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July 5, 2011

Mr. Mikel Elsen, Supervisor
Waste Management Section
Washington Department of Health
Division of Radiation Protection
111 Israel Road S.E.
P.O. Box 47827
Olympia, WA 98504-7827

Re: Revised Proposal for Disposal for Midnite Mine Water Treatment Plant Solids in Tailings Disposal Area 4

Dear Mr. Elsen:

Dawn Mining Company LLC (DMC) hereby submits to the Washington Department of Health (WDOH) this revised proposal for an amendment to Radioactive Materials License WN-I043-2 to allow continued disposal of Midnite Mine water treatment plant (MMWTP) solids in Tailings Disposal Area 4 (TDA-4). This revised proposal is developed in response to the WDOH's completeness review of DMC's original February 14, 2011 proposal and March 18, 2011 Addendum, which WDOH provided to DMC in its April 1, 2011 letter, and WDOH's completeness review of DMC's Draft Revised April 26, 2011 proposal which WDOH provided to DMC in its June 8, 2011 letter.

1. Description of MMWTP Solids Disposal Request

DMC proposes to dispose MMWTP solids[1] in TDA-4 for as long as it remains available for such disposal. The availability of TDA-4 is tied directly to the evaporation pond system in that TDA-4 will remain open while the evaporation pond system remains in operation. Once the evaporation pond system is terminated and decommissioned, the final radon barrier will be constructed over the tailings disposal areas and TDA-4 will no longer be available for MMWTP solids disposal.

1.1 TDA-4 Availability for MMWTP Solids Disposal

WAC 246-252-030, Criterion 6A(a), requires DMC to place the final radon barrier over the tailings disposal areas at the Millsite as expeditiously as practicable. DMC is committed to

[1] MMWTP solids refers to the precipitated solids that are produced in the final step in the water treatment plant process which separates the precipitates from the releasable (treated) water by centrifugence. The MMWTP solids can contain between 15% and 22% solid material with the remainder of the material made up of entrained water. The MMWTP solids produced by the centrifuge have been previously referred to as "sludge. "

working with WDOH to ensure compliance with Criterion 6A(a). In 1995, the evaporation pond system, designed to address contaminated groundwater and TDA-4 water at the Millsite, was constructed on top of tailings disposal areas 1, 2, and 3. Before the final radon barrier can be placed over the tailings disposal areas, the evaporation pond system must be decommissioned. See Evaporation Pond Water and Residuals Management Plan (2011 Evaporation Plan), submitted to WDOH under separate cover.

The 2011 Evaporation Plan provides a "base-case" estimate that evaporation system termination and decommissioning will occur in 2013. The base-case estimate does not take into account TDA-4 water pumping or possible Stockpile Area groundwater pumping, either of which would add to the amount of time needed to complete evaporation.[2] The 2011 Evaporation Plan contemplates, but does not yet take into consideration, the exploration of options that could expedite the evaporation process and/or the decommissioning of the existing evaporation ponds.

Based on the 2011 Evaporation Plan, TDA-4 will remain available for MMWTP solids disposal through at least 2013. In the annual Integrated Project Schedule (IPS), DMC will update both the Evaporation Pond Water and Residuals Management Plan and the Millsite closure schedule. The information presented in the annual IPS will enable WDOH to determine, on an ongoing basis, whether: (1) DMC is in compliance with Criterion 6A(a) by moving toward placement of the final radon barrier as expeditiously as practicable; and (2) TDA-4 remains available for MMWTP solids disposal.

1.2 TDA-4 Has the Capacity to Receive Additional MMWTP Solids

The remaining capacity in TDA-4 is sufficient to accommodate disposal of the estimated quantities of MMWTP solids and Millsite materials (building debris, evaporation pond residues and soils) that will be generated during final closure activities. Only about one-third of the remaining capacity in TDA-4 will be utilized for the disposal of MMWTP solids and Millsite material based on conservative estimates of the potential volume of all these materials. See Section 4.[3]

Since the issuance of Amendment 25 of DMC's license, TDA-4 stabilizing fill construction has been completed to "close" TDA-4 (meaning that TDA-4 no longer collects additional water that contributes water to the evaporation ponds system) and TDA-4 is being readied for final reclamation cover construction. However, TDA-4 is not "closed" in the sense that no capacity remains for disposal of MMWTP solids or other Millsite materials. Capacity remains available for this disposal.

Utilization of the remaining capacity in TDA-4 for such disposal will not affect the timing or effectiveness of the Millsite closure or performance of the reclamation of the tailings

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[2] The data collected by DMC is too preliminary to confidently estimate the duration of TDA-4 water pumping. Likewise, the Stockpile Area groundwater data is still being collected and it has not yet been determined whether Stockpile Area groundwater remediation will be necessary. In the absence of the data, the 2011 Evaporation Plan provides a preliminary estimate that for each year of added pumping to the evaporation pond system, one year of additional evaporation may be necessary. See 2011 Evaporation Plan.

[3] DMC also understands that because the original environmental review of disposing MMWTP solids into TDA-4 was based on a volume of 753,500 cubic feet of MMWTP solids, DMC cannot surpass that amount without undergoing additional WDOH environmental review. However, based on conservative estimates, it would take over eleven additional years to reach that volume of material.

disposal areas. As with the previous MMWTP solids disposal, and as discussed below, the disposal of MMWTP solids and other Millsite materials in TDA-4 will be located and managed so that radon emanation, groundwater protection and reclamation cover stability are maintained to achieve the required criteria for long-term control of radioactive materials and protection of environmental quality.

2. Background

DMC sought and received approval from WDOH for direct disposal into TDA-4 of MMWTP sludge in 2001 and again in 2009.

2.1 WDOH Approved MMWTP Sludge Disposal in 2000

In 2000, when DMC originally sought approval from WDOH to dispose MMWTP sludge in TDA-4, DMC anticipated the need to dispose of the sludge through 2004.[4] While at that time DMC did not expect that sludge disposal would be necessary beyond 2004, WDOH evaluated and ultimately approved DMC's proposal based on disposing MMWTP sludge in TDA-4 until 2008.[5] DMC's Radioactive Materials License (RML), issued in 2001, permitted DMC to dispose MMWTP sludge in TDA-4 and placed no time limit on the sludge disposal.[6] WDOH amended DMC's license in 2007 to require that disposal of MMWTP sludge in TDA-4 cease at the end of 2008.[7]

2.2 WDOH Approved Extending MMWTP Sludge Disposal in 2009

In 2008, DMC applied to WDOH to continue disposal of MMWTP sludge in TDA-4 for as long as TDA-4 would be open and available for such disposal, which at that time was anticipated to be through the year 2010.[8] WDOH determined that continued sludge disposal through 2010 would not interfere with the timing of closure activities and construction of the final radon barrier and would pose no significant adverse environmental impacts.[9] WDOH approved the extension of MMWTP sludge disposal through 2010.[10]

2.3 WDOH Approved Placement of MMWTP Solids On Top of the Overliner Backfill in 2010

On August 6, 2010, DMC requested approval from WDOH to dispose of MMWTP solids in a disposal cell constructed on top of the overliner backfill. See Letter from Louis Miller, Miller Geotechnical Consultants, Inc., to Dorothy Stoffel, WDOH (August 6, 2010). WDOH approved the placement of approximately ten truckloads of MMWTP solids on top of the overliner backfill in a manner similar to that proposed herein. See Letter from Sheila Pachernegg, WDOH, to Robert Nelson, WDOH (August 16, 2010).

2.4 DMC Continues to be Responsible for Operation of the MMWTP and For Disposal of the Resulting MMWTP solids

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[4] See DMC Application to Amend Radioactive Materials License at page 1, footnote 1, and Attachment 1, page 1 (February 16, 2000).
[5] See Technical and Environmental Evaluation at pages 8-9 (June 2000) (2000 TEE).
[6] See RML WN-I043-2, Amendment 23 at Conditions 29-33.
[7] See RML WN-I043-2, Amendment 24, Condition 33 (2007).
[8] See DMC Request for Extension of Sludge Disposal at page 2, footnote 2 (November 20, 2008).
[9] See WDOH Technical Evaluation Report at page 4 (January 2009) (2009 TER).
[10] See RML WN-I043-2, Amendment 25, at Condition 33 (2009).

DMC currently remains responsible for the operation of the MMWTP and the disposal of the resulting MMWTP solids. DMC's mine water treatment requirements are set forth in the *Environmental Protection Agency Unilateral Administrative Order and Statement of Work for Water Treatment and Sludge Disposal at Midnite Mine Superfund Site*, dated November 7, 2008.

2.4.1 Other MMWTP Solids Disposal Alternatives

Concurrent with this proposal, DMC continues to explore other MMWTP solids disposal alternatives.

2.4.1.1 U.S. Ecology

An alternative currently being used as an interim measure by DMC is disposing the MMWTP solids at the U.S. Ecology Low-Level Radioactive Waste facility at Hanford (US Ecology facility), located northwest of Richland, Washington on approximately 100 acres of land within the Hanford Nuclear Reservation. The facility, which is leased to the State of Washington, is approximately 190 miles from the Midnite Mine. Source material is explicitly permitted as material that may be disposed at the US Ecology facility.[11] The US Ecology facility is not licensed as a bulk facility and imposes onerous and costly restrictions on the processing and packaging of the MMWTP solids prior to disposal. In addition, the disposal fees at U.S. Ecology are enormously expensive. While DMC is currently sending MMWTP solids to U.S. Ecology as a temporary interim measure during WDOH's review of DMC's application, the expenses associated with this alternative make it unreasonable and impractical as a long-term alternative.

2.4.1.2 Denison White Mesa Mill

Another alternative would involve processing the MMWTP solids at the Denison White Mesa Mill in Utah. In 2008 DMC identified the Denison mill as a possible facility to accept and process MMWTP solids for the uranium content. DMC began discussions with Denison in 2009 and shipped a sample of MMWTP solids for process testing. This was done in conjunction with Denison taking yellow sand for processing. DMC met with Denison staff in January of 2010 to formally request that Denison begin the process to amend its license to accept sludge as alternate feed material. DMC offered to provide Denison with all the information for the license amendment in the form of a draft license amendment application. Denison predicted that it would be able to receive a license amendment in less than a year and there was a chance that some of the 2010 MMWTP solids could be processed at their mill. After several months of sporadic communications (due to Denison's unresponsiveness), in June of 2010 DMC provided a complete draft application for Denison to submit to the Utah Department of Environmental Quality (UDEQ) for a license amendment to accept MMWTP solids as alternate feed material. From June 2010 through April 2011, Denison was unresponsive to DMC's offers of additional

[11] See RML WN-I019-2 at 6B. Disposal of the MMWTP solids is allowed at the US Ecology Hanford facility because it contains greater than 0.05 percent natural uranium and is considered uranium ore and Source Material as per 10 CFR Part 810.3. Therefore, this material is specifically exempted from the Resource Conservation and Recovery Act (RCRA) under 40 CFR Part 261.4 and is not listed as hazardous waste as defined by RCRA 40 CFR Part 261.3. In addition, based on analytical test results, this material does not exhibit the characteristics of hazardous waste, including toxicity, ignitability, corrosivity, or reactivity. As a result, this material is not classified as mixed waste. WDOH concurs that the MMWTP solids is source material. (Mike Elsen e-mail, dated December 20, 2010.)

assistance and information. Finally, on April 27, 2011, Denison submitted a license amendment application to the UDEQ to allow Denison take the MMWTP solids as alternate feed material.

While not as expensive as disposal at U.S. Ecology, sending the MMWTP solids to the Denison mill is costly. DMC would be required to pay the entire cost of transporting and processing the MMWTP solids at the Denison mill without receiving any credit for the value of the resulting uranium.

2.4.1.3 Other Alternatives

In addition to the above-mentioned alternatives, DMC has considered others, including:

- Disposing of the MMWTP solids on-site at the Midnite Mine. While this alternative is DMC's preferred alternative, DMC has been advised by the EPA that it will not permit DMC to undertake this approach because of the objections of the Spokane Tribe of Indians.

- Constructing a new disposal cell at the DMC Millsite.[12] DMC is investigating the viability of this alternative as a long-term possibility. However, the time required for permitting, construction and implementation prevent this from being considered in the short-term.

2.4.2 Disposal of MMWTP solids in TDA-4 is the Best Short-Term Alternative

Disposal of the MMWTP solids in TDA-4 while it remains available for such disposal is the best short-term alternative for several reasons:

- Disposal of the MMWTP solids in TDA-4 will result in no significant environmental impacts. See Section 8.6, below.

- Disposal of the MMWTP solids in TDA-4 will not delay or interfere with the placement of the final reclamation cover or other closure activities. See Section 8.7, below.

- Disposal of the MMWTP solids in TDA-4 can be done at a minute fraction of the expense of other alternatives being considered.

- Disposal of the MMWTP solids in TDA-4 involves transporting the material a much shorter distance when compared with other available alternatives.

- Disposing of the MMWTP solids at the Hanford LLRW facility unnecessarily consumes valuable disposal space that could otherwise be used for more appropriate material containing higher levels of radioactivity.

Disposal of the MMWTP solids in TDA-4 while it remains available for such disposal makes technical and economic sense. There is sufficient remaining capacity for disposal of MMWTP solids and the other Millsite materials. DMC has been successfully placing MMWTP solids in TDA-4 since 2001.

[12] This alternative of a new disposal cell at the DMC Millsite is one that is different and distinct from the current proposal to continue disposing of MMWTP residuals into TDA-4

3. MMWTP Solids Chemical and Radiological Characteristics

The chemical and radiological characteristics of the MMWTP solids are the same as those of the historically produced sludge; the chemical treatment process will not change. There is a long history of sludge chemical analysis. Table 1 provides a summary of the physical and radiological (uranium and radium) sludge analysis results from 2002 to 2010. Table 2 provides the TCLP test results on sludge from 2002 to 2010. TCLP testing has been preformed annually by DMC on sludge and has shown that the sludge does not characterize as hazardous or dangerous waste.

Table 1. MMWTP Sludge Volume, Density, and Uranium, Radium and Moisture Contents for 2002 Through 2010

	Sludge Volume (cubic feet)	Uranium (mg/kg dry)	Radium (pCi/g)	Moisture %	Density (g/cc)
2002	22,060	11,079	11.3	83.76	1.10
2003	29,704	9,700	5.3	83.6	1.10
2004	24,750	8,600	2.4	87.0	1.10
2005	15,420	19,000	11.0	86.4	1.10
2006	45,220	11,200	9.1	86.3	0.90
2007	36,005	12,000	24.2	84.3	1.09
2008	30,944	13,500	10.8	79.4	1.11
2009	33,675	12,800	8.7	85.2	1.02
2010	28,521	16,400	6.7	82.1	1.10

Table 2. TCLP Test Results on MMWTP Solids for 2002 Through 2010

	Arsenic	Barium	Cadmium	Chromium	Lead	Mercury	Selenium	Silver
Sample Date	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
2002	<0.05	<10	<0.1	<0.5	<0.5	<0.02	<0.1	<0.5
2003	<0.5	<10	0.2	<0.5	<0.5	<0.02	<0.1	<0.5
2004	<0.5	<10	<0.1	<0.5	<0.5	<0.02	<0.1	<0.5
2005	<0.5	<10	<0.1	<0.5	<0.5	<0.02	<0.1	<0.5
2006	<0.5	<10	0.25	<0.5	<0.5	<0.02	<0.1	<0.5
2007	<0.5	<10	<0.1	<0.5	<0.5	<0.02	<0.1	<0.5
2008	<0.5	<10	<0.1	<0.5	<0.5	<0.02	<0.1	<0.5
2009	<0.5	<10	<0.1	<0.5	<0.5	<0.02	<0.1	<0.5
2010	<0.5	<10	<0.1	<0.5	<0.5	<0.02	<0.1	<0.5
40 CFR Part 261.24	5	100	1	5	5	0.2	1	5
PASS?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table 3 provides analytical results of TCLP and SPLP testing of a sample of MMWTP solids from a bench scale pressure filter test conducted on solids produced near the end of the 2010 treatment season. This analytical testing was conducted specifically to determine the effect of

rainwater percolating through the material. The results of that testing demonstrate that soluble constituents in the MMWTP solids are not mobilized by rainwater. The bench scale pressure filter test resulted in no alteration to the MMWTP solids other the more aggressive removal of entrained water.

Table 3. Results of TCLP and SPLP Testing of 2010 Bench Scale Filter-pressed MMWTP Solids

Analyses	Result	Units	RL
METALS – TCLP EXTRACTABLE			
Arsenic	ND	mg/L	0.5
Barium	ND	mg/L	10
Cadmium	ND	mg/L	0.1
Chromium	ND	mg/L	0.5
Lead	ND	mg/L	0.5
Mercury	ND	mg/L	0.02
Selenium	ND	mg/L	0.1
Silver	ND	mg/L	0.5
Uranium	ND	mg/L	0.5
METALS – SPLP EXTRACTABLE			
Arsenic	ND	mg/L	0.001
Barium	ND	mg/L	0.1
Cadmium	ND	mg/L	0.01
Chromium	ND	mg/L	0.05
Lead	ND	mg/L	0.05
Mercury	ND	mg/L	0.0010
Selenium	ND	mg/L	0.001
Silver	ND	mg/L	0.01
Uranium	ND	mg/L	0.0003

4. Remaining Capacity in TDA-4

The remaining capacity in TDA-4 after completion of the construction of stabilizing fill in 2009 and 2010, which eliminated TDA-4 as a contributing water source to the evaporation pond system and thus for reclamation purposes "closed" TDA-4, is very large when compared to the conservatively estimated volume of MMWTP solids and Millsite material that will be

disposed in TDA-4 before final reclamation of the Millsite occurs. The remaining capacity is conservatively calculated to be approximately 150,000 cubic yards. This volume is derived by calculating the volume in TDA-4 that will exist beneath the bottom of the radon barrier cover[13] and the top of the material that will be placed (i.e., an 18 inch thick protective fill on top of the overliner backfill surface) in preparation for the disposal of MMWTP solids and contaminated mill and evaporation pond material. The overliner backfill surface and the proposed general area of disposal is shown in Figure 1 and the cross sections provided in Figure 2 show the area above the protective fill and the bottom of the radon barrier cover which represents the remaining capacity. Further, the lateral boundary of the remaining capacity is a vertical line located 5 feet inside the outer location of the overliner before the overliner enters the anchor trench. Computer aided design software (Autocad) was used to calculate the remaining capacity volume. As discussed below in Section 7.0, the anticipated volumes of MMWTP solids and Millsite material to be disposed in TDA-4 will be far less than the remaining capacity.

5. MMWTP Solids Disposal in TDA-4

5.1 MMWTP Solids Disposal Operations

DMC will dispose the MMWTP solids in the general area for disposal shown on Figure 1. It is expected that the primary disposal area will be around the eastern and northeastern perimeter areas of TDA-4 where the reclamation cover will be thickest (in the area of reclamation cover transition from TDAs 1-3 to TDA-4). The initial concept for the annual sequencing of MMWTP solids disposal is shown in Figure 3. Figure 4 provides a generalized cross section of the annual MMWTP solids disposal showing the development of the daily solids "tacos" described in Section 5.2 below and the clean fill borrow edge berms along the perimeter of TDA-4 that ensure that the disposal of solids and Millsite material will be inside the edge of the TDA-4 overliner. MMWTP solids will be disposed by end-dumping from the transport trucks onto a section of reinforced polyethylene (RPE), or equivalent, which has been placed on the surface of the disposal location for that load. The RPE will be of sufficient length and width to accommodate each days load and allow for it to be folded over the load into a "solids taco" as described in Section 5.2, below. The goal is to isolate the solids to prevent contact with precipitation, yet provide openings at the sides to allow limited desiccation. In addition, DMC will construct a cover liner of 40 mil HDPE over all of the annually disposed material.[14]

5.2 MMWTP Annual Disposal Concept

The annual disposal of MMWTP solids is expected to follow the general plan presented in the follow steps:

- Placement of MMWTP solids will be by end-dumping from the same haul truck that DMC has used in the past. The dumping will occur in rows and the dump height and width is expected to be about 3 feet and 10 feet respectively based on haul truck dimensions.

[13] This calculation is based on the radon barrier cover design presented in the 2009 IPS. DMC will present updated information regarding the reclamation cover and radon barrier in its 2011 IPS

[14] DMC will demonstrate that the final reclamation cover and radon barrier constructed over TDA-4 will meet all State performance requirements after all disposal is completed. DMC will present this information in its 2011 IPS.

- The disposal area, including roadways on the overliner backfill, will be prepared prior to delivery of the MMWTP solids by construction of an 18 inch protective fill layer (the fill will be the same type of fill used in the construction the TDA-4 subgrade in 2009 and 2010). The 18 inch protective fill layer will be placed on top of the existing 18 inch overliner backfill, for a total of 36 inches of separation between the haul truck traffic and the overliner. Figure 4 shows a generalized cross section illustration of the disposal area.

- A berm will be constructed along the edge (the "edge berm") of TDA-4 to separate the disposal area from the TDA-4 side slope. The edge berm will extend into TDA-4 so that the disposal area is located approximately 5 feet inside the location of the overliner at the anchor trench. The edge berm will be approximately 3 feet high and constructed by end dumping clean borrow fill and will be extended periodically as disposal operations proceed.

- A second berm will be constructed approximately perpendicular to the edge berm to provide enclosure (the "enclosing berm") on one side of the disposal area. This enclosing berm will be approximately 3 feet high and created by end dumping clean borrow fill. The enclosing berm will provide the end point where solids dumping will begin and proceed along the end berm. A new row of dumping will begin adjacent to the preceding row in as many rows as needed until the annual disposal is completed. DMC will build the annual areas to essentially the dimensions shown in Figure 3 but will vary the configuration as site and solids production dictate. At the end of annual disposal enclosing berms will be placed on the two open sides of the disposal area in preparation for construction of the HDPE cover.

- Prior to dumping MMWTP solids, an RPE sheet approximately 12 feet wide will be placed over the area where the solids will be dumped each day and extended over the enclosing berm or previous days solids taco in a length sufficient to cover the next solids dump. MMWTP solids will be dumped on the RPE-covered floor area and the extra length pulled over the dumped solids. A new length of RPE will then be placed adjacent to completed solids taco ready for the next days solids disposal dump. This process of periodic RPE placement and MMWTP solids covering will be continued during the annual disposal period. The placement of the RPE under the MMWTP solids, and the daily covering of the solids in the solids RPE taco ensure that MMWTP solids are protected from summer rain fall. Side openings will allow limited desiccation. Sand bags or fill will be placed on the surface of the RPE solids tacos to stabilize the surfaces as determined warranted by DMC.

- Annual Covering – at the end of each year of disposal, an earthmoving contractor will cover the annual disposal area with approximately 12 inches of borrow fill and grade and prepare the surface for installation of a 40 mil HDPE liner cover. After the fill surface is prepared the HDPE liner will be installed by a liner installation contractor. The liner over the first annual disposal area will be anchored on all sides of the area. In subsequent years, the liner will be anchored on the interior and exterior sides of the disposal area and overlapped onto the existing liner of the adjacent disposal covered areas. Cross sections of the annual covering are shown in Figure 4. The cover liner will be covered by a protective and stabilizing clean borrow fill layer of approximately 18 inches.

- A settlement monument will be established on the covered surface of the annual disposal area and monitored on the schedule established for the other TDA-4 settlement monuments.

MMWTP solids disposal operation procedures are set forth in DMOP 18a, attached hereto as Attachment B.

6.0 Disposal of Millsite Contaminated Material in TDA-4

The Millsite materials that will be disposed of in TDA-4 during final closure and reclamation activities include contaminated Millsite soils, building demolition debris and evaporation pond cleanout residues. These Millsite materials will likely be generated during and after evaporation pond decommissioning is occurring and when the reclamation cover is being constructed. The sequencing of the disposal of these materials has not been finalized at this time. A description of the materials and a conservative estimate of the volumes are presented in the following subsections. The initial concept for the location of Millsite material disposal is illustrated in Figure 5. As this illustration shows, the Millsite material will be placed over the completed annual solids disposal areas. The plan for Millsite material disposal will be finalized and submitted to WDOH for review and approval prior to placement of the material into TDA-4.

6.1 Building Demolition Debris

The remaining Millsite buildings, the office and laboratory and maintenance buildings will be demolished as one of the last elements of Millsite closure so these facilities can be used to support other closure activities. A conservative estimate of the volumes of the buildings and structures that will be demolished (which assumes no material salvage) and of demolition debris are provided in Table 4 and the location of the buildings is shown in Figure 6.

Table 4. Buildings and Structures To Be Demolished and Estimated Volumes of Debris

Structure	Area (ft^2)	Floor (ft^3)	Walls (ft^3)	Roof (ft^3)[5]	Estimated Total (cf)
Office	2,950	983[1]	4,345	5,900	11,228
Garage 1	2,910	1,455[2]	1,295[3]	5,820	8,570
Boiler	2,518	839[1]	401[4]	5,036	6,276
Dry	1,075	358[1]	2,623	2,150	5,131
Gasoline Tank[6]	367	--	--	--	100
Water Tank[7] and pump house	602	--	--	--	1,500
Diesel Tank[7]	150	--	--	--	500
TOTAL (ft^3)					33,305
TOTAL (cu yds)					1,234

Notes:

1. Floor volume assumes 4 inch thick floor over entire square foot area of building footprint
2. Floor volume assumes 6 inch thick floor over entire square foot area of building footprint
3. Wall volume assumes 3 inch thick 12 feet high for exterior walls – no interior wall calculation (actual 0.048" thick with 6" girders)
4. Wall volume assumes 1 inch thick 12 feet high for exterior walls – no interior wall calculation (actual 0.048" thick)

5. Roof volume assumes 2 feet overall thickness
6. Gasoline Tank is under roof – volume estimated using build and tank considerations
7. Circular structures – volume estimated based on footprint area

6.2 Contaminated Millsite Soils

Contaminated Millsite soils will be excavated from in and around the footprint of demolished Millsite buildings, as well as from other areas of the Millsite already identified and that will be identified during the Final Status Survey. DMC has conducted soil cleanup on an ongoing basis in its preparation of the Millsite for final closure and with the exception of the area under and around the remaining buildings and structures, significant soil cleanup has already occurred.

Contaminated Millsite soils will be excavated from the Millsite areas as delineated by previous soil characterization investigations and recent excavation in the Stockpile Area. Table 5 provides an estimate of the volume of soil that will be generated by cleanup excavation assuming the depth of excavation will be 2 feet. These expected soil cleanup areas are shown in Figure 6.

Table 5. Estimated Volume of Millsite Contaminated Soil

Description	Area (ft^2)	Estimated Depth of Excavation (ft)	Estimated Excavation Volume (cubic yards)
Remaining Structures Area	299,717	2	22,201
Tailings Line Area	32,506	2	2,408
Tailings Embankment Toe Area	20,464	2	1,516
Total			26,125

6.3 Evaporation Pond Cleanout Residues

DMC plans to perform the final cleanout of evaporation pond residues by dry cleanout methods. The 2011 Evaporation Plan, submitted under separate cover, describes the plan for the final cleanout of the evaporation pond residues. The dry cleanup will be fully specified in an evaporation pond cleanup work plan which DMC will prepare prior to cleanup for WDOH review and approval. It is expected that the dry cleanout will use only enough water to control dusting of the evaporation residue during the cleaning work. As such, the residues will be disposed of in TDA-4 if TDA-4 is still open and available or will be removed to an acceptable and approved disposal site. For the purpose of evaluation of potential material volumes that may be disposed in TDA-4, a conservative estimate of the volume of evaporation pond residues is made by calculating the volume of residue, assuming that a uniform ½ inch layer exists over the entire bottom area of all 5 evaporation ponds (83.3 acres) or 5,599 cubic yards total. This estimate of volume and the characteristics of the residue will be further documented in annual updates to DMC's water management and evaporation system decommissioning plan.

6.4 Procedure for Disposal of Millsite Materials

The disposal of the Millsite materials in TDA-4 will occur as currently anticipated in the area of TDA-4 shown on Figure 5 and will be compatible with the disposal of MMWTP solids. In general, the disposal will follow the same procedures as anticipated for MMWTP solids except that RPE will not be used. An overview of the procedure will follow the likely sequence is presented below. This is not intended to be the final plan for disposal of millsite materials. The plan for Millsite material disposal will be finalized and submitted to WDOH for review and approval prior to placement of the material into TDA-4.

- Placement of Millsite materials will be by end-dumping from a trailer (for evaporation pond precipitates) or haulage vehicles selected by the demolition and/or earthworks contractors. The dumping will occur in rows of approximately 3 feet high and 10 feet wide respectively. The soil materials will be graded in lifts of approximately 18 inches and compacted using procedures similar to the compaction of the borrow fill used in the 2009/2010 TDA-4 stabilizing fill construction. Building debris will be sized in pieces no greater than approximately 3x3 feet and bedded with sandy borrow or Millsite soils to fill voids and compacted similarly to the disposed soils.

- The disposal area will be prepared prior to delivery of the Millsite materials with construction of an 18 inch protective fill layer. The 18-inch protective fill layer will be placed on top of the existing 18 inch overliner backfill, for a total of 36 inches of separation between the haul truck traffic and the overliner.

- An edge berm will be constructed along the edge of TDA-4 to separate the disposal area from the TDA-4 side slope at a location approximately 5 feet inside the location of the edge of the overliner at the anchor trench if the disposal area is adjacent to the edge of TDA-4. The edge berm will be approximately 3 feet high and constructed by end dumping clean borrow fill and will be extended periodically as disposal operations proceed.

- At the end of disposal, a confining berm of end dumped borrow fill will be placed around the disposed material and a 40 mil HDPE liner will be placed over the disposal area. An earthmoving contractor will first cover the disposal area with approximately 12 inches of borrow fill, and grade and prepare the surface for installation of a 40 mil HDPE liner cover. A liner contractor will prepare and place the cover liner. The cover liner will be covered by a protective and stabilizing clean borrow fill layer of approximately 18 inches.

- A settlement monument will be established on the covered surface and monitored on the schedule established for the other TDA-4 settlement monuments.

7.0 Total Estimated TDA-4 Disposal Volume – 2011 to 2016

The total estimated volume of all materials that would be disposed in TDA-4 from 2011 to 2016 is presented in Table 6.[15] This estimated volume is approximately one-third of the calculated remaining capacity of TDA-4.

Table 6. Estimated Disposal Volume Requirements 2011 to 2016

Description	Estimated Disposal Volume (cubic yards)
MMWTP Solids (2011-2016)	10,000[a]
Evaporation Pond Residues	5,599
Demolition Debris	1,270
Contaminated Millsite Soils	26,125
Clean Fill Borrow	10,000[b]
Total (cubic yards)	52,994
Calculated Approximate Remaining TDA-4 Capacity	150,000

[a] The projected volume of MMWTP solids that would be disposed in TDA-4 from 2011 to 2016 is discussed in greater detail in Section 8.6.
[b] The volume of clean fill borrow used in berms and cover bedding is assumed to be approximately 25% of the total volume of materials.

8.0 Compliance with NRC Guidance Criteria

As the following discussion demonstrates, DMC's proposal to dispose of MMWTP solids in TDA-4 satisfies each of the criteria in the Nuclear Regulatory Commission's (NRC) Final Revised Guidance on Disposal of Non-Atomic Energy Act of 1954, Section 11e.(2) Byproduct Material in Tailings Impoundments (NRC Guidance Criteria). Each criterion is in bold font, followed by a discussion of how the criterion is satisfied. When applicable, WDOH's evaluation of DMC's previous MMWTP sludge disposal applications are cited and relied upon.

8.1 NRC Guidance Criterion 1:

In reviewing licensee requests for the disposal of wastes that have radiological characteristics comparable to those of the Atomic Energy Act (AEA) of 1954, Section 11e.(2) byproducts material [hereinafter designated as "11e.(2) byproduct material"] in tailings impoundments, staff will follow the guidance set forth [in the criteria] below. Since mill tailings impoundments are already regulated under 10 CFR Part 40, licensing of the receipt and disposal of such material [hereinafter designated "non-11e.(2) byproduct material"] should also be done under 10 CFR Part 40.

An April 8, 1999 NRC staff memorandum interpreted this criterion as limiting "the type of material that could be placed in tailings impoundments to mainly soil contaminated with

[15] The selection of the year 2016 for this estimation is based on the closure schedule presented in the 2010 IPS and is used for illustrative purposes only. Based on the anticipated annual volume discussed in Section 8.6, 1,667 cubic yards of MMWTP solids would be disposed in TDA-4 each year.

primordial elements (uranium and thorium) and their progeny." The MMWT solids are just this type of material. The NRC's original consideration of the disposal of non-11e.(2) byproduct material into tailings impoundments was in part based on industry requests to dispose of mine water treatment plant solids into 11e.(2) impoundments. See 57 CFR 20525. The MMWTP solids come from the same source, and contain the same chemical and radiological elements, as the byproduct material that was produced during the milling operations and discharged into TDA-4.

8.2 NRC Guidance Criterion 2:

Radioactive material not regulated under the AEA shall not be authorized for disposal in an 11e.(2) byproduct material impoundment.

Both the NRC and the WDOH previously determined that the solids produced from the MMWTP are source material regulated under the Atomic Energy Act (AEA). Accordingly, NRC Guidance Criterion 2 is satisfied.

8.3 NRC Guidance Criterion 3:

Special nuclear material and Section 11e.(1) byproduct material waste should not be considered as candidates for disposal in a tailings impoundment, without compelling reasons to the contrary. If staff believes that such material should be disposed of in a tailings impoundment in a specific instance, a request for approval by the commission should be prepared.

The MMWTP solids are neither special nuclear material nor 11e.(1) byproduct material, but is source material as discussed under Criterion 2, above. Accordingly, NRC Guidance Criterion 3 is satisfied.

8.4 NRC Guidance Criterion 4:

The 11e.(2) licensee must demonstrate that the material is not subject to applicable Resource Conservation and Recovery Act (RCRA) regulations or other EPA standards for hazardous or toxic wastes prior to disposal. To further ensure that RCRA hazardous waste is not inadvertently disposed of in mill tailings impoundments the 11e.(2) licensee also must demonstrate, for waste containing source material, as defined under AEA, that the waste does not contain material classified as hazardous waste according to 40 CFR Part 261. In addition, the licensee must demonstrate that the non 11e.(2) material does not contain material regulated under other Federal statutes, such as the Toxic Substance Control Act, (TSCA). Thus, the source material physically mixed with other material, would require evaluation in accordance with 40 CFR Part 261, or 40 CFR Part 761. (These provisions would cover material such as: characteristically hazardous waste; listed hazardous waste; and polychlorinated biphenyls.) The EPA demonstration and testing should follow accepted EPA regulations and protocols.

DMC has previously demonstrated that MMWTP solids are neither a hazardous waste under EPA regulations, nor a dangerous waste under state regulations. See:

- Letter from NRC to Gary Robertson of WDOH (August 7, 1992) (concluding that MMWTP solids are not hazardous waste) (citing June 23, 1992 letter from Washington Department of Ecology stating same);

- DMC's 1992 application to WDOH for the processing of the MMWTP solids (citing "EP TOX" test results demonstrating that these solids do not classify as either hazardous or dangerous waste);

- DMC's 2000 Sludge Toxicity Classification Summary (citing TCLP test results confirming that MMWTP solids are not hazardous or dangerous waste);

- WDOH's Determination of Non-Significance on DMC's application to process MMWTP solids at the mill (citing EPA classification that the solids are non-hazardous material);

The MMWTP solids that will be disposed in TDA-4 are chemically identical to the material previously evaluated. Recent DMC testing has confirmed that the MMWTP solids do not classify as hazardous or dangerous waste. See Section 3.

8.5 NRC Guidance Criterion 5:

The 11.e(2) licensee must demonstrate that there are no CERCLA issues related to the disposal of the non-11.e(2) byproduct material.

The purpose of the NRC Guidance Criterion 5 is to reduce the potential for regulatory oversight of the tailings impoundment by more than one agency, in relation to the eventual transfer of the site to the Department of Energy. WDOH has previously stated that Criterion 5 does not require the licensee to demonstrate that there are no CERCLA issues related to the site whatsoever. Rather, the analysis of the CERCLA issues should be whether or not the disposal of MMWTP solids in TDA-4 raises any new or different CERCLA issues than those that already exist. See 2000 TEE at 14. The 1994 FEIS recognized that both CERCLA and MTCA authorities are available to address remediation of the site. Thus, CERCLA issues related to the Millsite already exist. Disposal of MMWTP solids in TDA-4, as with the previous disposal of MMWTP sludge, raises no new CERCLA issues.

8.6 NRC Guidance Criterion 6:

The 11e.(2) licensee must demonstrate that there will be no significant environmental impact from disposing of the non-11e.(2) byproduct material.

The disposal of MMWTP solids in TDA-4 while it remains available for such disposal will have no significant adverse environmental impacts. The following supports this fact:

- In 1992, WDOH determined that the transportation of the MMWTP sludge to the millsite and disposal of the processed sludge into TDA-4 would have no significant adverse environmental impact. See Determination on Non-Significance for License Amendment Approval Request to Begin Processing, for its Uranium Content, Filtercake Sludge (generated at the Midnite Mine near Wellpinit, Washington) at its Uranium Mill near Ford, Washington (June 23, 1992).

- In the 1994 Final Supplemental Environmental Impact Statement (1994 FSEIS), WDOH concluded that (1) detailed water balance investigations had not established that the presence significant leakage from TDA-4, and (2) surface and groundwater contamination had not occurred from TDA-4. See FSEIS at page 6-60 (Response to Comment 81) and page 6-193 (Response to Comment 641). Subsequent monitoring continues to confirm these conclusions.

- In the 1994 FSEIS, WDOH determined that the disposal of 30 million cubic feet of imported 11e.(2) byproduct material into TDA-4, at the maximum allowable concentrations set forth in Amendment 16 of DMC's Radioactive Materials License, would result in no significant adverse environmental impacts. See 1994 FSEIS at Chapter 4.

- The chemical characterization of the MMWTP solids shows that the radionuclide and non-radionuclide constituents of the MMWTP solids are present in forms that are not mobile. See Section 3.

- In the 2000 TEE and the 2009 Technical Evaluation Report (2009 TER), WDOH conducted an evaluation of the potential environmental impacts from the disposal of MMWTP sludge into TDA-4. The following discusses the elements of those evaluations and applies them to DMC's current proposal.

  Volume of MMWTP solids to TDA-4: In 2000, WDOH evaluated DMC's proposal to dispose of 753,500 cubic feet of MMWTP sludge into TDA-4. WDOH concluded (1) that the increase in the volume of material to be disposed into TDA-4 from direct sludge disposal was insignificant when compared to the overall volume of material already in TDA-4, and (2) that the proposed sludge volume was insignificant when compared with the then-licensed plan to fill TDA-4 with 30 million cubic feet of imported 11e.(2) material. See 2000 TEE at page 9.

  Between 2000 and 2008, DMC placed only 231,983 cubic feet of sludge into TDA-4, less than one-third of that evaluated in 2000. In 2009, WDOH determined that an additional two years of sludge disposal, at a maximum annual disposal volume of 45,000 cubic feet, represented only about 4% of the estimated total volume of fill to be placed into TDA-4 and would not adversely impact the environment. See 2009 TER at page 3. DMC conservatively estimates that from 2011 to 2016[16] an additional 270,000 cubic feet (10,000 cubic yards) of MMWTP solids would be disposed in TDA-4. See Table 7. The volume of 45,000 cubic feet per year is based on the greatest annual quantity of MMWTP solids placed into TDA-4 since WDOH approved of disposal of MMWTP solids into TDA-4 and was selected for use to provide a conservative estimate of solids disposal volume for the evaluation of remaining capacity and the sizing of annual disposal areas and the location of those areas in TDA-4 to ensure that acceptable conditions would be achieved. It is also the volume upon which WDOH's 2009 approval of continued MMWTP solids disposal was based. See 2009 TER at page 3. Based on the historic quantities placed into TDA-4, the actual annual volume is likely to be much less (only 4 of the 10 years saw volumes over 30,000 cubic feet). WDOH does not anticipate any

[16] The selection of the year 2016 for this estimation is based on the closure schedule presented in the 2010 IPS and is used for illustrative purposes only.

MMWTP operational changes that would increase the volume of solids above 45,000 cubic feet per year. The overall total of MMWTP solids disposed in TDA-4 would still be significantly less than originally approved by WDOH.

DMC's proposal to dispose of MMWTP solids in TDA-4 while TDA-4 remains available, along with the Millsite materials that will be disposed of in TDA-4 during final Millsite reclamation, simply utilizes a portion of the remaining capacity that exists in TDA-4. Utilization of the remaining capacity does not affect the acceptable performance of the reclamation planned nor delay the implementation of the final Millsite reclamation and closure.

Table 7. Actual Sludge Volume 2001-2010 and Estimated MMWTP solids Volume 2011-2016

Year	Actual or Estimated Volume of MMWTP Sludge Placed in TDA-4
2001	27,926 cubic feet
2002	22,060 cubic feet
2003	29,704 cubic feet
2004	24,750 cubic feet
2005	15,420 cubic feet
2006	45,220 cubic feet
2007	36,005 cubic feet
2008	30,944 cubic feet
2009	33,675 cubic feet
2010	28,521 cubic feet
2011	45,000 cubic feet
2012	45,000 cubic feet
2013	45,000 cubic feet
2014	45,000 cubic feet
2015	45,000 cubic feet
2016	45,000 cubic feet
Total	**564,225 cubic feet**

Geotechnical Stability: WDOH's 2000 review of MMWTP solids disposal into TDA-4 concluded that the physical characteristics of the MMWTP solids would not result in unacceptable settlement of the reclamation surface or affect the long-term stability of the reclamation. See 2000 TEE at page 10. The physical characteristics of the MMWTP solids will be identical to the sludge previously evaluated. Moreover, after placement into TDA-4, DMC will monitor the material for settlement. See TDA-4 Settlement Monitoring Plan (submitted under separate cover). The TDA-4 Settlement Monitoring Plan will by updated annually in the IPS.

Geochemistry: In 2009, WDOH evaluated the geochemical conditions in TDA-4 and the mobility of the uranium in the MMWTP sludge. WDOH found that the uranium has limited mobility and the continued disposal of the sludge would not affect the geochemical conditions in TDA-4. WDOH also found that the additional mass of uranium and other constituents associated with the disposal of additional sludge would be insignificant when compared to the existing materials already in TDA-4. See 2009 TER at page 3. As discussed in Section 3.0, the chemical characteristics of the MMWTP solids will be identical to the sludge already evaluated in 2009 and the uranium and other constituents are not soluble and not mobilized by leaching. In addition, the MMWTP solids are the insoluble, stable reaction products, amorphous oxyhydroxides, of the lime neutralization (to approximately pH 10.5) of the influent pit in the water treatment process, and, in conjunction with the operational elements of the disposal plan (see Section 5.0), there is little likelihood that the MMWTP solids would undergo any significant chemical change that would result in adverse environmental impacts.

Short-term Control: The operational plans for disposal set out in Section 5 minimize the potential for release of MMWTP solids from the disposal area that could possibly occur as a result of erosional transport from heavy, summer rainstorms. Long-term isolation of the disposal area is provided by the annually constructed cover liner. The geochemical characteristic of the MMWTP solids, discussed above, minimizes the potential for solute transport from the placed solids.

Transportation: DMC currently proposes a normal transport schedule of one truck of MMWTP solids from the MMWTP to TDA-4 Tuesday through Friday of each week. In 2000, WDOH determined that two trucks per day transporting sludge from the MMWTP to TDA-4 presented no adverse environmental impacts. See 2000 TEE at page 10. WDOH can rely on its 2000 analysis to again conclude that the transportation of the MMWTP solids from the Midnite Mine to the TDA-4 will result in no adverse environmental impacts.

In 2009, WDOH also concluded that the transport of the MMWTP sludge into TDA-4 would not adversely affect other closure activities or jeopardize the safety of workers. See 2009 TER at page 4. As discussed below in Section 8.7, the placement of one truck load MMWTP solids into TDA-4 each day will not interfere with closure activities at the Millsite or jeopardize the safety of workers.

Water Quality: WDOH based its 2000 analysis of impacts to water quality on the potential for mobility of uranium and other constituents from the sludge. See 2000 TEE at 11. Like the sludge evaluated by WDOH in the 2000 TEE, and as discussed in Section 3.0, the uranium and other constituents in the MMWTP solids are not soluble and are not mobilized by leaching. Because of the chemical stability of the MMWTP solids, release of uranium or other constituents will be minimal to non-existent. Moreover, operational procedures implemented during placement will further minimize or eliminate solid transport from the placed MMWTP solids. See Section 5 and DMOP 18a (Attachment B). As a result, the placement of MMWTP solids in TDA-4 will not result in any significant impact to water quality.

Water Management: WDOH found in 2009 that the addition of sludge in TDA-4 would not affect water management plans because the sludge would be placed on existing or

newly filled and stabilized areas, and would not be in contact with standing water. See 2009 TER at page 4. Under the current proposal, MMWTP solids would be placed into TDA-4 to minimize or prevent contact with standing water. See Section 5 and DMOP 18a (Attachment B). Consequently, disposal of MMWTP solids will have no significant effect on water management.

Air Emissions: The 2000 TEE concluded that the moist condition of the sludge presented no air emissions issues. See 2000 TEE at page 11. The moisture content of the MMWTP solids is high (in the range of 70%), which precludes air emission issues. Further, disposal of MMWTP solids into TDA-4 will significantly reduce the emission of greenhouse gasses over use of the other disposal options available.

Biota: The 2000 TEE biota analysis concluded that the plan to place sludge directly into TDA-4 would result in limited access or time for biota to have any contact the MMWTP sludge. See 2000 TEE at page 12. Nothing in the current proposal to dispose of MMWTP solids into TDA-4 changes this conclusion. Transport of the MMWTP solids will occur across areas where the biota is already disturbed, and the moist form of the MMWTP solids will prevent dispersal onto plants during transport and disposal. The operations and closure plans provide for covering the MMWTP solids, therefore isolating the MMWTP solids from biota.

Timing: As discussed in the 2011 Evaporation Plan, TDA-4 will remain available for MMWTP solids and Millsite materials disposal until at least 2013 and the continued disposal will not affect the timing and implementation of Millsite closure activities or final Millsite reclamation and closure. The disposal of the Millsite materials in TDA-4 is compatible with the disposal of MMWTP solids.

In fact, going forward, fewer closure activities will be taking place in and around TDA-4 than in previous years. Before the evaporation pond system is decommissioned and the final cover is placed over TDA-4, the only remaining TDA-4 related activities will be the disposal of Millsite buildings and debris, contaminated Millsite soils, and evaporation pond cleanup residues. The placement of one truck of MMWTP solids into TDA-4 each day will not interfere with those activities, nor will it delay the progress of the Millsite closure.

Radioactive materials: The 2000 TEE radiation analysis was based on the fact that disposal of sludge in TDA-4 would contribute an insignificant amount of radioactivity to the total radioactivity in TDA-4 and would contribute an insignificant amount, particularly when compared to the amount allowed under the 11e.(2) byproduct material closure plan. See 2000 TEE at page 13. The 2009 TER found that, even with the two-year extension, less than half of the originally approved radioactivity would be placed into TDA-4, leading WDOH to conclude that the extension would result in no significant environmental impact. See 2009 TER at page 4. Based on conservative estimates, disposing of MMWTP solids in TDA-4 through the year 2016 would result in less than three-quarters of the volume and radioactivity evaluated in 2000. Since the radioactivity from the current proposal will result in less of an impact than the closure plan evaluated by WDOH in the 1994 FSEIS, the only conclusion is that the additional radioactivity will pose no significant environmental impact.

8.7 NRC Guidance Criterion 7:

The 11e.(2) licensee must demonstrate that the proposed disposal will not compromise the reclamation of the tailings impoundment, by demonstrating compliance with the criteria of Appendix A of 10 CFR Part 40 (WAC 246-252-030).

WDOH determined both in 2000 and in 2009 that the disposal of MMWTP sludge in TDA-4 would not compromise the reclamation of the tailings impoundment, and was consistent and complied with WAC 246-252-030, the Washington States equivalent to Appendix A 10 CFR Part 40. As described above, under the current proposal, MMWTP solids will be placed in TDA-4 while it remains available for such disposal. Until the evaporation ponds are decommissioned, the only activities that may take place in TDA-4 will entail disposing of the Millsite buildings and debris, evaporation pond cleanout residues, and disposing of contaminated Millsite soils. Sufficient capacity remains in TDA-4 to accommodate the predicted volume of MMWTP solids and the Millsite materials that will be disposed in this facility. Further, disposal of these materials in TDA-4 in the manner planned will not compromise the reclamation of the tailings impoundment, and the reclamation will be in compliance with the criteria of Appendix A of 10 CFR Part 40 (WAC 246-252-030).

Moreover, the design and performance of the TDA-4 cover will not be affected by the disposal of MMWTP solids and Millsite materials into TDA-4 and DMC will confirm reclamation cover in final design after solids and Millsite material disposal has been completed.

8.8 NRC Guidance Criterion 8:

The 11e.(2) licensee must provide documentation showing approval by the Regional Low-Level Waste Compact, as well as approval by the Compact in whose jurisdiction the disposal site is located.

After WDOH has completed its review of DMC's proposal, DMC offers to assist WDOH in contacting the Northwest Interstate Compact to secure its review of, and concurrence with, WDOH's evaluation of DMC's proposal.

8.9 NRC Guidance Criterion 9:

The Department of Energy (USDOE) is to be informed of the NRC's (or agreement state's) findings and proposed actions, with a request to concur within 120 days. A concurrence and commitment from either the USDOE or the State to take title to the tailings impoundment after closure must be received before granting the license amendment to the licensee.

After WDOH has completed its review of DMC's proposal, DMC offers to assist WDOH in contacting the USDOE and NRC top secure their review of, and concurrences with, WDOH's evaluation of DMC's proposal.

8.10 NRC Guidance Criterion 10:

The mechanism to authorize the disposal of non-11.e(2) byproduct material in a tailings impoundment is an amendment to the mill license. Along with the license

amendment, the agreement state must also take appropriate action to exempt the non-11.e(2) byproduct material from regulation as a low-level waste.

After WDOH has determined that all other NRC Guidance Criteria have been met, DMC will provide WDOH with whatever assistance requested in finalizing the process of amending DMC's radioactive materials license.

9.0 Conclusion

DMC's proposal to dispose of MMWTP solids in TDA-4 while it remains available for such disposal satisfies all the necessary regulatory and NRC Guidance Criteria. As the above discussion demonstrates, DMC's proposal poses no significant environmental impact, will not interfere with any Millsite closure activities, will not compromise or delay the closure of TDA-4 and the placement of the final radon barrier, and is compatible with the disposal of Millsite materials in the capacity that remains in TDA-4.

Since DMC's proposal does not significantly alter the conditions, materials and findings evaluated in the 1994 FSEIS, the 2000 TEE and the 2009 TER, DMC believes that the appropriate mechanism through which to evaluate the potential for environmental impacts from this proposal is an Addendum to the existing environmental documents.

Thank you for considering DMC's request. DMC would like to offer its help in any way that would assist WDOH in its review and evaluation of this proposal. If you have any questions, please do not hesitate to contact me at 509-258-4511.

Sincerely,

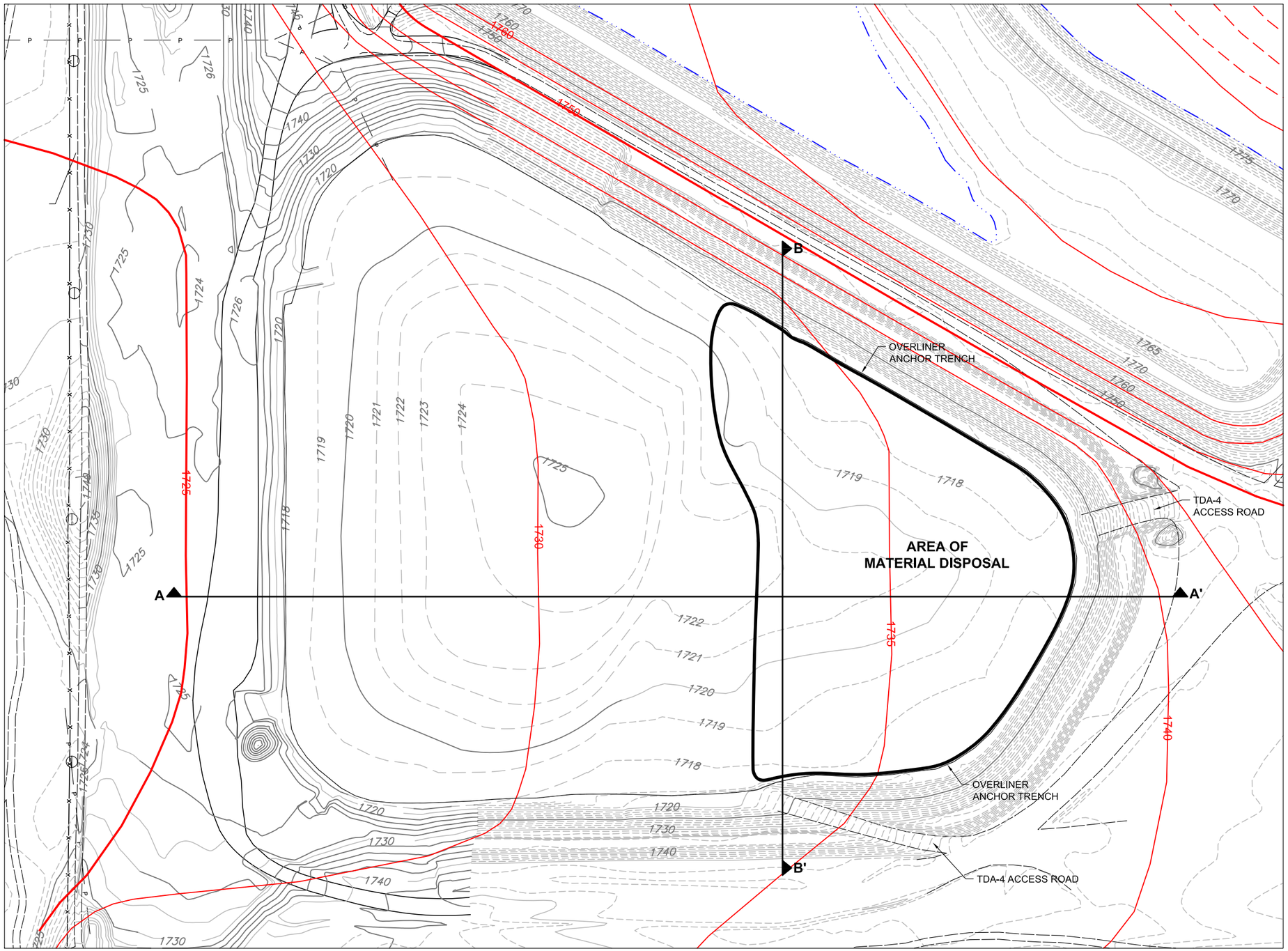
DAWN MINING COMPANY, LLC

Robert E. Nelson
Vice President and General Manager

Attachments:

Attachment A – Figures 1, 2, 3, 4, 5 and 6
Attachment B - DMOP 18a
Attachment C – DMC Responses to WDOH Completeness Review of DMC's April 26, 2011 Draft Revised License Amendment Application.

ATTACHMENT A
FIGURES 1-6



LEGEND

- 2009/10 SURVEY CONTOURS
- RECLAMATION SURFACE CONTOURS (2009 IPS)
- CROSS SECTION
- FENCE
- HAUL ROADS

Base Map Supplemented with Surveys Conducted on October 12, 2009 and September 17, 2008.
TDA-4 Areas 2 and 3 Contours Based of Top of Subgrade Fill Elevations (Benthin, September 3, 2010) and Overliner Backfill Thickness (Budinger, October 12, 2010)

NORTH

SCALE IN FEET
0 150

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June 2011

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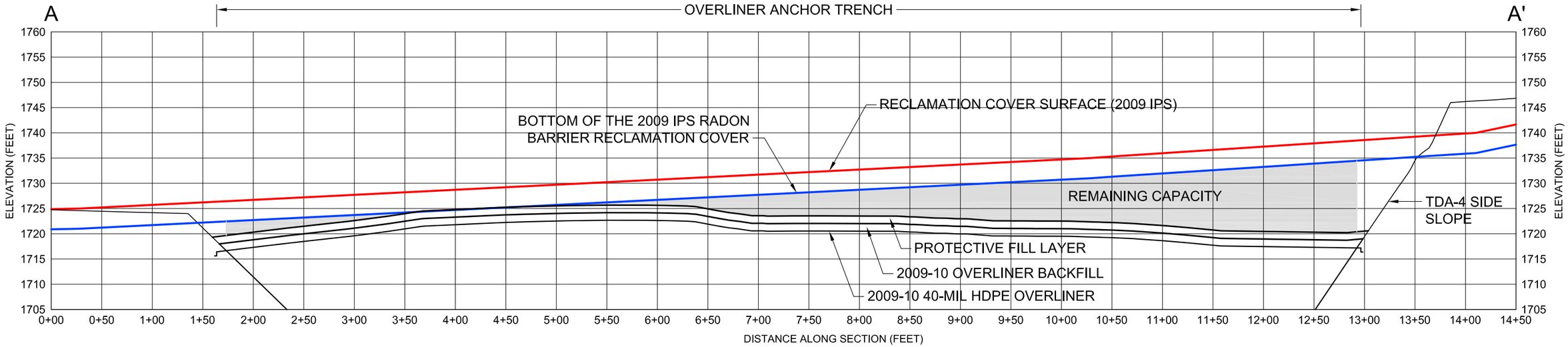
Figure 1
Schematic Layout of Area of Material Disposal



CALCULATED REMAINING CAPACITY VOLUME = 155,351 Cu. Yd.

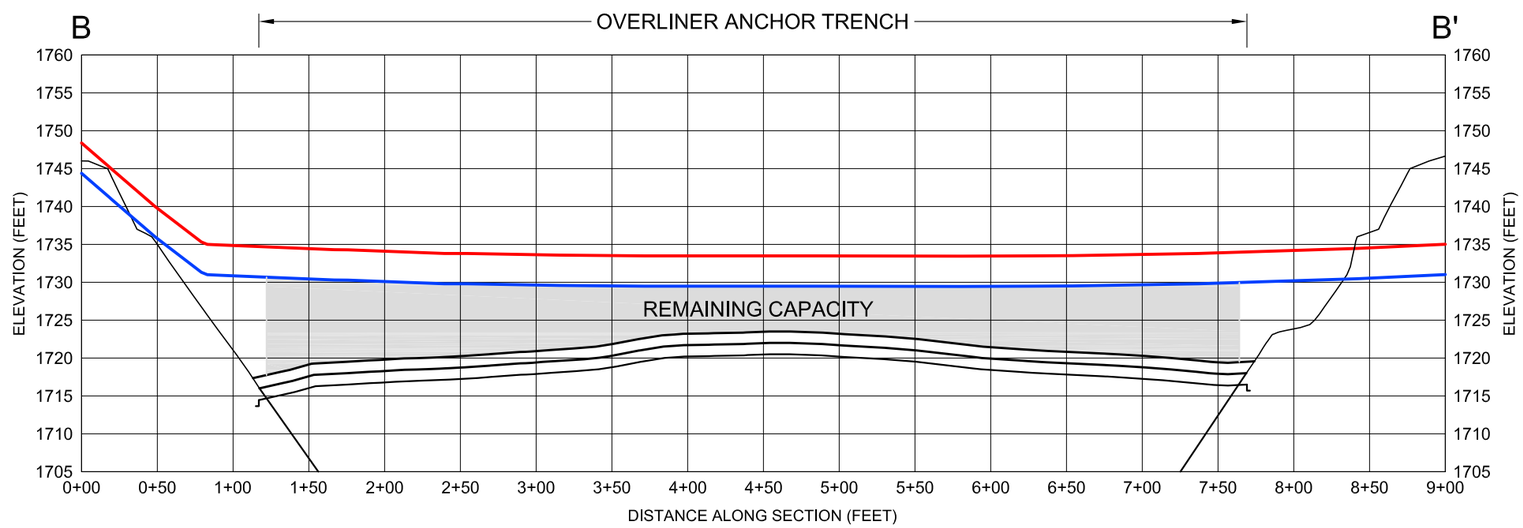


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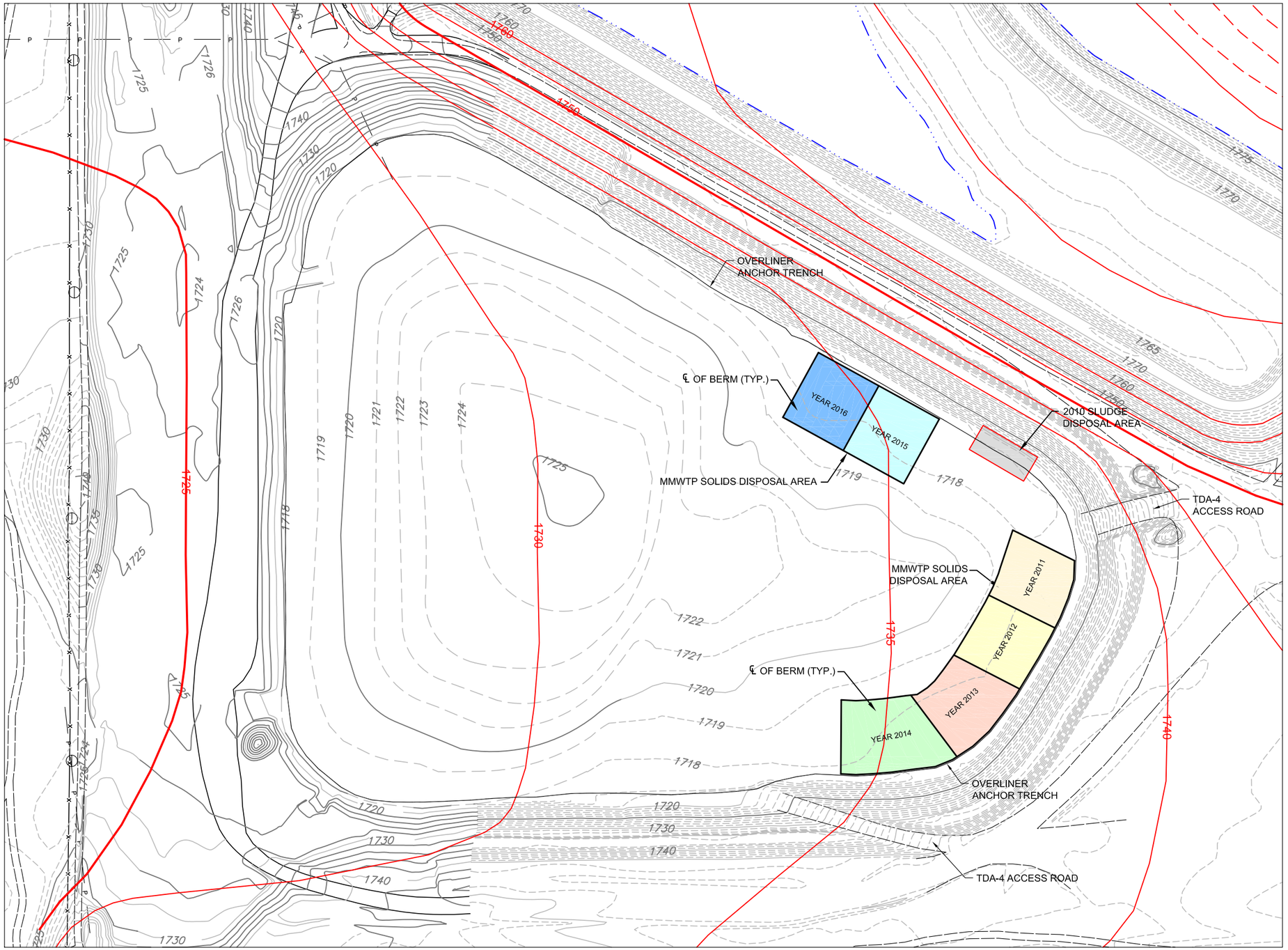
Figure 2
Illustrative Cross Sections of TDA-4 Remaining Capacity



LEGEND

- 2009/10 SURVEY CONTOURS
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Base Map Supplemented with Surveys
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TDA-4 Areas 2 and 3 Contours
Based of Top of Subgrade
Fill Elevations
(Benthin, September 3, 2010) and
Overliner Backfill Thickness
(Budinger, October 12, 2010)

NORTH

SCALE IN FEET
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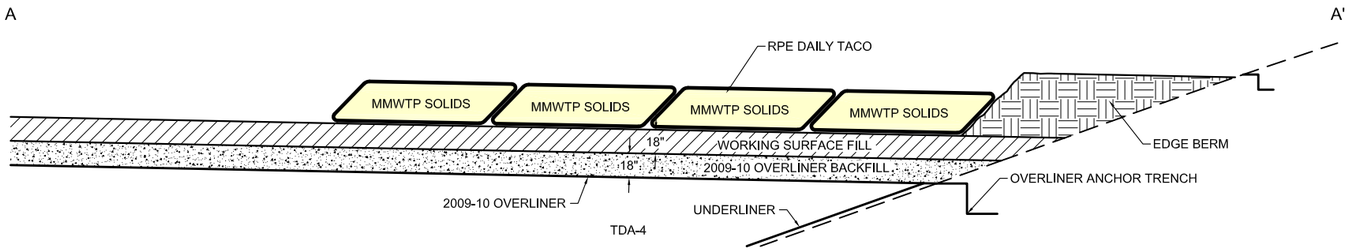
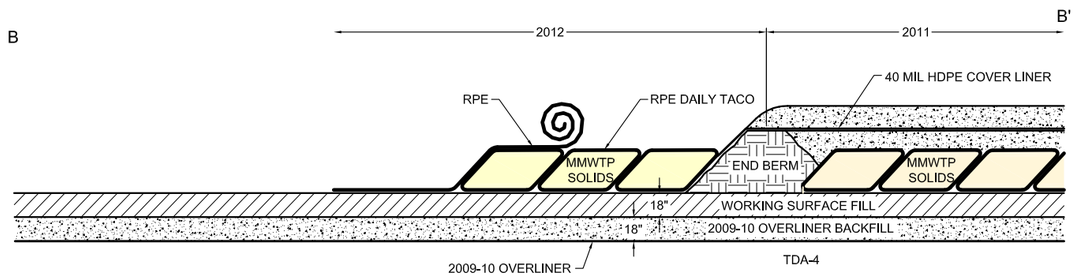
Figure 3
Schematic Layout of Annual MMWTP Soilds Disposal Areas



MMWTP SOLIDS DISPOSAL AREA - SECTION A-A'
NOT TO SCALE



MMWTP SOLIDS DISPOSAL AREA - SECTION B-B'
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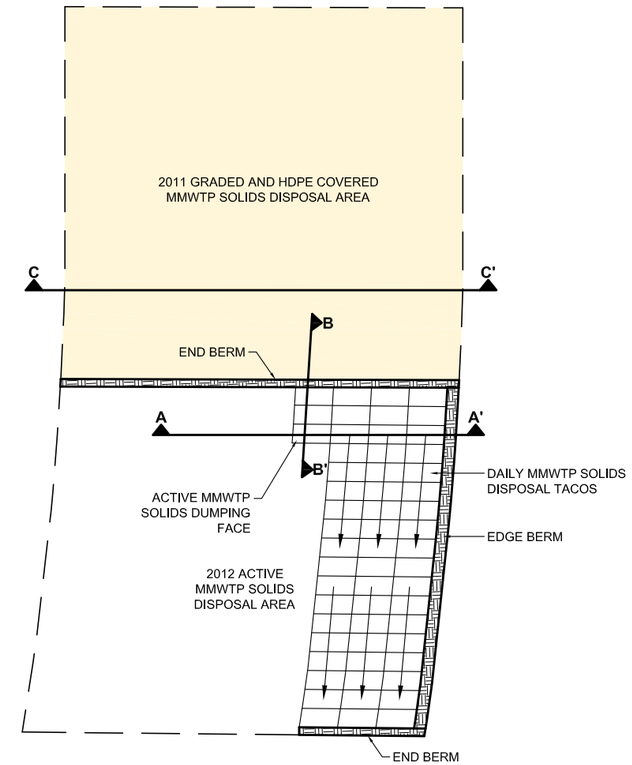
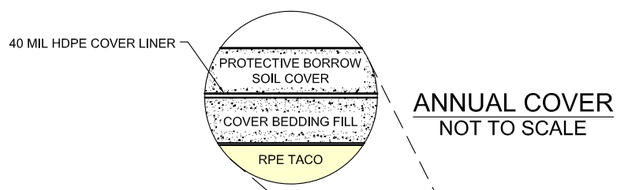
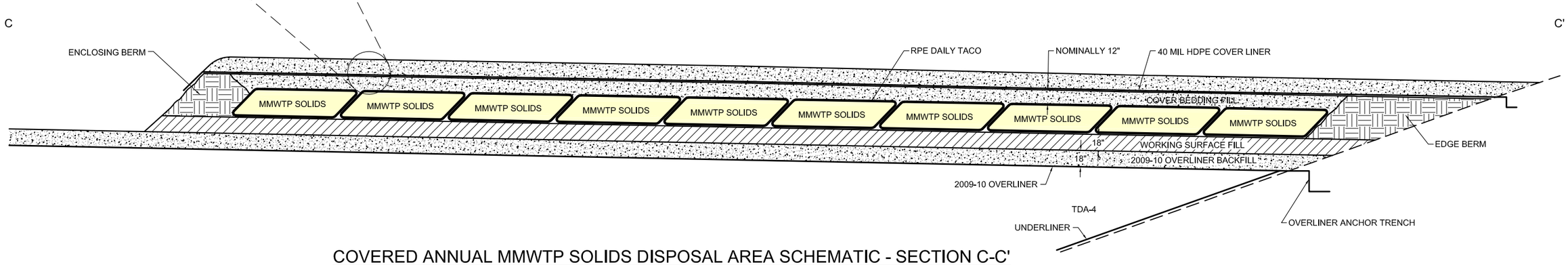


SCHEMATIC OF MMWTP SOLIDS DUMPING PROCESS
NOT TO SCALE



ANNUAL COVER
NOT TO SCALE



COVERED ANNUAL MMWTP SOLIDS DISPOSAL AREA SCHEMATIC - SECTION C-C'
NOT TO SCALE

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June 2011

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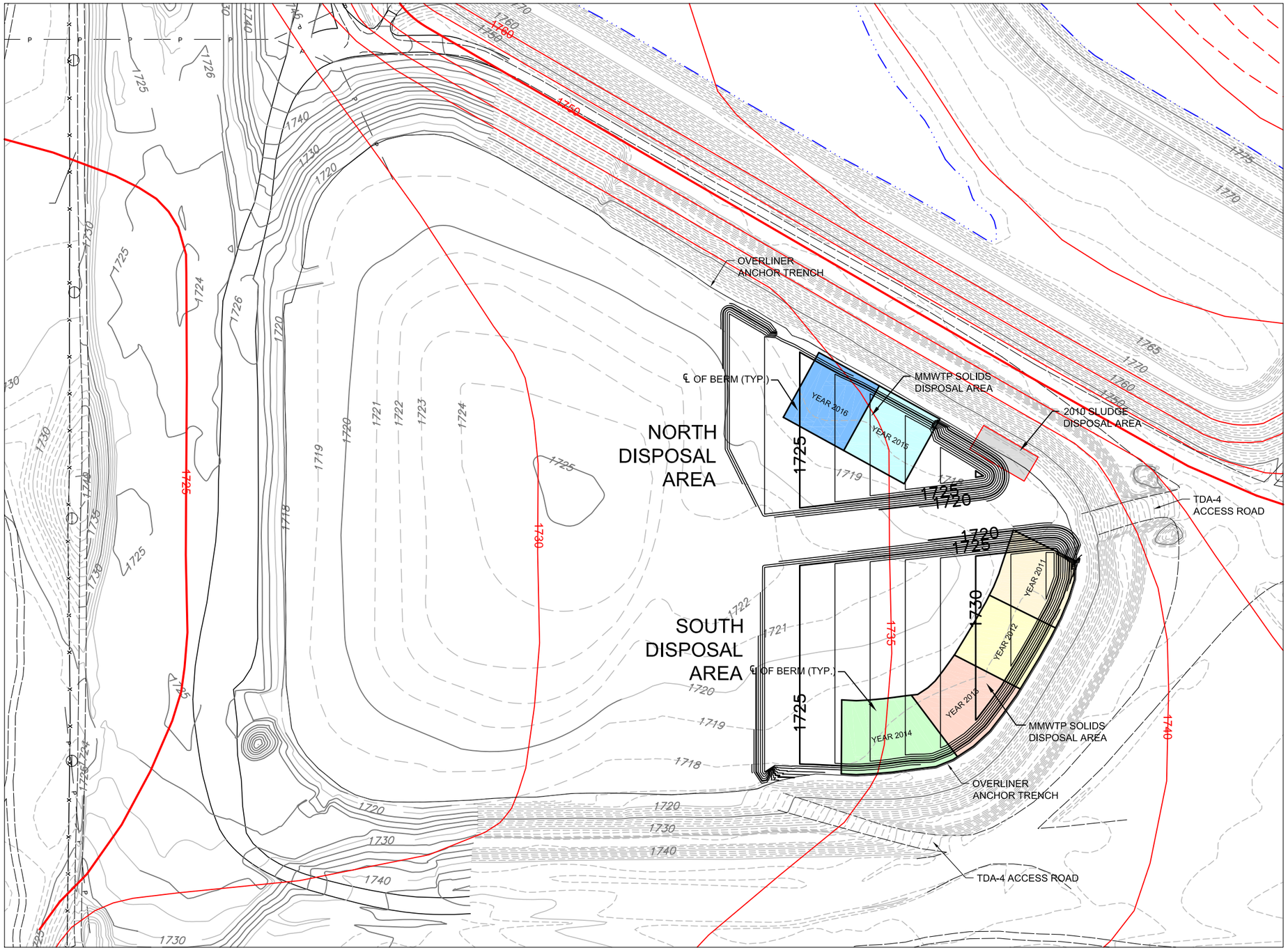
Figure 4
Schematic TDA-4 MMWTP Solids Disposal Area Cross Sections



LEGEND

- 2009/10 SURVEY CONTOURS
- RECLAMATION SURFACE CONTOURS (2009 IPS)
- FENCE
- HAUL ROADS

Base Map Supplemented with Surveys Conducted on October 12, 2009 and September 17, 2008.
TDA-4 Areas 2 and 3 Contours Based of Top of Subgrade Fill Elevations (Benthin, September 3, 2010) and Overliner Backfill Thickness (Budinger, October 12, 2010)

NORTH

SCALE IN FEET
0 150

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June 2011

DAWN MINING COMPANY

Figure 5
Schematic Layout of MMWTP Soilds and Millsite Materials Disposal Areas

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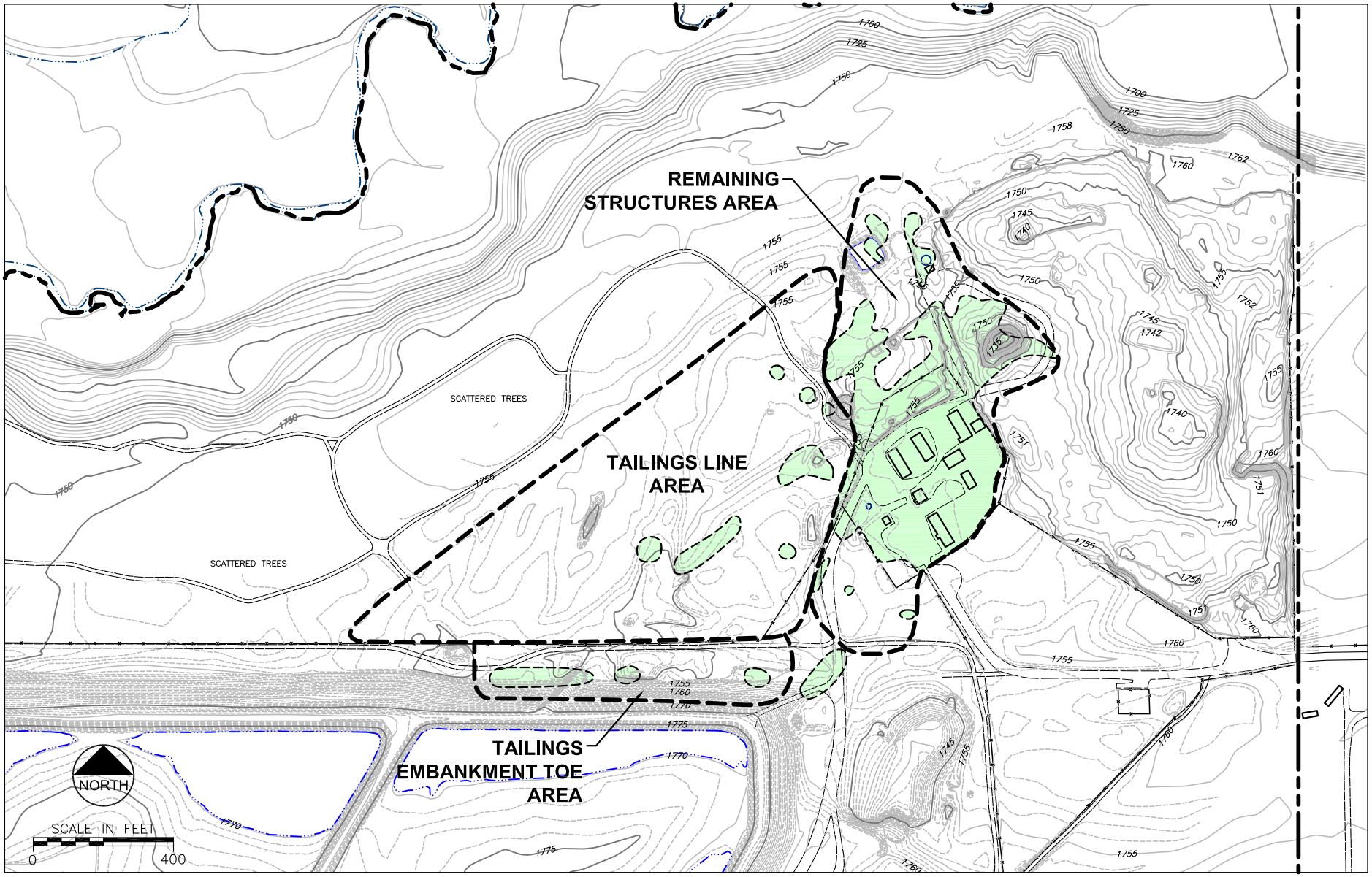


Project No. 180883

June 2011

LEGEND

PREDICTED SOIL CLEANUP EXCAVATION AREAS

REMAINING STRUCTURES

Figure 6
Soil Cleanup Excavation Areas

ATTACHMENT B
DMOP 18a

DAWN MINING COMPANY PROCEDURES	DMOP 18a
TDA-4 MMWTP SOLIDS DISPOSAL OPERATIONS	DATE: July 5, 2011

APPROVED BY:_____DATE:_____
GENERAL MANAGER

APPROVED BY:_____DATE:_____
RADIATION SAFETY OFFICER

APPROVED BY:_____DATE:_____
RADIATION SAFETY TECHNICIAN

TABLE OF CONTENTS

1. PURPOSE

This document presents the procedure for operations to be performed by Dawn Mining Company (DMC) personnel, for the receipt and placement of Midnite Mine Water Treatment Plant (MMWTP) solids in Tailings Disposal Area 4 (TDA-4) at the DMC Millsite. This procedure has been prepared to be consistent with applicable conditions in the DMC Radioactive Materials License. Placement procedures are presented in Attachment 18a-2 to this DMOP. Attachment 18a-2 may be revised to account for changes in the configuration and/or conditions within TDA-4 and to accommodate future Millsite reclamation activities.

2. DEFINITIONS AND RESPONSIBILITIES

2.1. General Manager

2.1.1 Ensuring that the placement activities are in full compliance with all license requirements and all other applicable requirements.

2.1.2 Suspending material placement activities, if activities are found not to be in compliance with all license requirements and the situation cannot be immediately corrected.

2.1.3 Implementing the TDA-4 MMWTP solids disposal operations.

2.2. Radiation Safety Officer

Oversight of MMWTP solids disposal operations for TDA-4 with regard to radiological controls to ensure compliance with license requirements and DMC policies, including the ALARA policy.

2.3. Radiation Safety Technician

2.3.1 Implementing all DMOP and other DMC policies related to worker safety for operations performed under the material placement program for TDA-4.

2.3.2 Recognizing and implementing controls to ensure that worker radiation exposure for work performed is As Low As Reasonably Achievable (ALARA).

2.3.3 Suspending, if necessary, material placement activities for TDA-4 if such activities fail to comply with DMC's license requirements.

2.4. Placement Operator

2.4.1 Understanding the nature of all placement activities to be performed under procedures and special work permits (SWPs).

2.4.2 Attending training or briefings required by the procedures and/or SWPs.

2.4.3 Observing all radiological and non-radiological postings.

2.4.4 Complying with verbal and written instructions and procedures, including instructions on SWPs.

2.4.5 Maintaining an awareness of radiological and non-radiological conditions in the work area.

2.4.6 Preparing the disposal area for acceptance of MMWTP solids

2.4.7 Escorting or directing the MMWTP solids truck to the off loading area, ensuring the material is placed in the proper location, decontaminating the truck, covering the material with clean fill and other tasks as assigned.

2.4.8 Sampling the each truck load of place MMWTP solids in accordance with the sampling procedures provided in Attachment 18a-3.

2.5 Transportation Operator

2.5.1 Understanding the nature of all transportation activities to be performed under procedures and special work permits (SWPs).and DOT regulations associated with the transportation of the MMWTP solids.

2.5.2 Attending training or briefings required by the procedures and/or SWPs.

2.5.3 Observing all radiological and non-radiological postings.

2.5.4 Complying with verbal and written instructions and procedures, including instructions on SWPs.

2.5.5 Maintaining an awareness of radiological and non-radiological conditions associated with transportation.

2.5.6 Preparing the transport vehicle for solids.

2.5.7 Observing DMC and DOT safety requirements on and off DMC property.

3. PRECAUTIONS

Water and spraying equipment for dust suppression shall be available at all times during disposal operations.

MMWTP solids contain uranium and other radioactive material that require special handling in accordance with DMC's Radioactive Material License. The MMWTP solids are primarily composed of lime and water, and may cause a skin rash if left in contact with the skin or may irritate the eyes. The Material Safety Data Sheets for lime, barium chloride and flocculant are posted at the MMWTP.

4. EQUIPMENT AND MATERIALS

4.1. Placement Equipment

Vehicles used for transport and disposal of MMWTP solids shall be licensed for highway use and of appropriate capacity to transport MMWTP solids from the MMWTP to the Millsite. The transport vehicles shall have an operable dumping bed, a removable cover for the truck bed, as well as a sealed end gate and an annual vehicle safety inspection conducted by an approved agent of the Washington State Department of Transportation.

4.2. Other Equipment

4.2.1. Properly calibrated radiological survey equipment in accordance with procedures outlined in DMOP 04.

4.2.2. Air sampling equipment in accordance with procedures outlined in DMOP 05.

4.2.3. Dust control equipment. Dust control will be achieved by water spraying of roadways and working surfaces as determined necessary by DMC and annual covering of the disposal areas.

4.2.4. Decontamination equipment. Decontamination will be performed by DMC personnel using high pressure spray and hand held scrapping tools.

4.3. Material

4.3.1. MMWTP solids.

4.3.2. Clean fill material and/or other site soils which will be obtained from Borrow Area A or B, utilized during 2009 and 2010 TDA-4 construction,

or from Millsite soil cleanup excavation. The borrow area used will be selected based on the type of material, such as sandy soil for liner bedding or cover (Borrow B), or random fill (Borrow Area A or B, or soil cleanup excavation). The amount and source of borrow used will be recorded by the placement operator or the site excavation contractor.

4.3.3. Water from DMC's potable water supply system to decontaminate the MMWTP solids truck upon completion of the placement activities.

5. PROCEDURE

5.1. Preparation of TDA-4

5.1.1 Preparation for disposal shall include upgrading existing roadways, or constructing new roadways, causeways, or ramps as needed for vehicle traffic within TDA-4. Roadways, causeways, or ramps shall be constructed from site soils or clean fill and shall be constructed such that surfaces that accommodate traffic are well drained. Roadways, causeways, and ramps over the TDA-4 overliner backfill surface will be constructed as part of the disposal area preparation by placement of 18 inches of fill thus providing a 36 inch (3 feet) protective fill layer over the overliner.

5.1.2 Preparation of the active disposal area as outlined in Attachment 18a-2.

5.2. Receipt of MMWTP solids

5.2.1 All transportation will be done in accordance with applicable U.S. Department of Transportation requirements.

5.2.2 The vehicle operator shall check in with the placement operator, or other responsible DMC personnel, who will record the information required on the MMWTP solids disposal form.

5.2.3 The transport vehicle shall then be escorted or directed to the dumping location.

5.3. Placement and covering of MMWTP solids

5.3.1 The MMWTP solids shall be placed in TDA-4 by dumping it from the transport vehicle at the location of active placement specified by the placement operator.

5.3.2 The MMWTP solids shall be placed according to the procedures outlined in Attachment 18a-2.

5.3.3 MMWTP solids will be annually covered as described in Attachment 18a-2 only after analytical confirmation that it does not classify as a dangerous or hazardous waste. Analytical testing for dangerous or hazardous waste, as described in Section 5.7, will be performed monthly. When this testing confirms that the MMWTP solids do not characterize as hazardous or dangerous waste, annual cover construction will proceed.

5.4. Transport Vehicle Decontamination

5.4.1 The transport vehicle shall be decontaminated in accordance with Section 5 of DMOP 06 (Decontamination) and surveyed in accordance with Section 5 of DMOP 04 (General Survey/Meter Operation). DMOP 04 and 06 are available in DMC offices.

5.4.2 Transport vehicle decontamination shall be conducted within a lined area of the Evaporation Pond system. Water spraying may be required to aid in MMWTP solids removal from the vehicle beds.

5.4.3 Transport vehicle decontamination shall consist of removing all of the visible MMWTP solids from the bed and outside of the transport vehicle by rinsing with fresh water.

5.5. Radiological Contamination Survey

5.5.1 The decontaminated transport vehicle leaving the restricted area shall meet the release level (100 counts per minute) as set out in DMOP-04. The survey will be conducted and documented as outlined in DMOP 04. If the transport vehicle does not meet survey criteria as set forth in DMOP 06, the vehicle shall be sent back for decontamination. When the transport vehicle meets survey criteria, the vehicle will be checked out with the placement operator.

5.5.2 Because the MMWTP solids are normally transported with a high moisture content, there is very little potential for airborne dust generation during initial placement in TDA-4. Therefore, no air sampling is necessary for initial placement.

5.5.3 Air sampling will be performed as described in DMOP 05 (Air Sampling) for operations where the MMWTP solids are dry and subject to resuspension as airborne dust, e.g., when the MMWTP solids are covered after drying.

5.6. Monitoring

5.6.1 The water quality in pit 3 at the Midnite Mine shall be monitored quarterly. The water quality data obtained will be used, if necessary, to evaluate possible causes if solids fail to meet TCLP criteria.

5.6.2 A composite sample of each truck load of MMWTP solids placed in TDA-4 will be collected from the placed (dumped) solids. The individual truck load samples will be stored at the Millsite. At the end of each month a composite sample (monthly composite sample) will be submitted to the laboratory for TCLP testing (see Attachment B section B.3.1.1).

5.6.3 TCLP testing will be preformed on the monthly composite samples. Section 5.7 describes the steps DMC will take if a monthly composite sample fails the TCLP test.

5.6.4 If DMC makes major changes to water treatment plant operations, such as a change in the lime source, a one week composite sample will be taken and TCLP testing will be conducted according to Attachment 18a-3.

5.6.5 An annual composite sample will be prepared at the end of the disposal season from the monthly composite samples. The annual composite sample will be analyzed for natural uranium and radium-226 in compliance with DMC's Site Use reporting requirements.

5.7. Hazardous Waste Confirmation

In the event that TCLP testing of MMWTP solids characterizes a specific sample as a hazardous or dangerous waste, DMC shall take the following actions:

1. Discontinue water treatment plant operation until the evaluation demonstrates that the problem is not related to the plant operations or until appropriate modifications are made.

2. Confirm initial test results by retesting the sample of MMWTP solids that failed. At the same time, DMC shall, as precisely as possible, delineate the location in TDA-4 of the material represented by the sample. DMC shall also notify both the Washington State Department of Ecology (WDOE) and WDOH that retesting is underway.

3. If the retesting confirms the original finding, DMC shall notify both the WDOE and WDOH and, at the same time, evaluate the situation and develop a plan of action. DMC shall consult with the WDOE to review the situation, describe the evaluation steps that would be taken, and establish a time line for reporting its findings and recommendations to rectify the situation. An informational copy of

this information shall be provided to WDOH. At a minimum, DMC shall take the following actions:

- Determine the amount of material affected by grid sampling of the disposal area in which MMWTP solids were placed since the last acceptable TCLP testing.

- Evaluate the potential causes, including water treatment plant operations, and determine the most likely cause of the situation,

- Evaluate appropriate corrective actions and select a recommended corrective action for presentation to the WDOE for review and approval. The alternative corrective actions may include, among other alternatives: *i*) no action; *ii*) amendment or modification of the target MMWTP solids in place; *iii*) physical isolation of the MMWTP solids in place, *iv)* removal and re-disposal in an appropriate manner within TDA-4; *v*) or removal and disposal off-site in an appropriate repository.

- DMC will notify EPA in the event of a designation test failure and corrective actions.

6. RECORDS

6.1. All records and documents associated with the MMWTP solids shipment shall become permanent records and shall be retained by DMC in accordance with the DMC Quality Assurance Plan and Procedures.

6.2. The volume of material received at TDA-4 will be calculated annually based on the number of truck loads and a weight factor. In addition the annual disposal area will be surveyed after cover construction is completed and the total volume of the annual area calculated and the remaining capacity in TDA-4 re-evaluated on the basis of MMWTP solids disposal, disposal of other Millsite material disposal and revised reclamation plans. This information, including analytical laboratory reports, construction field notes and liner certifications, will be included in DMC's Annual Environmental Report.

6.3. Prior to May 31 of the following year, a report shall be submitted to the WDOH summarizing MMWTP solids disposal operations for the calendar year. The report shall include analytical results, leach test results, radionuclide results, volume or weight of MMWTP solids disposed in TDA-4, and the general location of MMWTP solids disposal in TDA-4.

7. REFERENCES

7.1. WAC 246
7.2. License WN-I043-2

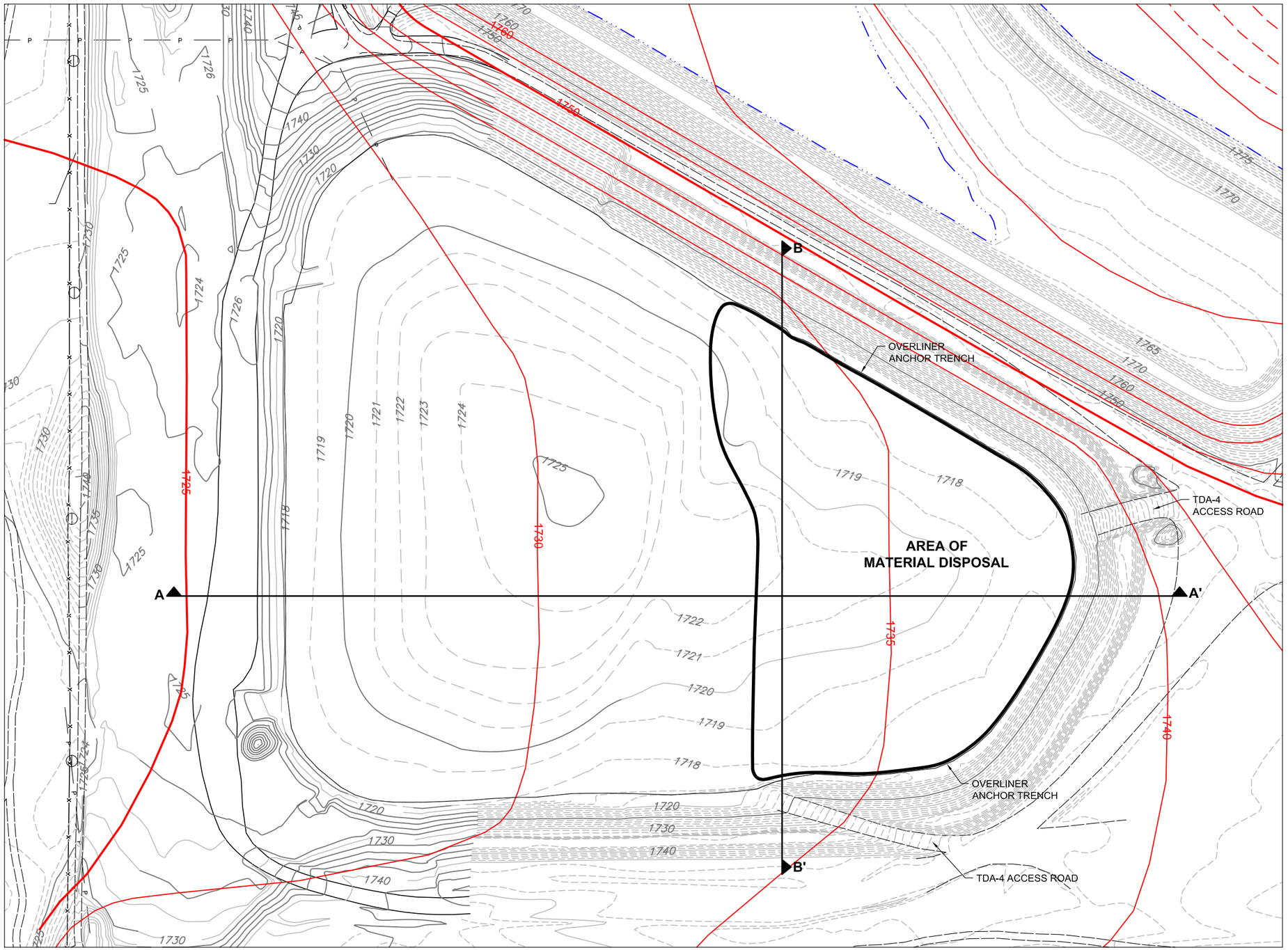
7.3. DMC Radiation Protection Procedures
7.4. DMC Quality Assurance Plan and Procedures
7.5. DMC Integrated Project Schedule

8. ATTACHMENTS

Attachment 18a-1 – Figures
Attachment 18a-2 – MMWTP Solids Placement Procedures
Attachment 18a-3 – MMWTP Solids Sampling and Analysis
Attachment 18a-4 – Vehicle Decontamination

DMOP 18a
Attachment 18a-1

Figures 18a-1.1, 18a-1.2, 18a-1.3 and 18a-1.4.



LEGEND

- 2009/10 SURVEY CONTOURS
- RECLAMATION SURFACE CONTOURS (2009 IPS)
- CROSS SECTION
- FENCE
- HAUL ROADS

Base Map Supplemented with Surveys Conducted on October 12, 2009 and September 17, 2008.
TDA-4 Areas 2 and 3 Contours Based of Top of Subgrade Fill Elevations (Benthin, September 3, 2010) and Overliner Backfill Thickness (Budinger, October 12, 2010)

NORTH

SCALE IN FEET
0 150

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June 2011

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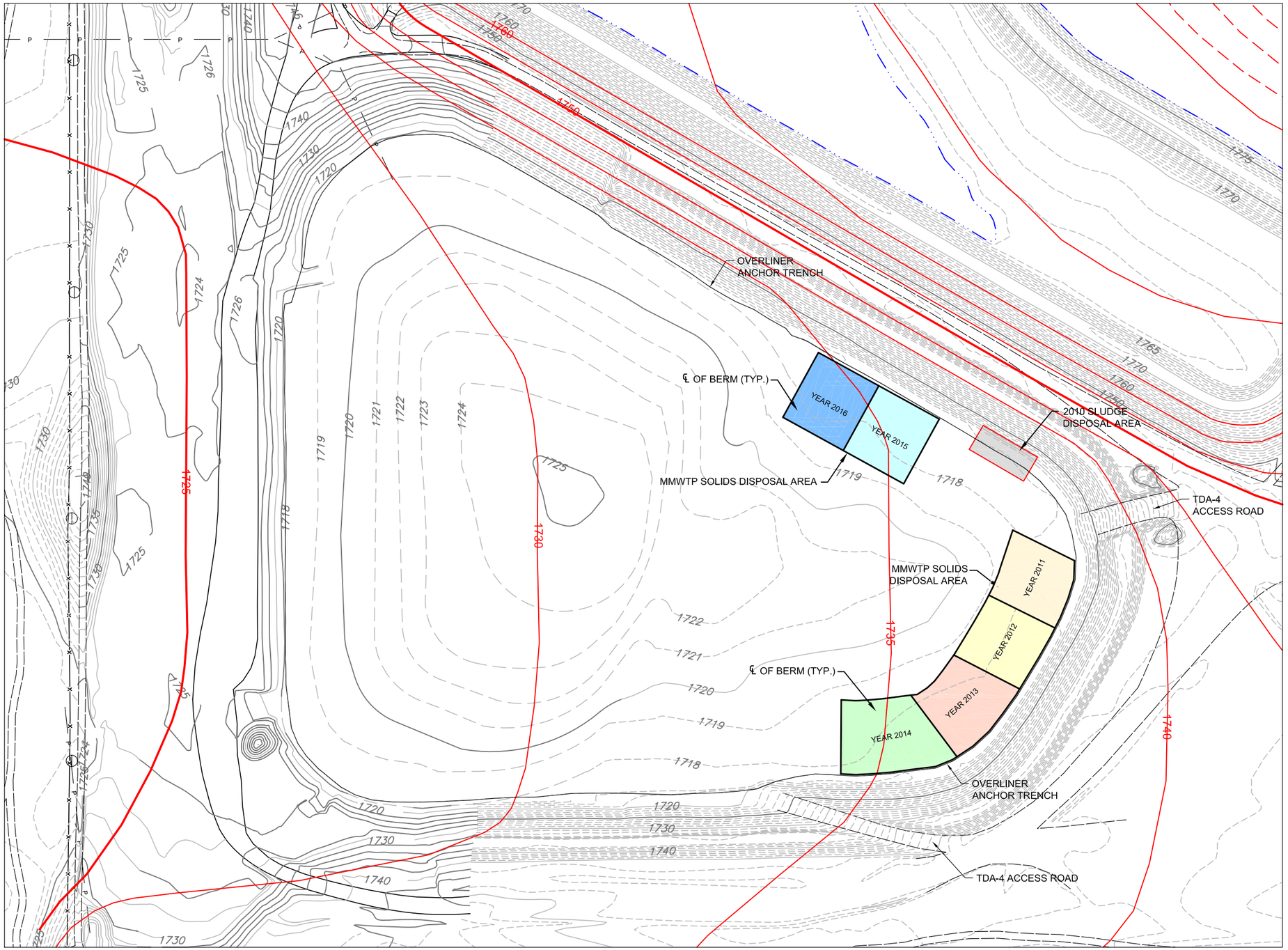
Figure 18a-1.1
Schematic Layout of Area of Material Disposal



LEGEND

- 2009/10 SURVEY CONTOURS
- RECLAMATION SURFACE CONTOURS (2009 IPS)
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Base Map Supplemented with Surveys Conducted on October 12, 2009 and September 17, 2008.
TDA-4 Areas 2 and 3 Contours Based of Top of Subgrade Fill Elevations (Benthin, September 3, 2010) and Overliner Backfill Thickness (Budinger, October 12, 2010)

NORTH

SCALE IN FEET
0 150

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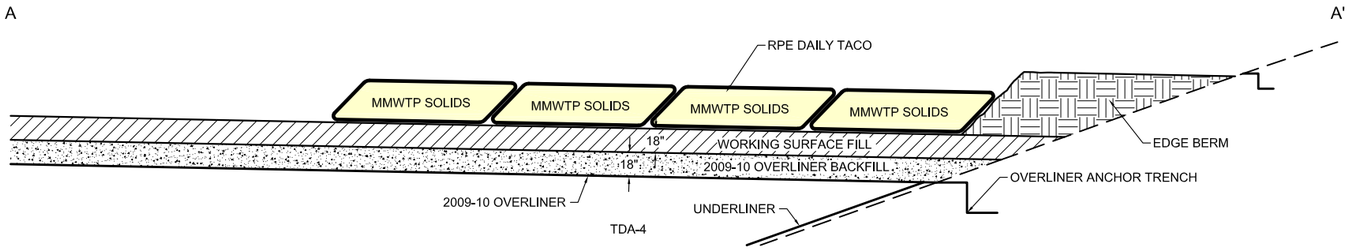
Project No. 180883

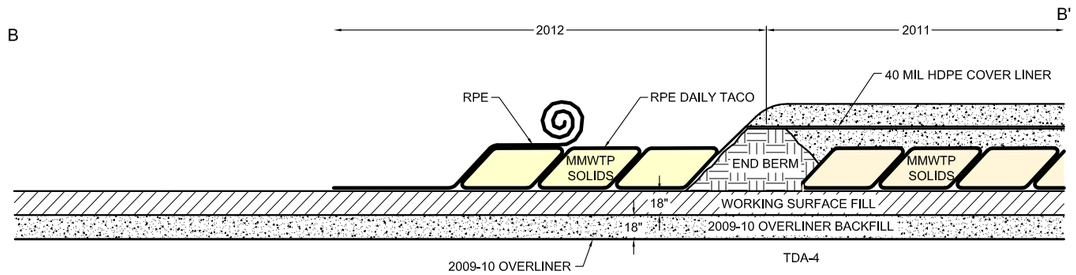
June 2011

DAWN MINING COMPANY

Figure 18a-1.2
Schematic Layout of Annual MMWTP Soilds Disposal Areas



MMWTP SOLIDS DISPOSAL AREA - SECTION A-A'
NOT TO SCALE



MMWTP SOLIDS DISPOSAL AREA - SECTION B-B'
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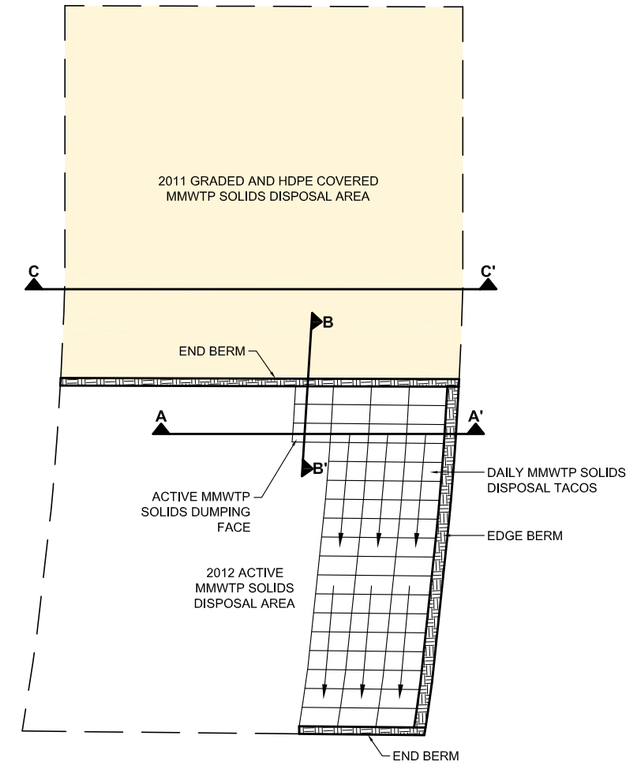
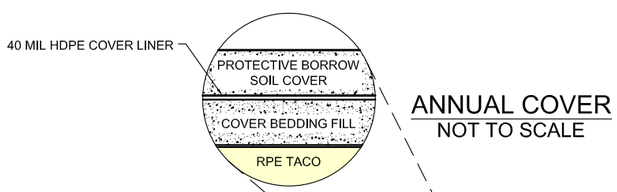
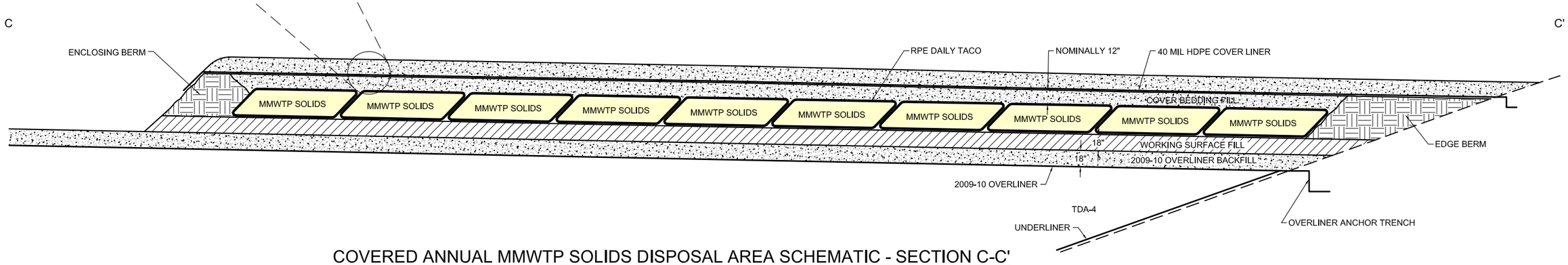


SCHEMATIC OF MMWTP SOLIDS DUMPING PROCESS
NOT TO SCALE



ANNUAL COVER
NOT TO SCALE



COVERED ANNUAL MMWTP SOLIDS DISPOSAL AREA SCHEMATIC - SECTION C-C'
NOT TO SCALE

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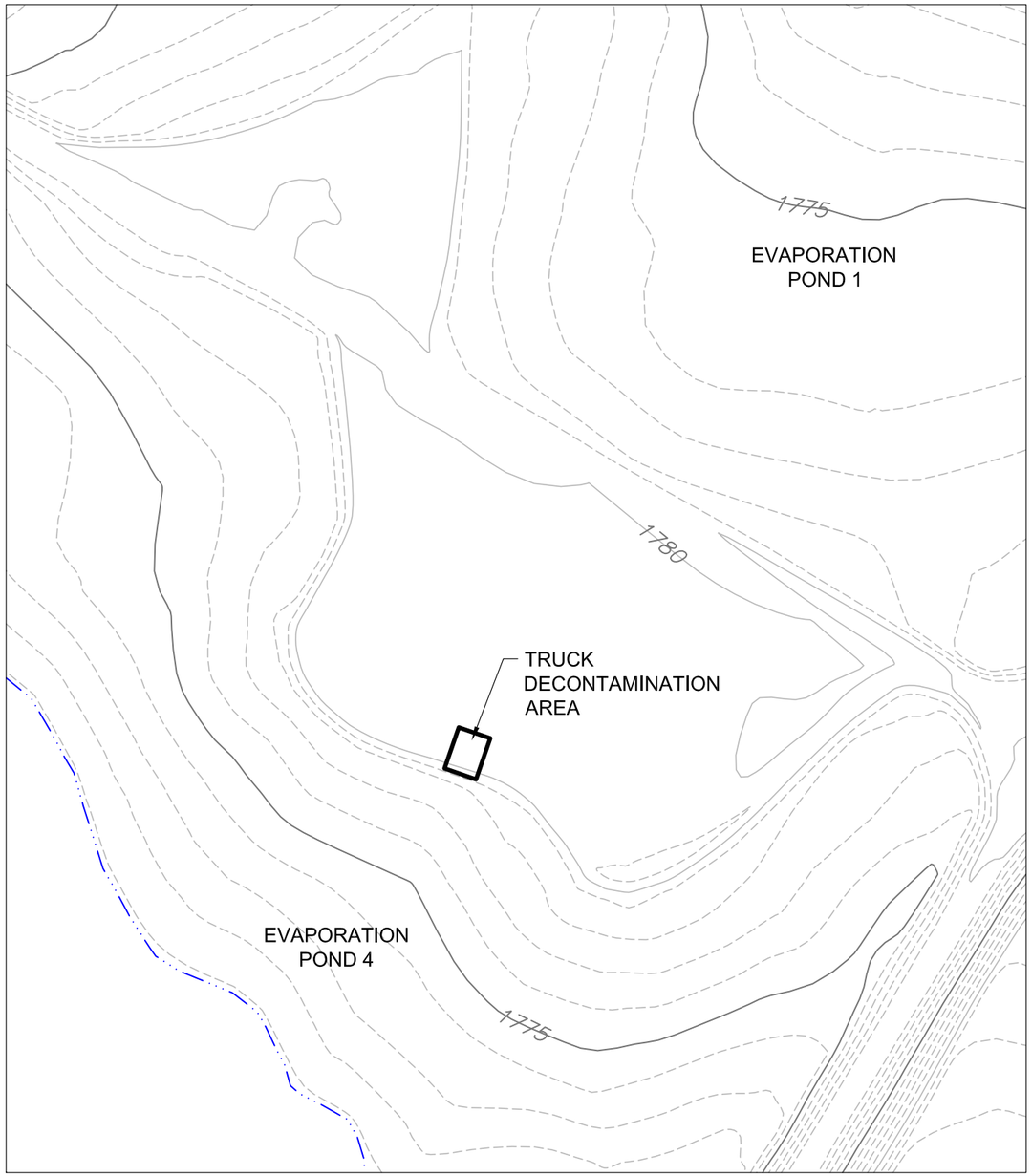
Project No. 180883

June 2011

DAWN MINING COMPANY

Figure 18a-1.3
Schematic TDA-4 MMWTP Solids Disposal Area Cross Sections

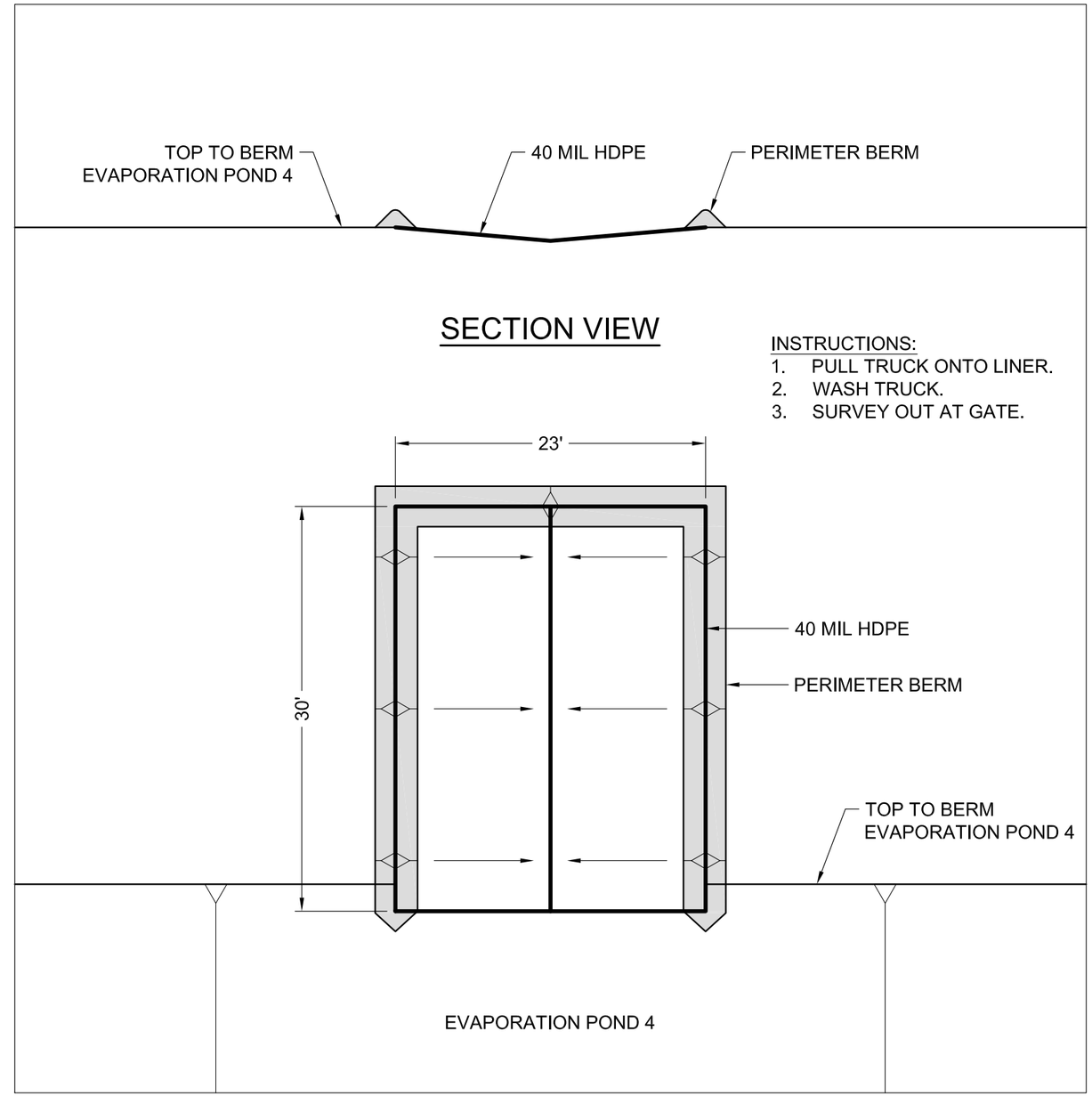


PLAN VIEW

SCALE: 1" = 100'

NORTH

SCALE IN FEET
0 100



DETAILED PLAN VIEW

SCALE: 1" = 10'

SCALE IN FEET
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Project No. 180883

June 2011

DAWN MINING COMPANY

Figure 18a-1.4
Truck Decontamination Area

DMOP-18a
ATTACHMENT 18a-2
MMWTP SOLIDS PLACEMENT PROCEDURES

A.1 PURPOSE

This attachment presents the specific procedures for placement of MMWTP solids within TDA-4. This attachment may be revised as needed to accommodate changing conditions within TDA-4 and other reclamation activities at the DMC Millsite, as well as to adjust placement procedures based on experience. DMC will notify the Washington Department of Health (WDOH) of proposed changes for WDOH review and approval.

A.2 MMWTP SOLIDS DISPOSAL LAYOUT IN TDA-4

Attachment 18a-1 shows the MMWTP solids disposal area in TDA-4.

A.3 MMWTP SOLIDS PLACEMENT

A.3.1 General Placement Method

The annual disposal of MMWTP solids will generally follow the conceptual plan outlined in the following steps:

- Placement of MMWTP solids will be by end-dumping from the same haul truck that DMC has used in the past. The dumping will occur in rows and the dump height and width is expected to be about 3 feet and 10 feet respectively based on haul truck dimensions. The general area of disposal is shown in Figure 18a-1.1 and the conceptual layout of the annual disposal areas is shown in Figure 18a-1.2.

- The disposal area, including roadways on the overliner backfill, will be prepared prior to delivery of the MMWTP solids by construction of an 18 inch protective fill layer (the fill will be the same type of fill used in the construction the TDA-4 subgrade in 2009 and 2010). The 18 inch protective fill layer will be placed on top of the existing 18 inch overliner backfill, for a total of 36 inches of separation between the haul truck traffic and the overliner. Figure 18a-1.3 shows a generalized cross section illustration of the disposal area.

- A berm will be constructed along the edge (the “edge berm”) of TDA-4 to separate the disposal area from the TDA-4 side slope. The edge berm will extend into TDA-4 so that the disposal area is located approximately 5 feet inside the location of the overliner at the anchor trench. The edge berm will be approximately 3 feet high and constructed by end dumping clean borrow fill and will be extended periodically as disposal operations proceed.

- A second berm will be constructed approximately perpendicular to the edge berm to provide enclosure (the "enclosing berm") on the one side of the disposal area. This enclosing berm will be approximately 3 feet high and created by end

dumping clean borrow fill. The enclosing berm will provide the end point where solids dumping will begin and proceed along the end berm. A new row of dumping will begin adjacent to the preceding row in as many rows as needed until the annual disposal is completed. DMC will build the annual areas to essentially the dimensions shown in Figure 18a-1.2 but will vary the configuration as site and solids production dictate. At the end of annual disposal enclosing berms will be placed on the two open sides of the disposal area in preparation for construction of the HDPE cover.

- Prior to dumping MMWTP solids, an RPE sheet approximately 12 feet wide will be placed over the area where the solids will be dumped each day and extended over the enclosing berm or previous days solids taco in a length sufficient to cover the next solids dump. MMWTP solids will be dumped on the RPE covered floor area and the extra length pulled over the dumped solids. A new length of RPE will then be placed adjacent to completed solids taco ready for the next days solids disposal dump.. This process of periodic RPE placement and MMWTP solids covering will be continued during the annual disposal period. The placement of the RPE under the MMWTP solids, and the daily covering of the solids in the solids RPE taco ensure that MMWTP solids are protected from summer rain fall. Side openings will allow limited desiccation. Sand bags or fill will be placed on the surface of the RPE solids tacos to stabilize the surfaces as determined warranted by DMC.

- Annual Covering – at the end of each year of disposal, an earthmoving contractor will cover the annual disposal area with approximately 12 inches of borrow fill and grade and prepare the surface for installation of a 40 mil HDPE liner cover. After the fill surface is prepared the HDPE liner will be installed by a liner installation contractor. The liner over the first annual disposal area will be anchored on all sides of the area. In subsequent years, the liner will be anchored on the interior and exterior sides of the disposal area and overlapped onto the existing liner of the adjacent disposal covered areas. A generalized depiction of the annual covering is shown in Figure 18a-1.3. The cover liner will be covered by a protective and stabilizing clean borrow fill layer of approximately 18 inches.

- A settlement monument will be established on the covered surface of the annual disposal area and monitored on the schedule established for the other TDA-4 settlement monuments.

A.3.2 Documentation

MMWTP solids disposal shall be documented on the form shown in Table A.1.

Table A.1 MMWTP Solids Disposal Form

Year_____

Date	Load	Truck Description	MMWTP Solids Weights	Truck Sample Collected	Truck Sample Identification	Decontamination Completed	Load Disposal Location
(Mo-Day)	(1,2)	(ford, int,..)	(x1,000 lb)	Initials		Initials	

Comments_____

DMOP-18a
ATTACHMENT 18a-3
MMWTP SOLIDS SAMPLING AND ANALYSIS

B.1 PURPOSE

This attachment presents the specific procedures for sampling and analysis of MMWTP solids upon disposal in TDA-4. The intention of this attachment is that it may be revised as needed to accommodate changing conditions within TDA-4 and other reclamation activities at the DMC Millsite, as well as to adjust sampling and sample compositing procedures based on experience or other factors. DMC will notify the Washington Department of Health (WDOH) of proposed changes for WDOH review and approval.

B.2 APPLICABLE SAMPLING PERIOD

Attachment 18a-3 to DMOP-18a applies to sampling and analysis of MMWTP solids starting in the year 2011. The sample compositing procedures outlined in this attachment may be modified by DMC based on sample analysis results and MMWTP solids disposal experience.

B.3 SAMPLING METHOD

B.3.1 General Sampling Method

B.3.1.1 MMWTP Sampling

B.3.1.1.1 Truck Composite Sample

A composite sample of each truck load of MMWTP solids placed in TDA-4 will be collected from the placed (dumped) solids. The sample will be a grab sample collected using a disposable plastic teaspoon. The sample collector will reach into the dumped solids pile and collect one teaspoon sample from the surface of the solids at the approximate middle and both ends of the dumped solids pile. The solids collected will be gently tamped and the surface stricken. The three teaspoon samples will be placed in a labeled ziplock bag and stored at the millsite for future compositing into the monthly sample.

B.3.1.1.2 Monthly Composite Sample

A monthly composite sample will be prepared for laboratory TCLP testing. This monthly composite sample is made of the individual truck composite samples collected since the last period composite sample was prepared. The entire volume of each truck composite sample will be combined to form the monthly composite sample. The monthly composite sample will be analyzed as described in the following section. A new monthly composite sampling period will begin after the then current month;ly composite sample is sent to the laboratory for analysis. The monthly composite sample will be stored on-site for at least one year.

B.3.1.1.3 Annual Composite Sample

An annual composite sample will be prepared at the end of the disposal season from the monthly composite samples. The annual composite sample will be analyzed for natural uranium and radium-226 in compliance with DMC's Site Use reporting requirements.

B.3.1.2 Sample Identification and Storage

B.3.1.2.1. Sample Identification

All samples will be labeled to identify the type of sample, the date the sample was take and the person taking the sample. The following provides the sample identification protocol that will be employed:

Truck sample – MMWTP Solids T year-sample date person, e.g., "MMWTP Solids T-11- June 12"

Monthly composite sample – MMWTP Solids MC year-sample date person, e.g., "MMWTP Solids MC 11-June 12"

Annual composite sample – MMWTP Solids AC year-sample date person, e.g. "MMWTP Solids AC 11-June 12"

B.3.1.2.2 Sample Storage

MMWTP solids samples will be stored at the Millsite in the locked sample archive room. Samples will be disposed of once acceptable analytical and test results are obtained.

B.3.1.3 Monthly Composite Sample Analysis

DMC will perform TCLP testing on the monthly composite sample. DMC will submit samples to a WDOH or EPA certified laboratory.

A sample of the monthly composite sample will be sent to the laboratory for analysis and a duplicate sample will be held for future analysis if necessary. DMC will prepare chain of custody documentation on samples sent for laboratory analysis following the procedures that it employs for all environmental samples shipment. Laboratory reports will include sample identification.

B.3.1.4 Special TCLP sampling

If DMC makes major changes to water treatment plant operations such as a change in the lime source, a one week composite sample will be taken and analyzed for TCLP metals. The samples will be obtained as described below for the weekly composite sample.

B.3.1.5 Natural Uranium and Radium-226 Analysis

DMC will submit the annual composite sample for laboratory analysis of natural uranium and radium-226.

B.3.2 MMWTP Solids Sampling Equipment

MMWT solids samples collected from the disposal area will be grab samples taken by hand. The samples will be collected from the surface of the dumped solids at the middle and two ends of solids pile and collected in plastic teaspoon. The collected solids in the teaspoon will gentle tamped and the top stricken. The monthly composite samples will be prepared by combining all of the entire volume of all truck samples..

B.3.3. Pit 3 Water Sampling and Analysis

DMC will sample and analyze Midnite Mine Pit 3 water quarterly for the historic analytes and compare the results to the history of Pit 3 analyte testing. DMC can use the concentrations of these analytes as an evaluative tool in the event the MMWTP solids fail a TCLP test.

B.4 CALCULATION OF WEIGHT, VOLUME AND TOTAL RADIONUCLIDE ACTIVITY IN MMWTP SOLIDS DISPOSED TO TDA-4.

The volume, weight, and total activity of water treatment MMWTP solids disposed of to TDA-4 during the year are reported in the annual Environmental Monitoring Report. These values will be estimated after water treatment terminates for the year, as follows:

B.4.1 Calculation of Total Weight of MMWTP Solids Disposed to TDA-4

At least one truckload of MMWTP solids to be disposed to TDA-4 will be weighed each week for as long as the local scales are available. The weights will be averaged to obtain and average truckload weigh for the year. The total weight of MMWTP solids disposed to TDA-4 in any year will be calculated based on the number of truckloads and the average truckload weight. The data will be reviewed periodically to assess the uniformity of the truckload weights

B.4.2 Calculation of Total Volume of MMWTP solids Disposed to TDA-4

The total volume of sludge disposed to TDA-4 will be estimated based on the total weight for the year and the density reported by the laboratory for the first week MMWTP solids sample. The laboratory reports density in g/cc. The volume is calculated as follows:

$V = (W \times 454\ g/lb)/(\rho \times 2.83E4\ cc/ft^3)$
Where:
V = total MMWTP solids volume in cubic feet
W = total MMWTP solids weight in lbs
P = reported MMWTP solids density based on the first week sample (g/cc)

B.4.3 Calculation of Total Activity for Specific Nuclides

The lab reports concentrations of U-nat in mg/kg dry weight and Ra-226 in pCi/g dry weight based on the annual composite sample. The percent moisture is reported for the first week sample. The estimated annual average radionuclide activity concentration as the MMWTP solids is disposed to TDA-4 (wet weight) is calculated as follows:

U-nat: $A_w = ([M_d] \times 6.77E2\ pCi/mg\ U\text{-}nat)(0.001\ kg/g)(1 - \%\ moisture/100)$
Where:
A_w = Activity concentration of U-nat (as disposed to TDA-4) in pCi/g
M_d = reported mass concentration U-nat (dry weight) in mg/kg
% moisture = percent moisture as reported by the lab [(wet wt – dry wt)/wet wt.]

Total Act. (U-nat) in curies = $A_w \times W \times 454\ g/lb \times 1\ E\text{-}12\ Ci/pCi$
Total Act. (Ra-226) in curies = ($A_d \times W \times 454\ g/lb \times 1E\text{-}12\ Ci/pCi$[)(wet wt – dry wt)/wet wt]
Where: A_d = reported activity concentration Ra-226 (dry weight) in pCi/g

ATTACHMENT 18a-4
VEHICLE DECONTAMINATION

The MMWTP solids transport vehicle bed or box will be lined with a sheet of plastic prior to filling at the mine. The plastic sheet under the load will either be a continuous sheet, or if a splice or patch made, the joined sections will have been overlapped and taped with Duct Tape or equivalent. This plastic sheet will surround the MMWTP solids load and minimize the potential for contamination of the vehicle bed or box. The plastic sheet will be dumped with the MMWTP load.

Prior to dumping, the rear tires on the dump trailer will be covered with an extended portion of the reinforced polyethylene (RPE). The load will be dumped onto the strategically placed RPE.

After dumping, the trailer bed or box will be lowered and examined for residual contamination as described in DMOP-04. If contamination is found, the vehicle will be driven to the decontamination area at the edge of EP-4. The truck will be backed to the edge of the decontamination area and the bed or box will be raised and washed with potable water from DMC's water supply system. The decontamination area will be constructed as illustrated in Figure 18a-1.4. The area will be covered with 40 mil HDPE and sloped toward EP-4 to allow wash water to drain into EP-4. The decontamination area will be surrounded on three sides with a berm to anchor the HDPE.

ATTACHMENT C
DMC RESPONSES TO WDOH COMPLETENESS REVIEW OF DMC'S APRIL 26, 2011 DRAFT REVISED LICENSE AMENDMENT APPLICATION

DOH COMMENTS ON DMC'S APRIL 26, 2011 LICENSE AMENDMENT APPLICATION TO EXTEND SLUDGE DISPOSAL IN TDA-4

The following plans are required by DOH to be submitted and approved prior to issuance of a license amendment to extend sludge disposal:

- An updated *MMWTP Solids Sampling Plan* - The sampling plan needs to address whether solids classify as Dangerous or Hazardous Waste, and also provide analyses that will further characterize solids for the duration of the operating season.

  DMC Response: DMC has incorporated the MMWTP Solids Sampling Plan into DMOP 18a. <u>See</u> DMOP 18a.

- A *TDA-4 Settlement Monitoring Plan* - All TDA-4 settlement data shall be submitted that have been collected since monitoring began with TDA-4 construction activities in 2009 and 2010 and initiation of pumping the underdrain system. The updated TDA-4 Settlement Monitoring Plan is required in order to confirm that there are no significant geotechnical stability issues associated with placement of MMWTP solids on top of the overliner. The plan should include locations and frequency based upon data that have been collected to date, when new settlement monitoring locations will be installed on the annual HDPE and soil cover, and the schedule for submitting the new settlement data reports.

  DMC Response: The TDA-4 Settlement Monitoring Plan has been submitted to DOH under separate cover. The TDA-4 Settlement Monitoring Plan will be updated annually with the Integrated Project Schedule (IPS).

- An updated *Evaporation Pond Water and Residuals Management Plan* - Section 6.3 of the application states that " ... *Cleaning will be done by brush and shovel and will not result in cleaned ponds/or storage and release o/clean water as DMC has done in the past ... "* Does this mean DMC is instituting new evaporation pond operational procedures that will not include the collection of dischargeable meteoric water in the cleaned ponds? The updated *Evaporation Pond Water and Residuals Management Plan* should include a revised DMOP to reflect changes in pond water and residues management operations. The Plan must include an updated pond water balance that includes up to date pond volumes, all data associated with pumping the underdrain system since pumping began (pumping rates and water quality), conservative values for precipitation, and projections for decommissioning ponds with and without pumping the ore stockpile area. The Plan should also address how much meteoric water is collected over the entire catchment area, and the sequence of decommissioning ponds to optimize evaporation surface and minimize meteoric catchment area. DMC will be required to submit an updated evaporation pond water balance and management plan annually, with analyses that show how soon water can be eliminated allowing for decommissioning.

  DMC Response: An Evaporation Pond Water and Residuals Management Plan has been submitted to DOH under separate

cover. This plan provides DMC's estimates of evaporation system operations, termination and decommissioning based on current process water volumes. This plan will be updated annually with the IPS. See also the discussion in Section 1.1 of DMC's License Amendment Application.

Other specific comments are provided in the following:

License Amendment Application

- Page 4, second paragraph - It is stated that an alternative to placing the MMWTP solids into TDA-4, that Dawn Mining Company is actively pursuing, is to send the material to the Dennison White Mesa Mill in Utah. Please provide a detailed report as to the status of sending this material to that facility.

  DMC Response: DMC's License Amendment Application has been revised accordingly. See Section 2.4.1.2.

- Page 4, 3rd paragraph - If DMC pursues constructing a new cell for MMWTP solids (source material) at property owned by DMC, on the millsite or adjacent to the millsite, there is a good possibility that it would need to comply with WAC 246-250, 10 CFR Part 61, for Low Level Radioactive Waste.

  DMC Response: Should DMC decide to pursue the option of constructing a new cell for MMWTP solids at or adjacent to the millsite, DMC will comply with WAC 246-250, 10 CFR Part 61, if applicable.

- Section 6.0 - DMC needs to provide a figure that shows the approximate lateral extents (footprint) of remaining millsite-contaminated materials (soils and demolition debris). Work plans for millsite demolition debris and associated materials, remaining contaminated soils, and evaporation pond residues will need to be submitted for DOH review and approval prior to placement in TDA-4.

  DMC Response: Figures showing the approximate lateral extent of the location of disposal of remaining millsite-contaminated materials in TDA-4 and the location of these materials in the millsite is included with DMC's License Amendment Application, Attachment A, as Figures 5 and 6 respectively. DMC will provide work plans for millsite demolition debris and associated materials, remaining contaminated soils, and evaporation pond residues for WDOH review and approval prior to placement of those materials in TDA-4.

- Section 7.0 (now Section 6) - What is meant in the first bullet by "suitable vehicle for other materials?" Section 7.0 also needs added language that discusses the appropriate placement of debris to minimize settlement and commitments to document locations, adequate compaction, and settlement monitoring.

DMC Response: DMC's License Amendment Application has been revised accordingly. See Section 6.4. Prior to placement of contaminated millsite materials in TDA-4, DMC will provide work plans for WDOH review and approval. These work plans will address the placement of debris to minimize settlement and commitments to document locations, adequate compaction, and settlement monitoring.

- Section 10.6 (now section 8.6) - **Volume of MMWTP solids to TDA-4** - Provide operational assumptions leading to estimated annual volumes of 45,000 cubic feet from 2011 through 2016. DMC needs to provide the specific references (citations) that support the statements made in this section for **Geochemistry, Transportation, Water Quality, and Water Management.** In the **Short-term Control** section, the statement that operational plans will *eliminate* the potential for release should be changed to acknowledge that the potential for release is *minimized* so that there should be no significant environmental impacts. Likewise, the **Water Quality** section is too strongly worded. The operations will minimize the potential for impacts.

DMC Response:

Volume of MMWTP solids into TDA-4: DMC's License Amendment Application has been revised accordingly. See Section 8.6. The estimated annual volume of solids used in the application is the highest annual level of MMWTP solids produced in the past ten years. This volume was selected to provide a conservative estimate of solids disposal volume for the evaluation of remaining capacity and the sizing of annual disposal areas and the location of those areas in TDA-4 to ensure that acceptable conditions would be achieved. DMC believes that actual annual disposal volume will be less than 45,000 cubic feet. Also, please note that the projected volume of 45,000 cubic feet per year is the same volume reviewed and approved by WDOH in 2009. See 2009 Technical Evaluation Report (2009 TER) at page 3.

Geochemistry: As stated in DMC's License Amendment Application, the discussion about the geochemistry of the MMWTP solids is based on WDOH's previous review of MMWTP solids in 2009. See 2009 TER at page 3. The geochemistry of the MMWTP solids has not changed since WDOH's previous review.

Transportation: As stated in DMC's License Amendment Application, the discussion about the transportation of the MMWTP solids is based on WDOH's previous review in 2009. See 2009 TER at page 4. The transportation of the MMWTP

solids to the millsite has not changed since WDOH's previous review.

Water quality: As stated in DMC's License Amendment Application, the discussion about water quality is based on the discussion in Section 3.0. Section 3.0 includes the results of tests on the MMWTP solids that demonstrate that the uranium and other constituents of the MMWTP solids are not mobilized by leaching. In previous reviews of DMC's applications to disposal of MMWTP solids into TDA-4, WDOH's evaluation of impacts to water quality were based on the mobility of the constituents of the MMWTP solids. See 2000 TEE at page 11. The mobility of the constituents of the MMWTP solids has not changed since WDOH's previous reviews. DMC's License Amendment Application has been revised to reflect that operations will minimize impacts. See Section 8.6.

Water Management: DMC's License Amendment Application has been revised accordingly. See Section 8.6.

Short-term Control: DMC's License Amendment Application has been revised accordingly. See Section 8.6.

Attachment A

- Figure 2 - Show where cross-sections intersect on each profile.

  DMC Response: The cross section locations used in Figure 2 have been located in Figure 1 which is the plan view of TDA-4 in the revised application. See DMC's License Amendment Application, Attachment A.

- Figure 3 - Provide a plan view of solids disposal sequencing.

  DMC Response: A plan view of the conceptual sequencing of the solids disposal in provided in Figure 3 of the revised application. See DMC's License Amendment Application, Attachment A.

- Annual cover with 40-mil HDPE - soil cover should be added at appropriate intervals, or provide discussion why the soil cover is not needed. (Also needs to be added to DMOP 18a.)

  DMC Response: DMC's License Amendment Application has been revised to include covering of the HDPE cover liner with an 18 inch soil layer annually. Figure 4 in the revised application shows the soil layer over the annual cover liner. See DMC's License Amendment Application, Attachment A.

Attachment B - DMOP 18a

- Section 1.0 - Purpose: 1st paragraph, last sentence - "Such changes may be made with 30 day prior notice to DOH ...." Changes will require DOH notification, review, and approval (similar to field changes during construction).

  DMC Response: Section 1 of DMOP 18a has been revised accordingly.

- Section 2.0 - Definitions and Responsibilities: Add transportation operator and responsibilities, and sample collection staff.

  DMC Response: DMOP 18a has been revised accordingly. <u>See</u> DMOP 18a, Section 2.5.

- Section 3.0 - Precautions: Attach MSDS for lime (as well as any other additives associated with sludge as disposed in TDA-4).

  DMC Response: MSDSs for lime, barium chloride and flocculant have been attached hereto.

- Section 4.2 - Other Equipment: Identify what (specifically) for each category of equipment, and how each will be used.

  DMC Response: DMOP 18a has been revised to include more specific information on "Other Equipment" to the extent that this equipment can be more specifically described. This "Other Equipment" is typically general in nature (air pumps, meters, high pressure washers, etc.) and DMC selects and replaces this equipment to meet the needs of the job. DMC does not believe that the specification of a particular brand of equipment serves any purpose in DMOP 18a.

- Section 4.3 - Materials: Identify borrow source for clean fill and water source for decontamination.

  DMC Response: DMOP 18a has been revised accordingly. <u>See</u> DMOP 18a, Section 4.3.

- Section 5.1 - Preparation ofTDA-4: Ensure that roadways, causeways, or ramps constructed in TDA-4 are at least three feet in depth to protect the overliner.

  DMC Response: DMOP 18a has been revised accordingly. <u>See</u> DMOP 18a, Section 5.1.1.

- Section 5.3 - Placement and covering of MMWTP Solids: Subsection 5.3.3 states that solids will be covered only after confirmation that they do not designate as hazardous

waste - please clarify the timing and extent of confirmation sampling and analyses (spelled out in the required *Sampling and Analysis Plan* revisions).

DMC Response: The HDPE cover over the annual solids disposal area occurs at the end of each disposal year. DMC will conduct monthly TCLP testing of solids during the disposal year (see DMOP 18a, Section 5.3.3, and 5.7). This monthly TCLP testing, the last of which will occur at the end of the disposal year, will provide timely information to allow annual cover construction to be completed.. See DMOP 18a, Section 5.3.3.

- Section 5.4 - Transport Vehicle Decontamination: In subsection 5.4.3, it should be noted that the vehicle must comply with DOT requirements for contamination levels, and all other DOT requirements should be addressed, such as (but not limited to) manifesting, marking, labeling, placarding, training, etc. Provide a reference to DMOP 4 - Vehicle Decontamination.

DMC Response: DMOP 18a has been revised accordingly. See DMOP 18a, Sections 5.2.1 and 5.4.1. Moreover, DMC will prepare (and submit to WDOH for approval) a transportation DMOP that addresses DOT requirements.

- Section 5.5 - Radiological Contamination Survey: In subsection 5.5.1, the release levels for loose contamination should be clarified or at least reference should be made to the proper DMOP and section.

DMC Response: DMOP 18a has been revised accordingly. See DMOP 18a, Section 5.5.1.

- Section 5.6 - Monitoring: Revise to reflect all changes in modified *Sampling and Analysis Plan* (DMOP 18a-3). Address the following:

DMC Response: DMOP 18a has been revised according to the specific elements of this comment as set out below. See DMOP 18a, Section 5.6 and Attachment 18a-3.

  - Midnite Mine Pit 3 water quality indicator parameters that will be monitored.

DMC Response: DMC has revised DMOP 18a Section 5.6 to remove the discussion relating to indicator parameters in pit 3 water and the use of these parameters to identify potential changes in solids characteristics. This is done to acknowledge that, based on historic and current MMWTP operations and historic pit 3 water quality monitoring, no indicator parameters can be identified. This is due to the lime neutralization treatment process used in the MMWTP which is insensitive to the quality of the influent mine pit water being treated. Rather, DMC has and will continue to rely on TCLP testing to observe solids

characteristics and the identification of any adverse condition. DMC will continue to monitor pit 3 water quality and will use that data, if necessary, to evaluate possible causes if solids fail to meet TCLP criteria.

- What constitutes effective change to composition of solids?

  DMC Response: DMC has and will continue to use TCLP testing as the basis for determination of acceptable solids composition.

- Describe basis for sampling frequency that is sufficient to monitor any substantial changes in solids.

  DMC Response: DMC has revised the sample and analysis plan in DMOP 18a, Attachment 18a-3. A monthly composite sample of MMWTP solids will be analyzed. Based on years of monitoring MMWTP solids (and finding no substantial changes in the solids), this frequency will provide sufficient notice of any substantial changes in the MMWTP solids.

- Describe sample compositing strategy to accurately reflect characteristics of placed sludge, and demonstrate inherent variability (or lack of).

  DMC Response: DMOP 18a has been revised accordingly. <u>See</u> DMOP 18a, Section 5.6 and Attachment 18a-3.

- Section 5.7 - Hazardous Waste Confirmation: Consider adding grid sampling of placed sludge, as needed to define the extent of material designating as hazardous waste. EPA should also be notified of any designation test failure and corrective actions.

  DMC Response: If solid TCLP testing indicates a failure of the solids to meet TCLP criteria, DMC will investigate the possible cause for this condition as set out in DMOP 18a section 5.7, including grid sampling of the placed solids to identify the location and extent of solids that do not meet TCLP criteria. DMOP 18a has been revised accordingly. <u>See</u> DMOP 18a, Section 5.7.

- Section 6.0 - Records: In subsection 6.2, the disposed and remaining capacity volumes in TDA-4 should be calculated annually, based on the actual surveyed area and depths (including fill, berms, and cover soil). Include laboratory analytical sheets.

  DMC Response: DMOP 18a has been revised accordingly. <u>See</u> DMOP 18a, Section 6.2. Laboratory analytical sheets will be submitted with DMC's annual MMWTP solids disposal report.

- DMOP 18a-2 - MMWTP Solids Placement Procedures:

- A.l and A.3.2 - Operational and location changes will require DOH review and approval, similar to field review and documentation efforts during *2009/2010* construction activities in TDA-4.

  DMC Response: DMOP 18a has been revised accordingly. <u>See</u> DMOP 18a, Attachment 18a-2, Section A.1.

- Table A1: Add sample identification number attached to load and location identification system for placement in TDA-4. Can also use as a database reference to attach sample analytical results (similar to what is currently being done with environmental monitoring at the millsite).

  DMC Response: DMOP 18a has been revised accordingly. <u>See</u> DMOP 18a, Attachment 18a-2, Table A.1.

- Figure 18a-2.1: Add soil cover over 40-mil HDPE and plan view showing disposal cell sequencing.

  DMC Response: DMOP 18a has been revised accordingly. <u>See</u> DMOP 18a, Attachment 18a-1, Figure 18a-1.1.

- Provide criteria for how often 40-mil HDPE will be installed.

  DMC Response: The annual cover will be installed every year after the disposal season is ended. DMOP 18a has been revised accordingly. <u>See</u> DMOP 18a, Attachment 18a-2, Section A.3.1.

- DMOP 18a-3 - MMWTP Solids Sampling and Analysis:

  - B.l - Purpose: Changes will require DOH notification, review, and approval

    DMC Response: DMOP 18a has been revised accordingly. <u>See</u> DMOP 18a, Attachment 18a-3, Section B.1.

  - B.3 - Sampling Method: The following should be addressed in the revised ***Solids Sampling and Analysis Plan:*** Provide laboratory sheets of all solids testing data; consider collecting samples once load is placed; potential indicator parameters; where will samples be stored and is the storage area monitored; compositing method; identify all parameters for testing, method numbers, and analytical laboratories.

    DMC Response: DMOP 18a has been revised accordingly. <u>See</u> DMOP 18a, Attachment 18a-3, Section B.3.1. Laboratory sheets will be provided with the annual MMWTP solids disposal report.

  - DMOP l8a-4 Vehicle Decontamination - See previous comment regarding vehicle decontamination.

DMC Response: DMOP 18a has been revised accordingly. <u>See</u> DMOP 18a, Attachment 18a-4.

Attachment C - Radon Model Flux Analysis

- Consider pulling this section out of the application or provide more clarification on why it's included in the submittal (the RADON model will be reviewed as part of Final Cover Design Basis).

  DMC Response: The Radon Model Flux Analysis section has been removed from the application.

- Consider adding another profile through the solids disposal area.

  DMC Response: The Radon Model Flux Analysis section has been removed from the application.

- Provide a basis for input parameters and ranges in properties.

  DMC Response: The Radon Model Flux Analysis section has been removed from the application.

ATTACHMENT
MSDSs

5-21-99

93623-34186

Aslchem International Inc.
100-9451 Van Horne Way,
Richmond, B.C.,
Canada V6X 1W2

Material Safety Data Sheet

Material: Barium Compounds, N.O.S. (Barium Chloride, Dihydrate)

PIN No.: UN1564

24 Hours Emergency Telephone Number = Canutec Call Collect (613)996-6666

Hazard Rating: National Fire Protection Association

4 = Extreme, 3 = High, 2 = Moderate, 1 = Slight, 0 = Insignificant, * = Chronic Health Hazard (See Sec. 6)

Fire = 0 Health = 2 Reactivity = 0 Special = None

SECTION 1. Identification of Product

Trade Name/Chemical Name:
Barium Chloride, Dihydrate

Synonyms:
Barium Dichloride

Chemical & Physical State: Solid

Molecular Formula: $BaCl_2 \cdot 2H_2O$

Chemical Family: Inorganic Salt

CAS No.: 10361-37-2

SECTION 2. Physical Properties

Appearance & Odour:
Odourless, white crystals

Boiling Point (degree C):
1560

Freezing Point (degree C):
963

Vapour Pressure (mm Hg):
< 0.1 mm Hg @ 20 Degree C

Specific Gravity (water = 1 at 4 degree C): 3.097

Bulk Density: N/A

Vapour Density (Air = 1): N/A

Solubility in Water: Not applicable

Other Solvents: Not applicable

pH: 5.0 - 8.0 (5% Solution)

SECTION 3. Fire & Explosion Hazard Data

Flash Point (degree C) & Method:
Non flammable

Autoignition Temperature (degree C):
Not applicable

Flammable Limits (% by vol. in air):
None

Lower: N/App Upper: N/App

Would any material saturated with this product be subject to spontaneous combustion?

[X] Yes [ ] No Materials: Barium Oxide, Hydrochloric Acid, Hydrogen Chloride Gas

Fire Extinguishing Media: Use any means suitable for surrounding fire.

Fire Fighting Procedures: Barium Chloride is toxic if ingested. Wash away any material which may have contacted the body with copious amount of water.

Other Fire or Explosion Hazards: None

Aslchem International Inc.
100-9451 Van Horne Way,
Richmond, B.C.,
Canada V6X 1W2

Material Safety Data Sheet

Material: Barium Compounds, N.O.S. (Barium Chloride, Dihydrate)
PIN No.: UN1564

SECTION 6. Special Protection Information

Ventilation Requirements:
Local exhaust ventilation required

Respiratory Protection: NIOSH/MSHA approved respirator

Skin Protection: Imervious rubber gloves, apron & general protective clothing

Eye Protection: Safety glasses or goggles / or full face shield

Other Protective Equipment: Ensure that emergency shower & eye wash facilities are in working order & within easy access.

SECTION 7. Special Requirements

Precaution in Handling and Storing: Avoid genreating dust. Avoid contact with skin, eyes & clothing. Follow routine safe handling procedures. Store in a tightly closed container in a cool, dry well-ventilated area. Store away from incompatible materials.
Other Precautions: Wear protective equipment when handling

SECTION 8. Spill or Leak Procedures

Steps to be taken in event of spill or release (in all cases notify applicable Government Authority if spill is significant): Shovel up spill and place in a suitable container for disposal. Wash site of spillage thoroughly with water & detergent.
Environmental Effects: Harmful to aquatic life in low concentrations. Prevent entry into potable water intakes & waterways. Human toxicity, critical concentration - 1.0 mg/l; fish toxicity, critical concentration - 10,000 mg/l
Neutralizing Chemicals: In some cases, Sodium Sulphate or Magnesium Sulphate can be used to precipitate Barium as insoluble Barium Sulphate.
Waste Disposal: Consult environmental authorities before taking any action. Observe all federal, provincial & local regulations when disposing of this substance.

SECTION 9. Transportation & Regulatory Information

Shipping Name: Barium Compounds, N.O.S. **PIN:** UN1564
T.D.G. Class: 6.1 **Packing Group:** III **Marine Pollutant :** Yes **WHMIS:** D1B, D2B

SECTION 10. References

1) SAX, N. Irving., Dangerous Properties of Industrial Chemicals. 6th Ed., 1984.
2) "Cheminfo", through "CCINFOdisc", Canadian Centre for Occupational Health and Safety, Hamilton, Ontario, Canada.

N/A : Not Available N/App : Not Applicable

3-3-2010

TYPICAL ANALYSIS SHEET

GRAYMONT

Lime and Limestone products
GRAYMONT Western US INC. 3950 South 700 East, Suite 301, Salt Lake City, UT 84107 (801) 262-3942 Fax (801) 264-8039

PRODUCT : **HIGH CALCIUM HYDRATED LIME**

PRODUCTION FACILITY : Indian Creek Plant – Townsend, Montana

PRODUCT DESCRIPTION :

A fine white powder made by reacting quicklime with sufficient water to convert the calcium oxide (CaO) to calcium hydroxide ($Ca(OH)_2$).

COMPOSITION AND TYPICAL CHEMICAL PROPERTIES :

Available Lime Index as Calcium Hydroxide ($Ca(OH)_2$), (%)	94.7
Total Calcium as Calcium Oxide (CaO), (%)	72.6
Available Lime Index as Calcium Oxide (CaO), (%)	71.7
Magnesium Oxide (MgO), (%)	1.6
Silica (SiO_2), (%)	0.8
Ferric Oxide (Fe_2O_3), (%)	0.1
Alumina (Al_2O_3), (%)	0.2
Total Sulfur (S), (%)	0.07
Loss On Ignition, (%)	25.4
Carbonates, ($CaCO_3$), (%)	3.8
Moisture (H_20), (%)	0.3
Neutralizing value ($CaCO_3$ = 100), (%)	130

TYPICAL PHYSICAL PROPERTIES :

Bulk Density (ASTM C 110),	(kg/m^3)	400 – 620
	(lbs/ft^3)	25 – 39

CLASSICAL REFERENCE DATA : (CRC Handbook of Chemistry and Physics)

Specific Gravity	2.24
Solubility in Water (0 °C), (g/l)	1.85
pH (saturated solution) (25 °C)	12.454

SIZE DISTRIBUTION :

SIEVE (mm.)	SIEVE (U.S.A.)	% PASSING
1.25	N° 16	100
0.600	N° 30	95 – 100
0.150	N° 100	90 – 100
0.075	N° 200	75 – 95
0.045	N° 325	55 – 85

NOTICE :

* The test data herein is based on average results on production samples. Product shipments are subject to normal variation. Accordingly, test data can not be taken as establishing maximum or minimum specifications.

CLASSIFIED UL WATER QUALITY

ANSI / NSF 60
DRINKING WATER TREATMENT ADDITIVES
< 8 N 63 >
MAXIMUM USE LEVEL: 650 mg/l.

GRAYMONT

MATERIAL SAFETY DATA SHEET

SECTION I - CHEMICAL PRODUCT AND COMPANY INFORMATION

Product Name:	HIGH CALCIUM HYDRATED LIME	WHMIS – CLASSIFICATION: D2A / D2B: MATERIALS CAUSING OTHER TOXIC EFFECTS E: CORROSIVE MATERIAL

MANUFACTURER'S AND SUPPLIER'S NAME:

GRAYMONT (NB) INC	4634, Route 880, Havelock, New Brunswick, E4Z 5K8.
GRAYMONT (QC) INC.	25 – 206, rue De Lauzon, Boucherville (Québec), J4B 1E7.
GRAYMONT (PA) INC.	965, East College Avenue, Pleasant Gap, PA 16823
GRAYMONT (WESTERN CANADA) INC.	190 – 3025, 12th Street N.E., Calgary, Alberta, T2E 7J2
GRAYMONT (WESTERN US) INC.	3950 South, 700 East, Suite 301, Salt Lake City, Utah 84107
GRAYMONT (WI) INC.	Foot of Hill Avenue, Superior, Wisconsin 54880

EMERGENCY TEL. No.: (613) 996 – 6666 CANUTEC (Canada) (800) 424 – 9300 CHEMTREC (US)

Chemical Name	Chemical Family	Chemical Formula
Calcium hydroxide	**Alkaline earth hydroxide**	**Complex mixture - mostly $Ca(OH)_2$**
Molecular Weight	Trade Name and Synonyms	Material Use
$Ca(OH)_2$ = 74.096	**Hydrated Lime, Lime, Slaked lime, Lime Putty, Lime Slurry, Milk of Lime, Calcium Hydroxide**	**Neutralization, Flocculation, Stabilization, absorption**

SECTION II - COMPOSITION AND INFORMATION ON INGREDIENTS

Hazardous Ingredients	Approximate Concentration (% by weight)	C.A.S. Number	Exposure limits (mg/m^3)					
			OSHA PEL	ACGIH TLV	RSST VEMP	MSHA PEL	NIOSH REL	NIOSH IDLH
(Complex Mixture)	**(% by weight)**		**(TWA) 8/40h**	**(TWA) 8/40h**	**(TWA) 8/40h**	**(TWA) 8/40h**	**(TWA) 10/40h**	
Calcium hydroxide	**92 to 100**	**1305-62-0**	**15 (tot dust) 5 resp dust**	**5**	**5**	**5**	**5**	**N/A**
Crystalline Silica, Quartz	**0.1 to 1**	**14808-60-7**	**10/(%SiO_2)+2 respirable silica dust**	**0.025 respirable silica dust**	**0.1 respirable silica dust**	**10/(%SiO_2)+2 respirable silica dust**	**0.05 respirable silica dust**	**50**
Crystalline Silica, Quartz	**0 to 0.1** (Note 1)	**14808-60-7**	**10/(%SiO2)+2 respirable silica dust**	**0.025 respirable silica dust**	**0.1 respirable silica dust**	**10/(%SiO2)+2 (respirable silica dust)**	**0.05 respirable silica dust**	**50**

(Note 1): Concentration of crystalline silica in a series of lime products will vary from source to source. It was not detected on some samples (< 0.1% w/w). Therefore two ranges are being disclosed. **(Note 2)**: ACGIH TLV Version 1973 has been adopted by the Mine Safety Health Administration (MSHA) as the regulatory Exposure Standard.

SECTION III - PHYSICAL AND CHEMICAL DATA

Physical State	Odor and Appearance		Odor Threshold (p.p.m.)	Specific Gravity
Gas ☐ Liquid ☐ Solid ☑	**Slight earthy odor – Fine white powder**		**Not applicable**	**2.3 – 2.4**
Vapor Pressure (mm)	Vapor Density (Air = 1)	Evaporation Rate	Boiling Point (°C)	Melting Point (°C)
Not applicable	**Not applicable**	**Not applicable**	**Not applicable**	**Not applicable**
Solubility in Water (20°C)	Volatiles (% by volume)	pH (25 °C)	Bulk Density (kg/m^3)	Coefficient of water/oil distribution
0.165g/100g solution	**Not applicable**	**Sat. soln $Ca(OH)_2$ 12.45**	**320 - 690**	**Not applicable**

SECTION IV - FIRE OR EXPLOSION HAZARD DATA

Flammability

Yes ☐ No ☑ If yes, under which conditions?

Extinguishing Media

Calcium Hydroxide does not burn. Use extinguishing media appropriate to surrounding fire conditions.

Special Fire Fighting Procedures

Not applicable

Flash point (° C) and Method	Upper flammable limit (% by volume)	Lower flammable limit (% by volume)
Not applicable	**Not applicable**	**Not applicable**
Auto Ignition Temperature (°C)	TDG Flammability Classification	Hazardous Combustion Products
Not applicable	**Non-flammable**	**None**

Dangerous Combustion Products **None**

EXPLOSION DATA

Sensitivity to Chemical Impact	Rate of Burning	Explosive Power	Sensitivity to Static Discharge
Not applicable	**Not applicable**	**Not applicable**	**Not applicable**

SECTION V - REACTIVITY DATA

Chemical Stability		
Yes ☑ No ☐	If no, under which conditions?	**Absorbs carbon dioxide in the air to form calcium carbonate.**
Incompatibility to other substances		
Yes ☑ No ☐	If so, which ones?	**Boron tri-fluoride, chlorine tri-fluoride, ethanol, fluorine, hydrogen fluoride, phosphorus pentoxide; and acids (violent reaction with generating heat and possible explosion in confined area).**
Reactivity		
Yes ☑ No ☐	If so, under which conditions?	**Reacts violently with strong acids. Reacts chemically with acids and many other compounds and chemical elements to form calcium based compounds. Explosive when mixed with nitro organic compounds.**
Hazardous Decomposition Products		**Thermal decomposition at 540°C will produce calcium oxide and water.**
Hazardous Polymerization Products		**Will not occur.**

SECTION VI - TOXICOLOGICAL PROPERTIES

Route of Entry

☑ Skin Contact ☐ Skin Absorption ☑ Eye Contact ☑ Acute Inhalation ☐ Chronic Inhalation ☑ Ingestion

Effects of Acute Exposure to Product

Skin	**Severe irritation of mucous and skin, removes natural skin oils.**
Eyes	**Severe eye irritation, intense watering of the eyes, possible lesions, possible blindness when exposed for prolonged period. Eye irritation data: Eye-Rabbit-10mg/ 24 h – Severe.**
Inhalation	**If inhaled in form of dust, irritation of breathing passages, cough, sneezing.**
Ingestion	**If ingested: pain, vomiting blood, diarrhea, collapse, drop in blood pressure (indicates perforation of esophagus or stomach).**

Effects of Chronic Exposure to Product:

Contact dermatitis. Following repeated or prolonged contact, this product can cause redness, desquamation and fissures. This product may contain trace amounts of crystalline silica. Excessive inhalation of respirable crystalline silica dust may result in respiratory disease, including silicosis, pneumoconiosis and pulmonary fibrosis.

LD_{50} of Product (Specify Species and Route) **7340 mg/kg (Rat, Oral)** **7300 mg/kg (Mouse, Oral)**	Irritancy of Product **Severe to moist tissues**	Exposure limits of Product **Unavailable**
LC_{50} of Product (Specify Species) **Unavailable**	Sensitization to Product **None**	Synergistic materials **None reported**

SECTION VI - TOXICOLOGICAL PROPERTIES (Cont'd)

☒ Carcinogenicity ☐ Reproductive effects ☐ Tératogenicity ☐ Mutagenicity

Calcium Hydroxide is not listed as a carcinogen by ACGIH, MSHA, OSHA, NTP, DFG, RSST or IARC. It may, however, contain trace amounts of Crystalline Silica listed carcinogens by these organizations.

Crystalline Silica, which inhaled in the form of quartz or crystobalite from occupational sources, is classified by IARC as carcinogenic to humans. (Group 1)

Silica, crystalline (Airborne particles of respirable size) is regulated under California's Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65). Crystalline Silica is listed as a chemical known to the State to cause cancer.

NIOSH considers crystalline silica to be potential occupational carcinogen as defined by the OSHA carcinogen policy [29 CFR 1990]. (Ca).

NTP lists respirable Crystalline Silica as known to be human carcinogens based on sufficient evidence of carcinogenicity in humans. (K).

ACGIH lists respirable Crystalline Silica (quartz) as suspected human carcinogen. (A2).

DFG lists respirable Crystalline Silica as a substance that causes cancer in man (1)

RSST lists respirable Crystalline Silica (quartz) as suspected human carcinogen.

SECTION VII - PREVENTIVE MEASURES

Personal Protective Equipment (PPE)	**Wear clean, dry gloves, full length pants over boots, long sleeved shirt buttoned at the neck, head protection and approved eye protection selected for the working conditions.**
Gloves (Specify)	**Gauntlets Cuff style.**
Respiratory (Specify)	**Respirator Recommendations for Calcium Hydroxide: Not available. Respirator Recommendations for Calcium Oxide: NIOSH approved respirator. Up to 10 mg/m^3: (APF = 5) Any quarter-mask respirator. Up to 20 mg/m^3: (APF = 10) Any particulate respirator equipped with an N95, R95 or P95 filter except quarter-mask respirator. Any supplied-air respirator. Up to 25 mg/m^3: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode. Any powered, air purifying respirator with a high-efficiency particulate filter.**
Eyes (Specify)	**ANSI, CSA or ASTM approved safety glasses with side shields. Tight fitting dust goggles should be worn when excessive (visible) dust conditions are present. Do not wear contact lenses without tight fitting goggles when handling this chemical.**
Footwear (Specify)	**Resistant to caustics.**
Clothing (Specify)	**Fully covering skin. Remove when wet or contaminated. Change daily.**
Other (Specify)	**Evaluate degree of exposure and use PPE if necessary. After handling lime, employees must shower. If exposed daily, use oil, Vaseline, silicone base crème etc. to protect exposed skin, particularly neck, face and wrists.**

Engineering Controls (e.g. ventilation, enclosed process, specify)

Enclose dust sources; use exhaust ventilation (dust collector) at handling points, keep levels below Max. Concentration Permitted.

SECTION VII - PREVENTIVE MEASURES (Cont'd)

Leak and Spill Procedure

Limit access to trained personnel. Use industrial vacuums for large spills. Ventilate area.

Waste Disposal

Transport to disposal area or bury. Review Federal, Provincial and local Environmental regulations.

Handling Procedures and Equipment

Avoid skin and eye contact. Minimize dust generation. Wear protective goggles and in cases of insufficient ventilation, use NIOSH approved dust respirator. An eye wash station and safety shower should be readily available where this material or its water dispersions are used. Contact lenses should not be worn when working with this chemical.

Storage Requirements

Keep tightly closed containers in a cool, dry and well-ventilated area, away from acids. Keep out of reach of children.

Special Shipment Information

Calcium Hydroxide is neither regulated by the Transportation of Dangerous Goods (TDG) Regulations (Canada) nor by the Hazardous Materials Regulations (USA).

SECTION VIII - FIRST AID MEASURES

Skin

Carefully and gently brush the contaminated body surfaces in order to remove all traces of lime. Use a brush, cloth or gloves. Remove all lime-contaminated clothing. Rinse contaminated area with lukewarm water for 15 to 20 minutes. Consult a physician if exposed area is large or if irritation persists.

Eyes

Immediately rinse contaminated eye(s) with gently running lukewarm water (saline solution is preferred) for 15 to 20 minutes. In the case of an embedded particle in the eye, or chemical burn, as assessed by first aid trained personnel, contact a physician.

Inhalation

Move source of dust or move victim to fresh air. Obtain medical attention immediately. If victim does not breathe, give artificial respiration.

Ingestion

If victim is conscious, give 300 ml (10 oz) of water, followed by diluted vinegar (1 part vinegar, 2 parts water) or fruit juice to neutralize the alkali. Do not induce vomiting. Contact a physician immediately.

General Advise

Consult a physician for all exposures except minor instances of inhalation.

SECTION IX - REGULATORY INFORMATION

Superfund Amendments and Reauthorization Act of 1986 (SARA Title III). / The Emergency Planning and "Community Right-to-Know" Act (EPCRA). / Comprehensive Environmental Response, Compensation and Liability Act (CERCLA). / Resource Conservation and Recovery Act (**RCRA**).

Component Calcium Hydroxide has been reviewed against the following regulatory listings:

- **SARA Section 302 – Emergency Planning Notification. Extremely Hazardous Substances (EHS) List and Threshold Planning Quantity (TPQ). (40 CFR, Part 355, Section 30) : Not listed.**
- **SARA Section 304 – Emergency Release Notification. Extremely Hazardous Substances (EHS) and Reportable Quantity (RQ) List. (40 CFR, Part 355, Section 40) : Not listed.**
- **SARA Section 311/312 – Hazard Categories (40 CFR, Part 370) : This product is regulated under CFR 1910.1200 (OSHA Hazard Communication) as Immediate (Acute) Health Hazards – Irritant.**
- **SARA Section 313 – Toxics Release Inventory (TRI). Toxic Chemical List (40 CFR, Part 372). Not listed.**
- **CERCLA – Hazardous Substance (40 CFR, Part 302): Not listed in Table 302.4.**
- **RCRA – Hazardous Waste Number (40 CFR, Part 261, Subpart D): Not listed.**
- **RCRA – Hazardous Waste Classification (40 CFR, Part 261, Subpart C): Not classified.**

CWA 311. - Clean Water Act List of Hazardous Substances.

Calcium Hydroxide has been withdrawn from the Clean Water Act (CWA) list of hazardous substances. (11/13/79) (44FR65400)

California Proposition 65.

Component Calcium Hydroxide does not appear on the above regulatory listing. This product may contain small amounts of crystalline silica. Silica, crystalline (Airborne particles of respirable size) is regulated under California's Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65). Crystalline silica is listed as a chemical known to the State to cause cancer.

Transportation - Hazardous Materials Regulations (USA) & Transportation of Dangerous Goods (TDG) Regulations (Can).

Calcium Hydroxide does not appear on the above regulatory listings

Toxic Substances Control Act (TSCA).

All naturally occurring components of this product are automatically included in the USEPA TSCA Inventory List per 40 CFR 710.4 (b). All other components are listed on the USEPA TSCA Chemical Substances Inventory. Calcium Hydroxide is subject to inventory update reporting (IUR).

Canadian Environmental Protection Act (CEPA) – Substances Lists (DSL/NDSL).

Calcium Hydroxide is specified on the public Portion of the Domestic Substances List (DSL).

ANSI/NSF 60 - Drinking Water Treatment Additives.

Hydrated Lime has been investigated with respect to elements identified by EPA as toxic and it has been classified for use in direct contact with drinking water (in accordance with Standard ANSI/NSF 60). For a list of classified products, refer to Underwriters Laboratories Inc.'s Online Certifications Directory.

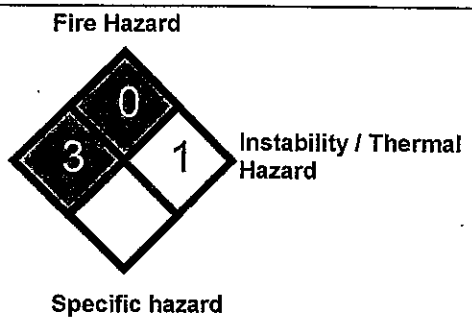
FDA - U.S. Food and Drug Administration, Department of Health and Human Services.

Calcium Hydroxide has been determined as "Generally Recognized As Safe" (GRAS) by FDA. See 21CFR184.1205. (CFR Title 21 Part 184 - - Direct food substances affirmed as generally recognized as safe).

SECTION X - OTHER INFORMATION

Hazardous Materials Identification System (U.S.)

National Fire Protection Association (U.S.) NFPA 704



WHMIS – Classification:	WHMIS – Classification:
"E" Corrosive Materials.	**"D2A" and "D2B" Materials causing other toxic effects.**
Symbol: 	Symbol: 

Additional Information/Comments:

The technical data contained herein is given as information only and is believed to be reliable. GRAYMONT makes no guarantee of results and assumes no obligation or liability in connection therewith.

Sources Used:

NFPA, NLA, TDG, CSST, RSST, (LSRO-FASEB), Hazardous Products Act, Environment Canada, Enviroguide, OSHA, ACGIH, IARC, NIOSH, CFR, NTP, HSDB, EPA SRS, RTECS, DFG, Chemistry and Technology of Lime and Limestone (John Wiley and Sons, Inc.), Lime and Limestone (WILEY-VCH).

SECTION XI - PREPARATION INFORMATION

Prepared by:	Telephone number:	Date :
GRAYMONT (QC) INC. **Quality Assurance & Technical Services**	**(450) 449-2262**	**September 2009**

An electronic version of this MSDS is available at: www.graymont.com under the PRODUCTS section.

724/728-1847
FAX: 724/728-3440

MATERIAL SAFETY DATA SHEET
NS 1100

1. IDENTIFICATION OF THE PRODUCT AND THE COMPANY

Product name : NS 1100

Supplier : Neo Solutions, Inc.
PO Box 26
Beaver, PA 15009

Emergency telephone # : 724/728-1847

2. COMPOSITION/INFORMATION ON INGREDIENTS

Description
Polyacrylic Acid - as acid or various neutralizations with sodium or ammonuim hydroxide.

3. HAZARDS IDENTIFICATION

Irritating to eyes and skin.
Spills produce extremely slippery surfaces.

HMIS & NFPA Ratings :

	HMIS	NFPA
Health :	1	1
Flammability :	0	0
Reactivity :	1	1

Special : To be determined by user

4. FIRST AID MEASURES

Inhalation : Move to fresh air. Consult a physician in case of irritation or other symptoms.

Skin contact : Wash off immediately with soap and plenty of water. In case of skin irritation, consult a physician.

Eye contact : Rinse with plenty of water. In case of persistent eye irritation, consult a physician.

Ingestion : Do not induce vomiting. Consult a physician if discomfort or other symptoms develop.

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media
Foam, carbon dioxide (CO2), or dry chemical.

Special Fire-fighting precautions
Spills produce extremely slippery surfaces

Special protective equipment for firefighters
NIOSH approved self-contained breathing apparatus.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions
No special precautions required.

Environmental precautions
Avoid contaminating water.

Methods for cleaning up
Do not flush with water. Dam up. Soak up with inert absorbent material. If liquid has been spilt in large quantities clean up promptly by scoop or vacuum. Keep in suitable and closed containers for disposal. After cleaning, flush away traces with water.

7. HANDLING AND STORAGE

Handling
For good industrial hygiene, avoid contact with skin and eyes, avoid forming mist. Wash hands before breaks and at the end of the workday.

Storage
Keep in a dry, cool place (O - 30° C).

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering measures to reduce exposure
Use local exhaust if misting occurs. Natural ventilation is adequate in absence of mists.

Personal protection equipment

Respiratory protection
In case of insufficient ventilation and/or misty conditions, wear NIOSH approved organic filter respirator.

Hand protection
Rubber gloves.

Eye protection
Safety glasses with side-shields. Splash-proof goggles if liquid contact is possible. Do not wear contact lenses.

Skin and body protection
Chemical resistant apron or protective suit if splashing or repeated contact with solution is likely.

Hygiene measures
Wash hands before breaks and at the end of workday Handle in accordance with good industrial hygiene and safety practice

9. PHYSICAL AND CHEMICAL PROPERTIES

Form:	liquid
Color:	amber
pH:	3.0-10.0 @ 5 g/l for product series. See technical bulletin for specific value.
Flash point (°C) :	N/A
Vapor Pressure (mmHg) :	N/A
Bulk density :	See Technical bulletin
Water solubility :	Complete
Viscosity (mPa s) :	See Technical Bulletin.

10. STABILITY AND REACTIVITY

Stability : Product is stable, no hazardous polymerization will occur.

Materials to avoid : Strong oxidizing agents.

Hazardous decomposition products : May produce carbon dioxide and/orcarbon monoxide.

11. TOXICOLOGICAL INFORMATION

Irritation

- Skin : May cause irritation.

- Eyes : Irritating to eyes.

Sensitization : The product is not expected to be sensitizing.

12. ECOLOGICAL INFORMATION

Ecotoxicity

Ecological injuries are not known or expected under normal use.

Bioaccumulation

The product is not expected to bioaccumulate.

Persistence / degradability

No data available.

13. DISPOSAL CONSIDERATIONS

Waste from residues / unused products

Burn in an adequate incinerator or bury in landfill in accordance with all applicable regulations.

Contaminated packaging

Rinse empty containers with water and use the rinse water to prepare the working solution. Any disposal practice must be in compliance with all applicable regulations.

14. TRANSPORT INFORMATION

Not regulated by Department of Transportation.

15. REGULATORY INFORMATION

All components of this product are on TSCA and DSL inventories

RCRA status :	Not a hazardous waste.
Hazardous waste number :	Not applicable.
Reportable quantity (40 CFR 302) :	Not applicable.
Threshold planning quantity (40 CFR 355) :	Not applicable.
Toxic Chemical Release Reporting (40 CFR 302) :	Not applicable.

16. OTHER INFORMATION

This Material Safety Data Sheet, revised : 02/28/1996

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release, and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process unless specified in the text.

724/728-1847
FAX: 724/728-3440

TECHNICAL DATA SHEET

NS 1100

APPEARANCE	CLEAR LIQUID
IONIC CHARACTER	ANIONIC
CHARGE DENSITY	HIGH
MOLECULAR WEIGHT	LOW
SPECIFIC GRAVITY	1.2
pH	3.2–4.0
BULK VISCOSITY (cps)	50-300
APPROX. VISCOSITY @ 5 G/L ACTIVE CONTENT (cps)	SIMILAR TO WATER
FREEZING POINT (°C)	0
STORAGE TEMPERATURE (°F)	10 - 35
SHELF LIFE (months)	6

The data in this Technical Data Sheet is provided for information only. It is correct to the best of our knowledge, information and belief at the date of its publication. It does not constitute a specification and no liability is assumed nor freedom from any existing patents.

P.O. Box 26

Neo Solutions, Inc.

Beaver, PA 15009-0026