well exhibits its original depth.

IV.E. Leachate Collection System, Leak Detection System Maintenance and Secure Disposal Cell Permanent Sump

Due to the upgraded design associated with the major portion of each Leachate Collection, Leak Detection and Secure Disposal Cell Permanent Sump System in which the lateral trench pipes are wrapped in a geotextile material, the maintenance activities that are expected are extremely limited. Repairs to the exposed portion of the surface access standpipes, associated security devices (e.g. locking caps), and standpipe grouting will be performed as necessary throughout the closure period.

Maintenance activities required during the closure period will consist of removal of sand or sediment from the standpipes or sumps, and removal or mowing of vegetation in the vicinity of the surface projection of the standpipes. Any sediment or sand removed from Leachate Collection, Leak Detection, and Secure Disposal Cell Permanent Sump Systems will be transported to an off-site disposal facility.

Throughout the post-closure period, the collection systems within the Secure Disposal Cells will be checked regularly for the presence of leachate. Based on the amount of liquid found in each system, a determination will be made as to the integrity of the collection trenches. If a system is suspected of being clogged, an assessment by a contracted Professional Engineer will be made. All repairs will be made by a certified contractor, based on the Professional Engineer's assessment.

V. POST CLOSURE RESPONSE PLAN

V.A. Loss of Containment Integrity

If there is just 1 employee or contractor on the premises during the post-closure care period, he/she must have immediate access to a device such as a telephone or a hand-held 2-way radio capable of summoning external emergency assistance.

If during the post-closure care period there is a sudden or non-sudden release of hazardous constituents, the appropriate section or section(s) of the Contingency Plan will be implemented. General responses are summarized below.

V.A.1. Groundwater

Groundwater monitoring for the Facility is detailed in the Groundwater Monitoring Plan. Planned post-closure responses to the results of the groundwater monitoring that indicate the presence of groundwater contamination are described in the Facility's Contingency Plan.

V.A.2. Cover Failure

Final cover failure may result from severe erosion, cracking caused by differential settling, or penetration by deep-rooted vegetation or burrowing animals. In the event that final cover failure results in the migration of contamination to surface water, the following response will be initiated immediately upon discovery:

V.A.2.a. If contaminant migration is still occurring, such migration will be

contained as close to the source as possible. Containment will consist of the placement of soil dikes around the source to inhibit the movement of contamination to site drainage systems.

V.A.2.b. Discharge point(s) for site drainage will be blocked, if necessary, to prevent off-site discharge of potentially contaminated runoff.

V.A.2.c. The Department will be notified of the discovery of final cover failure verbally within 24 hours and in writing within 7 days.

V.A.2.d. Following containment of run-off, on-site water contained in site diversion and drainage systems will be sampled sequentially from the source of contamination to determine the extent of contamination. All water found to exhibit hazardous waste characteristics will be removed and transported to an approved off-site facility (injection well, secure landfill with solidification capability, POTW, etc.) for treatment or disposal.

V.A.2.e. The failing portion of final cover will be repaired by excavation and off-site disposal of all contaminated cover materials at a properly permitted facility. The excavated area will then be repaired by replacement of the compacted clay layer, the drainage layer, and the vegetative layer. The replaced materials will be tied into the remaining cover in such a manner as to produce a continuous impermeable cover at the location of the repair.

V.B. Storm Erosion

Facilities at the closed site that may experience substantial erosion as a result of severe storms include the final cover and drainage ditches. The following responses will be employed in the event that such erosion is detected:

V.B.1. Final cover

Sand bags will be positioned over the final cover in a manner that diverts the flow of runoff that is responsible for erosion.

V.B.2. Drainage ditches

Sand bags will be positioned at eroding areas to prevent further erosion and to

contain runoff within the ditches.

V.C. Drainage Failure

Closed site drainage systems may fail as a result of erosion of drainage ditches, change in slope of final cover caused by differential settling, or accumulation of sediment or debris in drainage ditches.

Responses to drainage failure resulting from erosion have been previously described in Section IV.C. of this Post-Closure Plan.

Responses to drainage failure resulting from differential settling will normally be those described in Section V.C. of this Post-Closure Plan. In an emergency situation, sand bags will be used to contain accumulations of runoff until it can be transferred to functional portions of the drainage system.

Responses to drainage failure resulting from accumulation of sediments or debris will normally be those described in Section V.C. of this Post-Closure Plan. In an emergency situation, sand bags will be used to contain runoff within the boundaries of drainage ditches until accumulated sediment or debris can be removed.

V.D. Drought

In the event of a prolonged period of drought, cover integrity and cover vegetation will be preserved by sprinkling water from a leased spray irrigation system or a truck-mounted sprayer.

VI. POST-CLOSURE TRAINING

VI.A. Applicability

Untrained individuals will not be allowed to work unsupervised at the Facility. The following individuals performing post-closure activities will receive training:

VI.A.1. Site Inspectors - (Job description includes performing necessary post-closure site inspections and security. Ensures that maintenance and remedial actions during post-closure are accomplished).

VI.A.2. Sampling Personnel - (Job description includes performing all necessary groundwater, soil and surface water sampling. Collects samples, as required, of liquids from the Leachate Collection System(s)/Leak Detection System(s), and Secure Disposal Cell Permanent Sump(s). Knowledgeable in the proper sampling, preserving labelling, and shipping of samples.)

VI.A.3. Manual Laborers - (Job description includes operations of vehicles and/or equipment in a safe and responsible manner. Performs physical labor and assigned tasks in a safe and efficient manner.)

VI.B. Trainer Requirements

Training will be under the guidance of the Facility's post-closure care supervisor. This individual must be knowledgeable in hazardous waste management procedures including knowledge of the Facility's Permit and Post-Closure Plan. He/she must oversee the individuals and/or companies performing post-closure maintenance or inspections.

VI.C. Training Program

All individuals performing post-closure activities will receive post-closure classroom and on-the-job-training.

VI.C.1. Classroom Training

Classroom training will be given to all individuals performing post-closure activities. Classroom training will consist of the following:

VI.C.1.a. A description of the Facility, including the types of wastes disposed of at the site, and site history.

VI.C.1.b. An explanation of site safety requirements including personnel hazards and the Contingency Plan.

VI.C.2. On-The-Job Training

Post closure inspectors will receive on-the-job-training in the proper inspection procedures, the inspection schedules, and on the types of remedial actions necessary to correct any problem during the post-closure period.

Samplers will receive on-the-job-training on the correct procedure for sampling, preserving, shipping and labelling of samples. The proper use of sampling and monitoring equipment will also be included as part of on-the-job-training.

Manual laborers will receive on-the-job-training in the proper use of equipment and the location of well caps and other physical hazards.

POST CLOSURE PLAN

APPENDIX 1

Inspection Requirements

POST CLOSURE PLAN
INSPECTION REQUIREMENTS
APPENDIX 1

Frequency First Year: Monthly
Frequency Year 2-30: Once every 2 months

GENERAL SITE	PROBLEM YES NO	REMEDIATION
1. **Security**		
-Perimeter Fencing	___ ___	Replace or repair.
-Gates	___ ___	Replace or repair.
-Locks	___ ___	Replace or repair.
-Signs missing from Fencing	___ ___	Replace or repair.
-Signs of Unauthorized Entry	___ ___	Notify Adams County Sheriff's Office and the Department.
-Trash, windblown debris	___ ___	Remove.

PROBLEM DESCRIPTION		
LOCATION:	**COORDINATES**	
REMEDIAL ACTION NEEDED:		
	WORK ORDER #	
RAR NO.:	**REMEDIATION COMPLETION DATE:**	**INSPECTOR:**

2. **Site Vegetation**	**PROBLEM YES**	**NO**	**REMEDIATION**
- Evidence of vegetative stress	___	___	Reseed and mulch with Blue Grama, Western Wheatgrass and Buffalo grass, fertilize.
- Lack of precipitation	___	___	Supplemental sprinkling will take place when there is vegetative stress due to lack of precipitation, during periods of drought, or when there is evidence of excess soil erosion due to lack of precipitation.
- Evidence of erosion, cracking	___	___	Regrade; replace soil
- Evidence of settling	___	___	Regrade; replace soil
- Evidence of water ponding	___	___	Regrade; replace soil; determine if cover drain layer is clogged.

PROBLEM DESCRIPTION		
LOCATION:	**COORDINATES**	
REMEDIAL ACTION NEEDED:		
	WORK ORDER #	
RAR NO.:	**REMEDIATION COMPLETION DATE:**	**INSPECTOR:**

2. **Site Vegetation** (Continued)	**PROBLEM YES**	**NO**	**REMEDIATION**
- Presence of detrimental vegetation	___	___	Remove detrimental growth, reseed area; evaluate mowing schedule.
- Evidence of leachate penetration of soil, or cover	___	___	See Contingency Plan and notify the Department.
- Burrowing animals	___	___	Trap and remove animals.

PROBLEM DESCRIPTION		
LOCATION:	**COORDINATES**	
REMEDIAL ACTION NEEDED:		
	WORK ORDER #	
RAR NO.:	**REMEDIATION COMPLETION DATE:**	**INSPECTOR:**

3. **Remaining Buildings and Structures**	**PROBLEM YES**	**NO**	**REMEDIATION**
- Secure (check locks, windows, entrances)	___	___	Repair or replace.
- Structure sound, maintained	___	___	Remove structure if unsound.
- Rodents	___	___	Remove.

PROBLEM DESCRIPTION		
LOCATION:	**COORDINATES**	
REMEDIAL ACTION NEEDED:		
	WORK ORDER #	
RAR NO.:	**REMEDIATION COMPLETION DATE:**	**INSPECTOR:**

4. **Run-off Control Structures (Ditches)**	**PROBLEM YES**	**NO**	**REMEDIATION**
- Evidence of erosion	___	___	Regrade; Replace soil. Line ditches, if necessary.
- Obstruction in ditches	___	___	Remove.
- Discoloration	___	___	See Contingency Plan.

PROBLEM DESCRIPTION		
LOCATION:	**COORDINATES**	
REMEDIAL ACTION NEEDED:		
	WORK ORDER #	
RAR NO.:	**REMEDIATION COMPLETION DATE:**	**INSPECTOR:**

Post-Closure Inspection Schedule
Frequency Year 1-30; Semi-Annual

GENERAL FACILITY	PROBLEM YES	NO	REMEDIATION
1. **General Maintenance**			
- Mowing	___	___	Twice a year or when greater than 8 inches.
- Need for reseeding and mulching	___	___	As necessary, document location; If recurring problem, investigate.
- Soil Replacement	___	___	As necessary, document location; If recurring problem, investigate.
- Spot fertilization of vegetative cover	___	___	As necessary, document location; If recurring problem, investigate.
- Sprinkling Needed	___	___	As necessary, document location; If recurring problem, investigate.

PROBLEM DESCRIPTION		
LOCATION:	**COORDINATES**	
REMEDIAL ACTION NEEDED:		
	WORK ORDER #	
RAR NO.:	**REMEDIATION COMPLETION DATE:**	**INSPECTOR:**

Ground Water Detection Monitoring and Inspection Monitoring

	PROBLEM YES	NO	REMEDIATION
1. **General Maintenance**			
- Casing intact	___	___	Replace or repair.
- Caps locked	___	___	Replace or repair.
- Aprons intact, not cracked	___	___	Replace or repair.

PROBLEM DESCRIPTION		
LOCATION:	**COORDINATES**	
REMEDIAL ACTION NEEDED:		
	WORK ORDER #	
RAR NO.:	**REMEDIATION COMPLETION DATE:**	**INSPECTOR:**

Leachate Collection and Leak Detection Secure Disposal Cell Sump Systems

		PROBLEM YES	NO	REMEDIATION
1.	Poor integrity of riser pipe	___	___	Repair and notify Management.
2.	Level of liquids in riser pipe Record level _____	___	___	Sample and pump. Notify Management.
3.	Presence of liquid Record level _____ - System over 8 inches	___ ___	___ ___	Sample and analyze. Remove liquids to below 8 inches.

PROBLEM DESCRIPTION		
LOCATION:	**COORDINATES**	
REMEDIAL ACTION NEEDED:		
	WORK ORDER #	
RAR NO.:	**REMEDIATION COMPLETION DATE:**	**INSPECTOR:**

Survey Monuments

		PROBLEM YES	NO	REMEDIATION
1.	Poor structural integrity	___	___	Repair and notify management.
2.	Record level of subsidence and/or differential settlement	___	___	Contact Land Surveyor to assess degree of settlement.

PROBLEM DESCRIPTION		
LOCATION:	**COORDINATES**	
REMEDIAL ACTION NEEDED:		
	WORK ORDER #	
RAR NO.:	**REMEDIATION COMPLETION DATE:**	**INSPECTOR:**

POST CLOSURE COST ESTIMATE

I. OVERVIEW/AMENDMENTS

The Post-Closure Cost Estimate provided herein was developed to coincide with the Post-Closure Plan. This cost estimate will be amended whenever a change in the Post-Closure Plan increases the cost of post-closure care.

II. ASSUMPTIONS

II.A. Groundwater Monitoring

II.A.1. Groundwater monitoring during the post-closure period at the Facility will be conducted in accordance with the Facility's Groundwater Monitoring Plan.

II.A.2. A total of 17 groundwater-monitoring wells and one permanent sump are assumed to produce sufficient water for sampling and analysis during the post-closure monitoring program.

II.A.3. Provided sufficient water is present, the 17 monitoring wells will be sampled and analyzed semi-annually for the parameters specified within the Facility's Groundwater Monitoring Plan.

II.B. Leachate Collection Systems and Leak Detection Systems

II.B.1. The Leachate Collection and Leak Detection Systems at the Facility will be inspected as described in the Post-Closure Plan.

II.B.2. The Leachate Collection Systems will be inspected for fluids on a semi-annual basis. If present, samples will be collected and analyzed on a semi-annual basis for the parameters listed in Section III of the Post-Closure Plan. Assume each of the 7 collection systems will have fluids present once per year.

II.B.3. The amount of leachate collected in the first year will be 2,590 gallons. The amount of leachate collected per year will decrease at an annual rate of 10 percent. Therefore, approximately 24,800 gallons of leachate will be generated during the post-closure period.

II.B.4. Leachate will be removed from the collection systems using a vacuum truck or by a portable pump.

II.B.5. Tank loads of leachate will be transferred to a properly permitted facility.

II.B.6. The seven Leak Detection Systems will be inspected as described in the Post-Closure Plan. Fluids are not expected to be present in these systems throughout

the post-closure care period. However, for the purposes of this estimate, assume two samples will be collected and analyzed per year.

II.C. Maintenance Activities

II.C.1. The post-closure maintenance activities at the Facility will be conducted in accordance with the description of activities contained in the Post-Closure Plan.

II.B.2. During the first year of post-closure, the Facility will receive 12 monthly inspections.

II.B.3. During years 2 through 30 of the post-closure period, the Facility will receive regular inspections once every two months.

II.B.4. During years 1 through 30, additional inspection requirements will be conducted on a semi-annual basis.

II.B.5. During the first two years of the post-closure period, approximately 7 acres (10 percent) of the area that receives final cover will require maintenance consisting of the application of a layer of silty clay soil averaging 6 inches in-place thickness over the entire area followed by grading and re-vegetation.

II.B.6. During years 3 through 30 of the post-closure period, an additional 4 acres of final cover (5 percent) will require maintenance consisting of application of an average 6 inch in-place layer of silty clay soil, followed by grading and re-vegetation.

II.B.7. Cover vegetation will be mowed yearly throughout the post-closure period.

II.B.8. During the first two years of post-closure, seven acres of final cover will require re-vegetation consisting of seeding, fertilizing, and mulching only.

II.B.9. During years 3 through 30 of the post-closure period, an additional 4 acres of final cover will require re-vegetation consisting of seeding, fertilizing, and mulching.

II.B.10. The grass seed used for re-vegetation will be Blue Grama, Western Wheatgrass and Buffalo grass applied at a maximum rate of 32 pounds per acre.

II.B.11. The fertilizer used for seeding and re-vegetation will consist of a balanced nitrogen/phosphate blend applied at a rate of 80 pounds per acre.

II.B.12. The mulch used for re-vegetation will be straw applied at a rate of 100 bales per acre.

II.B.13. Soil required to maintain surface drainage and diversion systems has been included in the quantities required to maintain final cover.

II.B.14. Clay soil for maintenance of final cover and surface drainage and diversion systems will be obtained from on-site stockpiles at the Facility.

II.B.15. During the post-closure period, two monitoring wells will require replacement.

II.B.16. Costs associated with unscheduled maintenance activities, and with responses to possible occurrences will be funded from the 15 percent contingency included in this post-closure estimate.

II.B.17. With the exception of site inspections performed by Facility personnel, all post-closure maintenance activities will be performed by contractors using crews achieving the levels of production specified below.

II.B.17.a) Re-surveying of final cover elevation reference points will be performed by a surveyor and helper. One 8-hour day will be required to complete each re-survey.

II.B.17.b) On-site silty soils required for cover maintenance will be excavated, loaded, and transported to the required location by equipment capable of moving 800 yd^3 per 8-hour day.

II.B.17.c) Cover maintenance including placement, compaction, and grading will be performed by equipment capable of spreading, compacting, and grading 800 yd^3 per 8-hour day.

II.B.17.d) Seeding of portions of final cover that require re-vegetation will be performed by equipment capable of spreading approximately 2 acres of seed per hour.

II.B.17.e) Mulching of portions of final cover that require re-vegetation will be performed by equipment capable of spreading approximately 4 acres of mulch per 8-hour day.

II.B.17.f) Fertilization of the final cover will be performed by equipment capable of spreading approximately 2 acres of fertilizer per hour.

III. Calculations

III.A Groundwater Monitoring

Item	Amount		Unit Rate	Cost	ref.
Sample Monitoring Wells and Permenant Sump	18	ea	200	$3,600	5
Sample Analysis	17	ea	1725	$29,325	4
Total Estimated Cost per event				$32,925	
Total for 2 events per year, 30 years				**$1,975,500**	

III.B Leachate Collection System

Item	Amount		Unit Rate	Cost	ref.
Removal Costs, 7systems per year for 30 years	210	ea	350	$73,500	5
Transportation, 24,800 gallons over 30 years	27800	gal	0.42	$11,676	5
Analytical Costs, 7systems per year for 30 years	210	ea	1725	$362,250	4
Total Estimated Cost				**$447,426**	

III.C Leak Detection System

Item	Amount		Unit Rate	Cost	ref.
Sample LDS	60	ea	200	$12,000	5
Sample Analysis	60	ea	1725	$103,500	4
Total Estimated Cost				**$115,500**	

III.D Maintenance

III.D.1 Inspections

Item	Amount		Unit Rate	Cost	ref.
				$	
First Year (Monthly)	12	ea	514	6,168.00	5
Years 2-5 (Every 2 months)	174	ea	514	$ 89,436.00	5
Semi-Annual Inspections (Years(1-30)	60	ea	514	$ 30,840.00	5
Total Estimated Cost for Inspections				**$ 126,444.00**	

III.D.2 Surveying

Item	Amount		Unit Rate		Cost	ref.
					$	
First Year (Two Surveys)	2	ea	1500		3,000.00	12
Years 2-30 (One Survey)	29	ea	1500	$	43,500.00	12
Total Estimated Cost for Surveys				**$**	**46,500.00**	

III.D.3 Soil Replacement

Item	Amount		Unit Rate		Cost	ref.
First Two Years	1774	cy	5.98	$	10,610.31	5
					$	
Years 3-5	1129	cy	5.98		6,752.02	5
					$	
Years 6-10 (Every 3 months)	565	cy	5.98		3,375.71	5
Total Estimated Cost for Soil Replacement				**$**	**20,738.04**	

III.D.4 Re-Vegetation

III.D.4.a Seeding

Item	Amount		Unit Rate		Cost	ref.
					$	
First Two Years	4	acre	592		2,604.80	5
					$	
Years 3-5	3	acre	592		1,657.60	5
					$	
Years 6-10 (Every 3 months)	1	acre	592		828.80	5
Total Estimated Cost for Seeding				**$**	**5,091.20**	

III.D.4.b Fertilizing

Item	Amount		Unit Rate	Cost	ref.
First Two Years	4	acre	158	$ 695.20	5
Years 3-5	3	acre	158	$ 442.40	5
Years 6-10 (Every 3 months)	1	acre	158	$ 221.20	5
Total Estimated Cost for Fertilizing				**$ 1,358.80**	

III.D.4.c Mulching

Item	Amount		Unit Rate	Cost	ref.
First Two Years	4	acre	706	$ 3,106.40	5
Years 3-5	3	acre	706	$ 1,976.80	5
Years 6-10 (Every 3 months)	1	acre	706	$ 988.40	5
Total Estimated Cost for Mulching				**$ 6,071.60**	

III.D.5 Vegetation Maintenance

III.D.5.a Mowing

Item	Amount		Unit Rate	Cost	ref.
70 acres x 30 years x 2 year	60	ea	4000	$ 240,000.00	1,5
Total Estimated Cost for Mowing				**$ 240,000.00**	

III.D.6 Monitor Well Replacement

Item	Amount		Unit Rate		Cost	ref.
Monitor Well Installation	4	ea	6,000	$	24,000.00	5
Total Estimated Cost for Monitor Well Replacement				**$**	**24,000.00**	

III.D.7 Drainage Ditch Clean Out

Item	Amount		Unit Rate		Cost	ref.
					$	
First Two Years, 2 cleanout per year	4	ea	1800		7,200.00	5
Years 3-30, 1 cleanout per year	28	ea	1800	$	50,400.00	5
Total Estimated Cost for Ditch Cleanout				**$**	**57,600.00**	

III.E Total Maintenance Cost

Total Estimated Cost for Inspections	$126,444
Total Estimated Cost for Surveys	$46,500
Total Estimated Cost for Soil Replacement	$20,738
Total Estimated Cost for Seeding	$5,091
Total Estimated Cost for Fertilizing	$1,359
Total Estimated Cost for Mulching	$6,072
Total Estimated Cost for Mowing	$240,000
Total Estimated Cost for Monitor Well Replacement	$24,000
Total Estimated Cost for Ditch Cleanout	$57,600
Total Maintenance Cost	**$527,804**
10% Contingency	**$52,780**
Total Maintenance Cost	**$580,584**

III.F Total Post-Closure Costs

Groundwater and Permanent Sump Sampling	$1,975,500
Leachate Collection System	$447,426
Leak Detection System	$115,500
Total Maintenance Cost	$580,584
Total Post Closure Cost Estimate	**$3,119,010**

III.G Closure Cost Estimate References

1. Clean Harbors Deer Trail LLC Operational Experiences
2. 2004 Secure Disposal Cell Construction Bids, other Clean Harbors facilities
3. *R.S. Means Environmental Remediation Cost Data, Unit Price 2004*
4. Severn Trent Laboratories (STL), Denver, Colorado
5. Cameron-Cole LLC, Boulder, Colorado
6. Resource Technologies Group; Lakewood, Colorado
7. Poly-Flex, Inc., Grand Prairie, Texas
8. Bulk Materials, Inc., Fort Collins, Colorado
9. Hill Petroleum, Fort Morgan, Colorado
10. Clean Harbors Field Service Center, Denver, Colorado
11. Clean Harbors Environmental Services, Inc. Kimball, Nebraska