



U.S. Department of Energy
Idaho Operations Office

Closure Plan and Post-Closure Care Plan for the Test Area North Demolition Landfill at the Idaho National Laboratory

February 2008

Idaho Cleanup Project

DOE/ID-11347
Revision 0

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February 2008

Prepared for the
U.S. Department of Energy
DOE Idaho Operations Office

ABSTRACT

This Closure Plan and Post-Closure Care Plan will be submitted for the U.S. Department of Energy Idaho Operations Office Idaho National Laboratory Test Area North Demolition Landfill as required by the Idaho Administrative Procedures Act Solid Waste Management Rules in IDAPA 58.01.06. This Closure Plan presents the approach to be utilized to ensure that the clean site/access control and drainage/erosion control standards required to be protective of human health and the environment are achieved in accordance with the requirements of IDAPA 58.01.06.012.

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ACRONYMS

ACM	asbestos-containing material
BEA	Battelle Energy Alliance, LLC
DEQ	Idaho Department of Environmental Quality
DOE-ID	Department of Energy Idaho Operations Office
IDAPA	Idaho Administrative Procedures Act
TAN	Test Area North
TSF	Technical Services Facility

Closure Plan and Post-Closure Care Plan for the Test Area North Demolition Landfill at the Idaho National Laboratory

1. INTRODUCTION

This Closure Plan and Post-Closure Care Plan will be submitted for the U.S. Department of Energy Idaho Operations Office (DOE-ID) Idaho National Laboratory Test Area North Demolition Landfill as required by the Idaho Administrative Procedures Act (IDAPA) Solid Waste Management Rules in IDAPA 58.01.06. This Closure Plan presents the approach to be utilized to ensure that the clean site/access control and drainage/erosion control standards required to be protective of human health and the environment are achieved in accordance with the requirements of IDAPA 58.01.06.012. This Post-Closure Care Plan presents the approach to be utilized to ensure that the integrity/effectiveness of the final cover is maintained, that the security of the closed landfill is maintained, and that routine inspections are performed. The plans ensure compliance with the applicable closure and post-closure specific requirements found in IDAPA 58.01.06.012.05, IDAPA 58.01.06.012.06, and IDAPA 58.01.06.012.11.

1.1 Closure Requirements

The closure requirements identified in IDAPA 58.01.06.012.05 address the following:

- Public notice
- Facility closure
- Clean site and access control
- Drainage and erosion control
- Closure plan certification.

1.1.1 Public Notice

IDAPA 58.01.06.012.05.a. reads as follows: For a facility open to the public the owner and operator shall provide public notice of the facility's closure by publishing a notice in the local newspaper and posting signs at the facility's entrance. This notice shall be published and the signs posted: i. At least thirty (30) days and not more than ninety (90) days prior to the date of last receipt of waste for a facility that has reached disposal capacity; or ii. If the facility has remaining capacity and there is a reasonable likelihood that the facility will receive additional waste, a notice shall be published and signs posted at least thirty (30) days and not more than ninety (90) days prior to closure.

The Test Area North (TAN) Demolition Landfill is not open to the public and thus the requirements relative to public notice are not applicable.

1.1.2 Facility Closure

IDAPA 58.01.06.012.05.b. reads as follows: Unless the Department establishes an alternative closure time period, the owner and operator shall close the facility within six (6) months of the

Department's approval of the Closure Plan. The facility shall be closed in accordance with the approved Closure Plan.

The TAN Demolition Landfill will be closed in accordance with the approved Closure Plan. The demolition landfill received the last waste shipment on October 25, 2007 and had the final cover construction completed by November 15, 2007. Application of an approved seed mix of native vegetation was by November 29, 2007.

1.1.3 Clean Site/Access Control

IDAPA 58.01.06.012.05.c. reads as follows: *The owner and operator shall close the facility by managing or removing all solid waste to prevent impact to human health or the environment and installing a gate or other device to prevent public access after the last receipt of waste.*

All demolition debris from demolition of the remaining TAN facilities that meets the TAN Demolition Landfill Operating Plan requirements will be disposed of in the TAN Demolition Landfill prior to closure. The location of the landfill within the Battelle Energy Alliance (BEA) controlled property fence will prevent public access after the last receipt of waste.

1.1.4 Drainage and Erosion Control

IDAPA 58.01.06.012.05.d. reads as follows: *The owner and operator shall install appropriate measures to control erosion and install appropriate measures to control the run-on and run-off from a twenty-five (25) year, twenty-four (24) hour storm event and to provide for the diversion of other surface waters from the closed facility.*

Drainage ditches and culverts have been installed will to serve as control for the run-on and run-off from a twenty-five (25) year, twenty-four (24) hour storm event. The slopes of the cap have been constructed to minimize erosion of the cap and direct water away from the waste disposal area. A 25-year 24-hour storm event at the TAN LF would generate precipitation of 1.75 inches or approximately 76,230 ft³ (1.75 acre-feet) of water.

A 25-year 24-hour storm event would generate approximately 1.75 inches of precipitation which would produce a volume of 570,240 gallons of water to accumulate in the extreme SSW corner of the LF. The railroad embankment to the west of the landfill has the lowest point of the surrounding dikes at 4782.04 ft. msl; this is approximately six times higher than necessary to contain the water generated during a 25-year 24-hour storm event.

The railroad embankment along the western boundary of the TAN landfill parallels Birch Creek and functions as a dike to guide Birch Creek 100-year flood prone area flows away from the landfill. The elevation of the railroad embankment at the north end of the landfill is 4788.90 ft msl, and decreases to 4782.04 ft msl at the southwest corner of the site. At the elevation of the top of the dikes, Birch Creek Playa has a volume of 21,600 acre-feet, which is greater than the volume of 13,000 acre-feet that would be generated by the hypothetical 100-year peak flow, or the hypothetical volume generated during a 25-year 24-hour storm event. Therefore, no water would run-on the TAN landfill from a 100-year flood or 25-year 24-hour storm event.

1.1.5 Closure Plan Certification

IDAPA 58.01.06.012.05.e. reads as follows: *Within thirty (30) days of closure, the owner and operator shall notify the Department in writing that the facility was closed in accordance with the*

approved Closure Plan. If closure of the facility is different from the approved Closure Plan, the owner and operator shall submit for Department review and approval documents, such as “as-built” plans, showing the final conditions of the facility.

Closure Plan certification will be submitted within 30 days, as required. As-built drawings will accompany the submittal, as required.

1.1.6 Deed Notation

IDAPA 58.01.06.012.11.h.iii. reads as follows: *Federal agencies with responsibility for management of landfills on federal property shall make a notation in the federal property records for the affected property. If the subject property is ever sold or transferred by the federal government, a notation on the deed or patent shall be made.*

After completion of closure plan certification, a notation in the federal property records will be made to provide notice to any potential purchasers or transferees that the property has been used a solid waste disposal facility and its future use is restricted in accordance with the Post-Closure Care Plan.

1.2 Closure Plan Application

IDAPA 58.01.06.012.06 requires submittal of a closure plan application to DEQ no later than ninety (90) days before the date on which the facility receives the known final receipt of wastes if there is no remaining capacity. The TAN Demolition Landfill is being closed with approximately 50 acres of remaining capacity. The completed Closure Plan Application is being submitted as a stand-alone document and accompanies this Closure Plan and Post-Closure Care Plan.

1.2.1 Complete and Accurate Legal Description of the Facility

The TAN Demolition Landfill is located within Township 6 North, Range 31 North, Sections 12 and 13. The landfill is located between the former Initial Engine Test Facility train tracks and the natural escarpment of the former Lake Terreton from west to east and north of the TAN Technical Services Facility (TSF) fence line to an intersection of the escarpment and the train tracks.

1.2.2 Map of the Facility

The TAN Demolition Landfill closure map shows the following pertinent facility features: 1-foot contour intervals, 5-foot index contours, waste disposal limits, facility boundaries, drainage patterns, location of access control measures, and water features and wells within one-quarter (1/4) mile of the facility boundary, and a wind rose. No ponds, lakes, reservoirs, canals, irrigation systems, or existing water supplies are within one-quarter (1/4) miles of the facility boundary (see Figure 1).

Only nonhazardous and nonradioactive demolition wastes have been disposed in the landfill. Nonfriable asbestos-containing material (ACM) that qualifies as Category I nonfriable ACM and has not been subjected to sanding, grinding, cutting, or abrading and Category II nonfriable ACM that has not been crumbled, pulverized, or reduced to powder have been disposed in the landfill. Routine waste characterization prior to disposal ensures that unauthorized waste is not disposed in the landfill. Daily written logs document the types and quantities of waste disposed in the landfill. The narrative log also documents the routine inspections made at the demolition landfill.

1.2.3 Estimated Date of Last Receipt of Waste

The recorded date of last receipt of waste is October 25, 2007.

1.2.4 Description of How Public Access to the Closed Facility Will Be Controlled

The TAN facility is a controlled access location that is controlled using a locked gate and security fencing. The demolition landfill is located within the TAN facility security fence. The security fence and locked gate will prevent public access to the closed facility.

1.2.5 Estimated Waste In-Place

The estimated total volume of waste-in-place is 152,000 cubic yards.

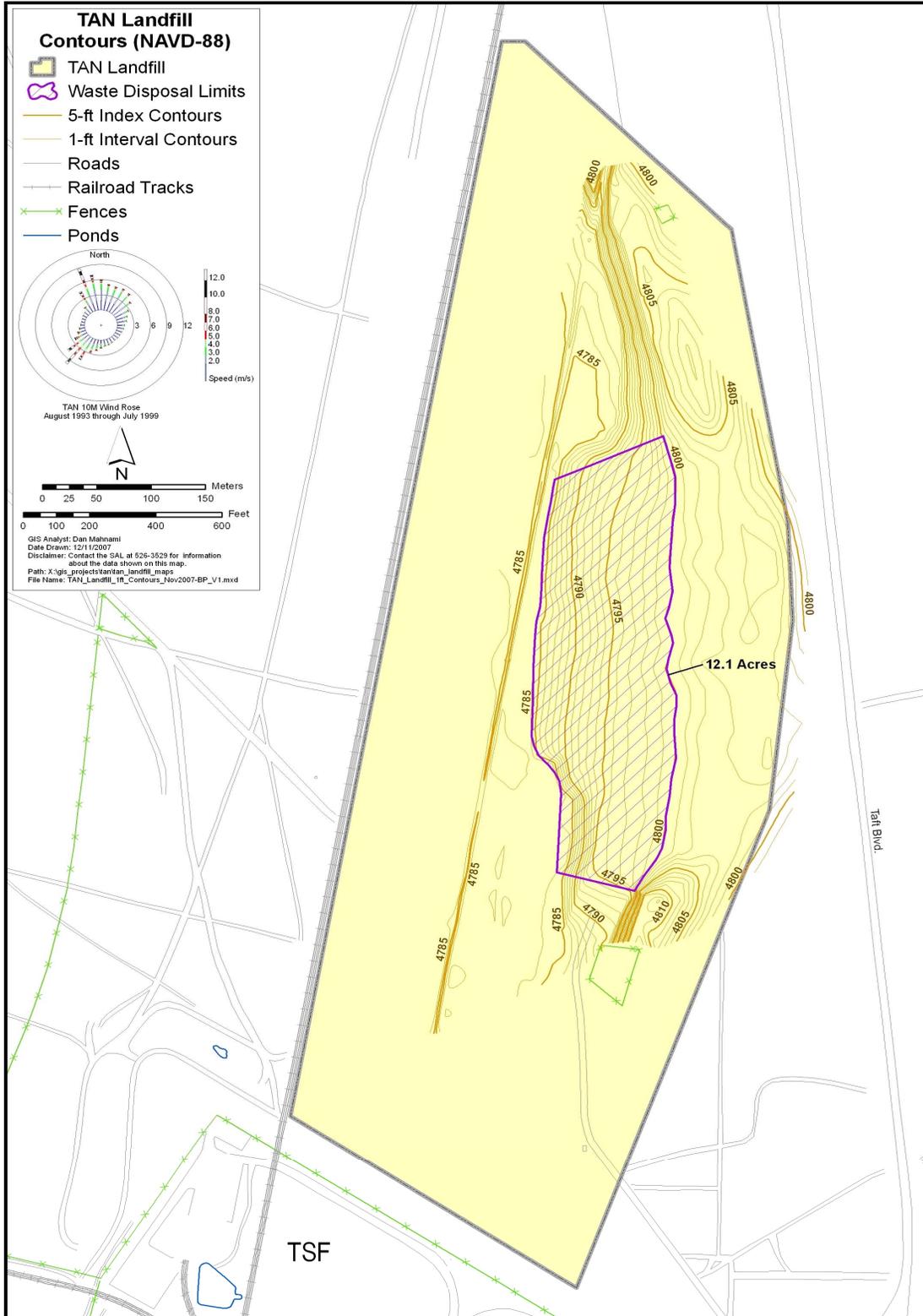


Figure 1. TAN Demolition Landfill topographic map.

1.2.6 Total Acreage of the Facility and Acres Containing Waste

The total acreage of the TAN landfill is approximately 64 acres. The total acreage of the TAN demolition landfill containing waste is approximately 12.1 acres.

1.2.7 Closure Equipment and Procedures to Be Used

Eighteen inches of compacted low permeability soil will be placed for the final cover. This material will be placed in lifts and compacted at or slightly above optimum moisture content to a minimum density of 90 percent of standard proctor. The low hydraulic conductivity compacted final cover shall be placed using standard grading equipment such as scrapers, loaders, or graders. A dozer will be used to tie lifts together and to achieve proper compaction. Graders shall be used to smooth out contours and achieve the final design grade.

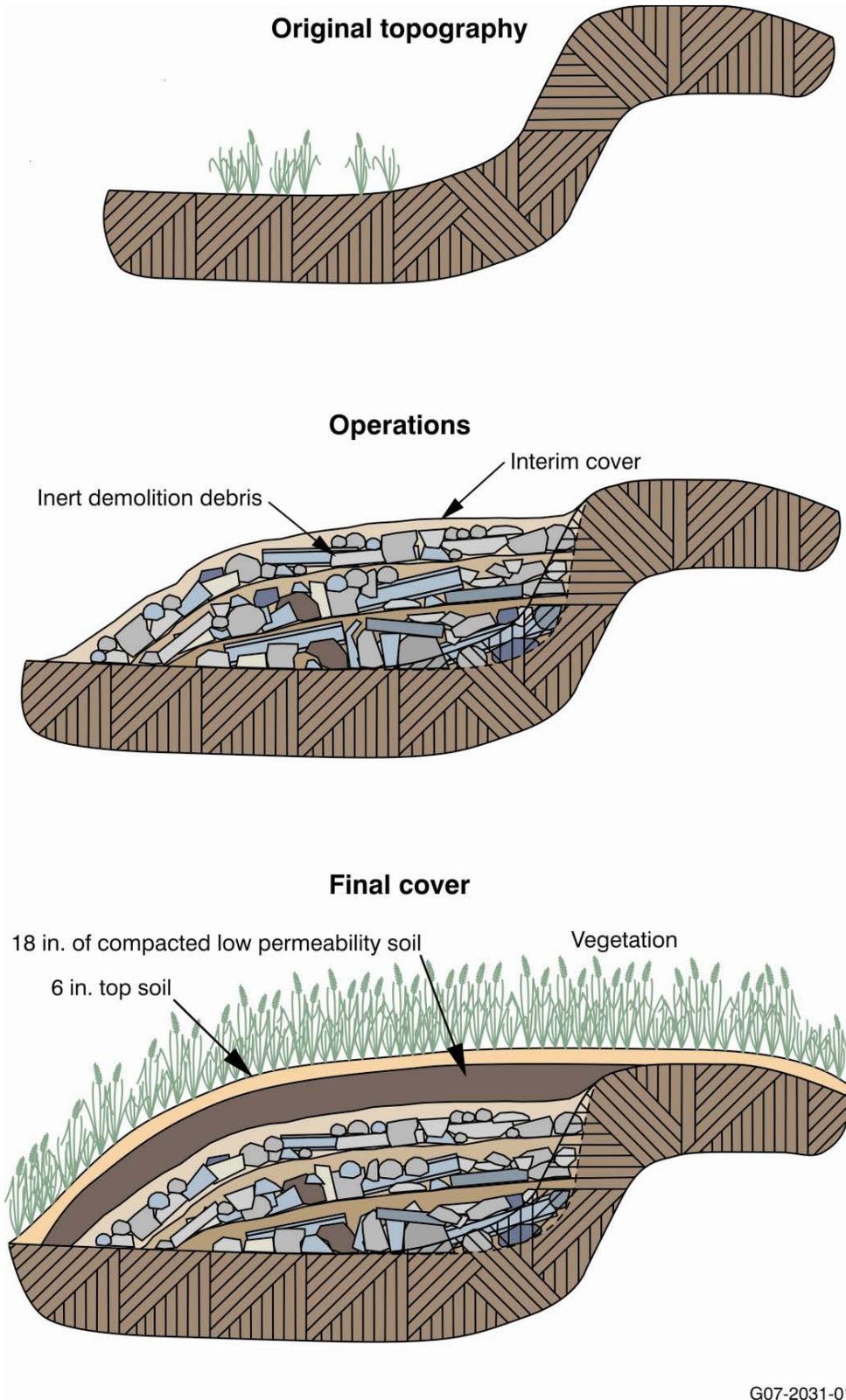
A minimum of 6 inches of topsoil to minimize erosion and sustain plant growth will be placed over the low hydraulic conductivity soil final cover. This topsoil layer will be used for establishing vegetative cover.

1.2.8 Texture, Depth, and Permeability of Final Cover Material

The final cover will consist of fine-grained native soils obtained from the area within the landfill boundary. The material is described as lean clay with sand and representative samples have been tested showing 55 percent clay and 20-30 percent silt and fine grained sand. The soil has a liquid limit of 30 and plastic limit of 17 with optimum moisture content of 16 percent at a maximum dry density of 112 pcf per ASTM D698, "Standard Proctor Method." Approximately 18 inches of final cover material will be placed in lifts and compacted at or slightly above optimum moisture content to achieve a minimum of 90 percent of standard proctor density. Test results have shown that this level of compaction will achieve a hydraulic conductivity less than 1×10^{-6} centimeters per second.

1.2.9 Design and Construction Plan for Any Necessary Final Cover

Within 7 days of the date of the last waste receipt, a 6-inch cover layer of pit run originating from a local borrow pit will be placed to prevent nuisances and vector conditions. This layer of pit run will extend from 6 inches below grade to existing grade. The final cover will consist of 18-inch layer of compacted low permeability soil. This low hydraulic conductivity value is designed to minimize infiltration through the landfill area. A 6-inch soil layer that will minimize erosion and sustain plant growth will be constructed over the low permeability soil layer. The final cover will be graded to prevent surface water ponding and erosion and to conform to the local topography. Finished grade will be approximately 7% and shall include contouring the cap to match the ancient lake shore topography and minimize erosion. Figure 2 depicts a typical cross-section of the TAN Demolition Landfill cover.



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Figure 2. TAN Demolition Landfill cover cross section.

1.2.10 Placement, Design, and Management of Run-On and Run-Off Storm Water Controls

Drainage control ditches will be constructed as necessary to control run-on and run-off of the final cover side slope.

1.2.11 Types of Vegetation and Planting Procedures to be Used for Establishing Vegetative Cover

Native grasses or their functional equivalents will be used in the revegetation effort associated with the final cover cap and other disturbed areas of the TAN Demolition Landfill. Revegetation efforts will start this fall, if applicable, and if weather permits, but no later than the late spring of 2008 or fall of 2008. Planting will be accomplished using disks, harrows, or other similar equipment as well as hand tools and hand-crank seeders, as needed. A commercial seed mix comprised of native grasses seeds will be used for reestablishment of the perennial plant community. Activities associated with post-closure care will focus on maintaining the health and viability of this plant community. Post-closure care will try to minimize invasion by noxious weeds and other invasive plants (e.g., invasive annual species and crested wheatgrass stands).

2. POST-CLOSURE CARE APPROACH

This section describes the approach planned to ensure compliance with the post-closure care requirements specified in IDAPA 58.01.06.012.11.

2.1 Post-Closure Care Requirements

The post-closure care requirements identified in IDAPA 58.01.06.11.i. addresses the following:

- Name and address of authorized agent during the post-closure care period
- Provisions to maintain the integrity and effectiveness of the final cover
- Provisions to continue to maintain and operate the systems required in the operating plan
- Provisions to maintain security of the closed facility
- Provisions for routine facility inspections to ensure compliance with the Post-Closure Care Plan
- Description of the planned use for the property during the post-closure care period.

2.1.1 Authorized Agent

IDAPA 58.01.06.012.11.i.i. indicates that the Post-Closure Care Plan should contain the following: *The name and address of an agent authorized to accept communications or service during the post-closure care period. The name may be changed during the post-closure period by providing the Department with twenty (20) days notice of the change.*

The property owner of record and agent authorized to accept communications or service during the post-closure care period is the Department of Energy located at 1955 Fremont Avenue, Idaho Falls, Idaho, 83402. Notification of name or address change will be provided within 20 days of the change.

2.1.2 Final Cover Integrity and Effectiveness

IDAPA 58.01.06.012.11.i.ii.indicates that the Post-Closure Care Plan should contain the following: *Provisions to maintain the integrity and effectiveness of the final cover.*

The TAN Demolition Landfill consists of compacted demolition and construction waste, which is expected to have minimal settlement. Periodic inspection of the landfill cap for evidence of cracking or settling will ensure that final cover effectiveness and integrity is maintained. Monthly inspections to observe cracking or settling of the landfill cap will be performed for the first 6 months. After the first 6 months, the inspection to observe cracking or settling will be conducted on a semi-annual basis (i.e., spring after snow melt and late fall). Hand tools may be used to fill cracks and the cap will be regraded to prevent ponding, as needed.

2.1.3 Systems Operation

IDAPA 58.01.06.012.11.i.iii.indicates that the Post-Closure Care Plan should contain the following: *Provisions to continue to maintain and operate the systems required in the operating plan, including run-on/run-off control systems.*

The operating plan does not require continued maintenance and/or operation of any systems during the post-closure care period. Periodic inspections of the drainage ditches and storm water collection/evaporation depression for evidence of blockage or erosion will be performed to ensure that run-on/run-off control systems remain intact. This inspection will be performed monthly for the first 6 months and then on a semi-annual basis (i.e., spring after snow melt and late fall) thereafter. Hand tools or construction equipment, as needed, will be used to remove blockages or repair damage caused by erosion.

2.1.4 Security of Closed Facility

IDAPA 58.01.06.012.11.i.iv.indicates that the Post-Closure Care Plan should contain the following: *Provisions to maintain appropriate security of the closed facility.*

The TAN-601 security gate, which is maintained by BEA, will prevent public access after the last receipt of waste. Periodic inspections of the security gate and fence are performed by BEA to ensure that the structure remains intact and debris free.

2.1.5 Facility Inspections

IDAPA 58.01.06.012.11.i.v.indicates that the Post-Closure Care Plan should contain the following: *Provisions for routine facility inspections by the owner and operator to ensure compliance with the Post-Closure Care Plan.*

Idaho Cleanup Project personnel will perform the periodic inspections that are required during the post-closure care period. Periodic inspection of the landfill cap for evidence of cracking or settling will ensure that final cover effectiveness and integrity is maintained. Monthly inspections to observe cracking or settling of the landfill cap will be performed for the first 6 months. After the first 6 months, the inspection to observe cracking or settling will be conducted on a semi-annual basis (i.e., spring after snow melt and late fall). Periodic inspections of the drainage ditches and storm water collection/evaporation depression for evidence of blockage or erosion will be performed to ensure that run-on/run-off control systems remain intact. This inspection will be performed monthly for the first 6 months and then on a semi-annual basis (i.e., spring after snow melt and late fall) thereafter. Periodic inspections of the security

gate and fence will be performed to ensure that the structure remains intact and debris free. This inspection will be performed monthly for the first 6 months and then on a semi-annual basis (i.e., spring after snow melt and late fall) thereafter.

2.1.6 Planned Use

IDAPA 58.01.06.012.11.i.vi.indicates that the Post-Closure Care Plan should contain the following: *A description of the planned use(s) of the property during the post-closure care period.*

There is no planned use of the property during the post-closure care period.

2.2 Post-Closure Care Timeframe

Post-closure care of the closed TAN Demolition Landfill will be conducted for a period of 5 years from the date of completion of closure certification.

2.3 Post-Closure Standards and Inspection

There will be no post-closure use and operation of the site, other than that use associated with performance of post-closure care inspections and maintenance. The final cover and storm water controls systems will not be disturbed in a manner that will increase the potential to threaten human health or the environment.