



State of Utah

GARY R. HERBERT
Governor

GREG BELL
Lieutenant Governor

Department of
Environmental Quality

Amanda Smith
Executive Director

DIVISION OF RADIATION CONTROL
Rusty Lundberg
Director

MEMORANDUM

TO: Rusty Lundberg

FROM: Dave Rupp and Loren Morton

DATE: July 13, 2011

SUBJECT: **Statement of Basis for Minor Modification to DUSA Ground Water Discharge Permit (the Permit); Reduced Slimes Drain Recovery Elevation (SDRE) for Cell 2 Monitoring Frequency: Change of SDRE Testing to Quarterly Monitoring from Monthly Monitoring**

See attached markup of the current Permit, last modified on February 15, 2011. This proposed markup is a monitoring change for the subject SDRE from monthly to quarterly [Part I.D.3(b), etc.].

This change was proposed by DUSA in three (3) submittals from DUSA dated February 25, May 27, and June 17, 2011. After review of the requested change in monitoring frequency, the DRC considers the proposed change to be a minor modification to the permit, and it is recommended we proceed with the change, as this action has the potential to 1) increase the annual volume of slimes drain wastewater pumped from Cell 2, and 2) reduce the volume of wastewater stored in the Cell 2 tailings, that otherwise might have potential to leak to underlying soil and groundwater without this change.

Additional collateral changes were also made to the Permit, including:

- A. Parallel changes for Cells 3, 4A and 4B slimes drain SDRE monitoring, as shown in various locations in the permit text. These are related to the following Permit sections:
 - a. Consistent performance standards for Cells 4A and 4B [shown in Parts I.D.6(c) and I.D.13(c)].
 - b. Consistent monitoring requirements for Cells 2 and 3 [Part I.E.7(b)] and Cells 4A and 4B [Parts I.E.8(b) and I.E.12(b)],
 - c. Consistent reporting requirements for Cells 2 and 3 [Part I.F.11]. Reporting requirements for Cells 4A and 4B will need to be added to the Permit at a future date when dewatering begins there.
- B. Change to the Cell 2 Slimes Drain Performance Standard - The mathematics of

Equation 1 given in I.D.3(b)(3) are changed to accommodate the new quarterly monitoring frequency. This formula is used to determine and compare the average head of three earlier years (years 2, 3 and 4 years ago) in the slimes drain, to the average annual head of the three most current years (years 1, 2, and 3 years ago).

The purpose of this formula change is to equally weight the entries for new quarterly readings with the former monthly readings. Thus, the fewer quarterly readings will not be diminished in weight relative to the former monthly readings in calculation of annual average head.

- C. New compliance schedule item at Part I.H.7 to require DUSA to update / revise the DMT Monitoring and the Cell 4A and 4B BAT O&M plans to reflect this change.
- D. The July 11, 2011 effective date for use of quarterly monitoring [Part I.D.3(b)(2)], and the August 1, 2011 deadline for DUSA to submit the revised DMT and BAT monitoring plans [Part I.H.7], were provided as a means of expediting implementation of the new monitoring frequency, and to encourage DUSA progress in de-watering the Cell 2 tailings.

Attachment: Changes to G.W.P. 07-14-11 SDRE Mos to Quarterly Monitoring.doc

STATE OF UTAH
DIVISION OF WATER QUALITY
DEPARTMENT OF ENVIRONMENTAL QUALITY
UTAH WATER QUALITY BOARD
SALT LAKE CITY, UTAH 84114-4870

GROUND WATER DISCHARGE PERMIT

In compliance with the provisions of the Utah Water Quality Act, Title 19, Chapter 5, Utah Code Annotated 1953, as amended, the Act,

Denison Mines (USA) Corp.
Independence Plaza, Suite 950
1050 17th Street
Denver, Colorado 80265

is granted a ground water discharge permit for the operation of a uranium milling and tailings disposal facility located approximately 6 miles south of Blanding, Utah. The facility is located on a tract of land in Sections 28, 29, 32, and 33, Township 37 South, Range 22 East, Salt Lake Base and Meridian, San Juan County, Utah.

The permit is based on representations made by the Permittee and other information contained in the administrative record. It is the responsibility of the Permittee to read and understand all provisions of this Permit.

The milling and tailings disposal facility shall be operated and revised in accordance with conditions set forth in the Permit and the Utah Ground Water Quality Protection Regulations.

This modified Ground Water Quality Discharge Permit amends and supersedes all other Ground Water Discharge permits for this facility issued previously.

This Permit shall become effective on _____.

This Permit shall expire March 8, 2010 (This Permit is in Timely Renewal)

Application for Permit Renewal was received September 1, 2009

Signed this ____ day of _____, 2011

Co-Executive Secretary
Utah Water Quality Board

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PART I. SPECIFIC PERMIT CONDITIONS

A. **GROUND WATER CLASSIFICATION** - the groundwater classification of the shallow aquifer under the tailings facility has been determined on a well-by-well basis, as defined in Table 1, below:

Table 1. Ground Water Classification

Class II Groundwater Average TDS (mg/L) DUSA Data				Class III Groundwater Average TDS (mg/L) DUSA Data			
Well ID	N ⁽¹⁾	Average Concentration ⁽²⁾	Standard Deviation ⁽²⁾	Well ID	N ⁽¹⁾	Average Concentration ⁽²⁾	Standard Deviation ⁽²⁾
MW-1	77	1,273	93	MW-2	77	3,050	252
MW-5	82	2,058	170	MW-3	78	5,217	263
MW-11	71	1,844	178	MW-12	61	3,894	241
MW-30	10	1,745	87	MW-14	51	3,592	176
MW-35	TBD	TBD	TBD	MW-15	47	3,857	243
				MW-17	22	4,444	321
				MW-18 ⁽³⁾	18	2,605	297
				MW-19 ⁽³⁾	22	2,457	900
				MW-20 ⁽⁴⁾	7	5,663	114
				MW-22 ⁽⁴⁾	8	7,537	365
				MW-3A	9	5,547	129
				MW-23	10	3,443	244
				MW-24	10	4,116	117
				MW-25 ⁽⁵⁾	11	2,843	67
				MW-26 ⁽⁶⁾	12	3,155	65
				MW-27 ⁽⁷⁾	10	1,019	28
				MW-28	11	3,677	87
				MW-29	8	4,380	27
				MW-31 ⁽⁷⁾	10	1,265	50
				MW-32 ⁽⁸⁾	12	3,669	247

Footnotes:

- 1) N = Number of Samples
- 2) Based on historic total dissolved solids (TDS) data provided by the Permittee for period between October, 1979 and December, 2007. This data was obtained from the Permittee's background groundwater quality reports dated October 2007 and April 30, 2008.
- 3) Background concentrations of uranium in well MW-18 (55.1 µg/L) and thallium in MW-19 (2.1 µg/L) exceed the GWQS, 30 µg/L and 2.0 µg/L, respectively. Therefore these wells have been classified as Class III groundwater rather than Class II groundwater.
- 4) Wells MW-20 and MW-22 are not point of compliance monitoring wells, but instead are general monitoring wells as per Part I.E.2. Average concentrations and standard deviations for wells MW-20 and MW-22 were provided by the Permittee for the period between June, 2008 and February, 2010. This data was obtained from the Permittee's Background Groundwater Quality Report for wells MW-20 and MW-22 dated June, 2010.
- 5) Background concentration of manganese in well MW-25 (1,806 µg/L) exceeds the GWQS, therefore well MW-25 has been classified as Class III groundwater rather than Class II groundwater.
- 6) Well MW-26 was originally named TW4-15 and was installed as part of the chloroform contaminant investigation at the facility. Under this Permit, MW-26 is defined as a Point of Compliance (POC) well for the tailings cells (see Part I.E.1).
- 7) Background concentrations of uranium in well MW-27 (34 µg/L) and selenium in MW-31 (71 µg/L) exceed the GWQS, therefore these wells have been classified as Class III groundwater rather than Class II groundwater.
- 8) Well MW-32 was originally named TW4-17 and was installed as part of the chloroform contaminant investigation at the facility. Under this Permit it is included as a POC well for the tailings cells in Part I.E.1.

B. **BACKGROUND WATER QUALITY** - based on groundwater samples collected through June 2007 for existing wells (MW-1, MW-2, MW-3, MW-5, MW-11, MW-12, MW-14, MW-15, MW-17, MW-18, MW-19, MW-26, and MW-32) and through December 2007 for new wells (MW-3A, MW-23, MW 24, MW-25, MW-27, MW-28, MW-29, MW-30 and MW-31), the upper boundary of

background groundwater quality is determined on a well-by-well basis, pursuant to Environmental Protection Agency (EPA) guidance, and documented in the Permittee's background groundwater quality reports dated October 2007 and April 30, 2008.

C. PERMIT LIMITS - the Permittee shall comply with the following permit limits:

1. Ground Water Compliance Limits - contaminant concentrations measured in each monitoring well shall not exceed the Ground Water Compliance Limits (GWCL) defined in Table 2, below. Groundwater quality at the site must at all times meet all the applicable GWQS and ad hoc GWQS defined in R317-6 even though this permit does not require monitoring for each specific contaminant.
2. Tailings Cell Operations - only 11.e.(2) by-product material authorized by Utah Radioactive Materials License No. UT-2300478 (hereafter License) shall be discharged to or disposed of in the tailings ponds.
3. Prohibited Discharges - discharge of other compounds such as paints, used oil, antifreeze, pesticides, or any other contaminant not defined as 11.e.(2) material is prohibited.

Table 2. Groundwater Compliance Limits (GWCL)

Contaminant	Upgradient Wells		Down or Lateral Gradient Wells									
	MW-1 (Class II) GWCL ⁽⁶⁾	MW-18 (Class III) GWCL	MW-19 (Class III) GWCL	MW-27 (Class III) GWCL	MW-2 (Class III) GWCL	MW-3 (Class III) GWCL	MW-3A (Class III) GWCL	MW-5 (Class II) GWCL ⁽⁷⁾	MW-11 (Class II) GWCL ⁽⁷⁾	MW-12 (Class III) GWCL	MW-14 (Class III) GWCL	MW-15 (Class III) GWCL
Nutrients (mg/L)												
Ammonia (as N)	6.25	0.27	0.31	12.5	12.5	1.16	0.6	1.02	6.25	0.6	12.5	0.21
Nitrate + Nitrite (as N)	2.5	2.5	2.83	5.6	0.12	0.73	1.3	2.5	2.5	5	5	0.27
Heavy Metals (µg/L)												
Arsenic	12.5	25	25	25	25	25	25	17	15	25	25	25
Beryllium	1	2	2	2	2	2	2	1	1	2	2	2
Cadmium	4.2 ⁽⁸⁾	2.5	2.5	2.5	2.5	4.67	8.3	2	1.25	7	2.5	2.5
Chromium	50	50	50	50	50	50	50	25	25	50	50	50
Cobalt	730 ⁽⁹⁾	365	365	365	365	365	365	182.5	182.5	365	365	365
Copper	325	650	650	650	650	650	650	325	325	650	650	650
Iron	2,750	414.68	5,500	5,500	151.6	427.13	5,500	2,750	2,750	5,500	5,500	81.7
Lead	5.59	7.5	7.5	7.5	7.5	7.5	7.5	4.1	3.75	7.5	7.5	7.5
Manganese	800 ⁽⁴⁾	350	400	400	378.76	4,233	6,287	376.74	131.29	2,088.80	2,230.30	400
Mercury	0.5	1	1	1	1	1	1	1	0.5	1	1	1
Molybdenum	40 ⁽²⁾	20	20	20	20	20	20	10	10	20	25	30
Nickel	100 ⁽³⁾	50	50	50	60	100	105	44.1	46.2	60	50	97
Selenium	50	25	28.96	25	26.6	37	89	12.5	12.5	25	25	128.7
Silver	100	50	50	50	50	50	50	25	25	50	50	50
Thallium	2	0.5	2.1	1	1	1.6	1.4	0.5	0.5	1	1	1
Tin	17,000 ⁽⁴⁾	8,500	8,500	8,500	8,500	8,500	8,500	4,250	4,250	8,500	8,500	8,500
Uranium	30 ⁽⁵⁾	7.28	21.43	34	18.45	47.32	35	7.5	7.5	23.5	98	65.7
Vanadium	60 ⁽⁴⁾	15	30	30	30	30	30	15	15	30	30	40
Zinc	5,000	251	2,500	2,500	2,500	173.19	155	87.38	1,250	2,500	35.04	2,500
Radiologics (pCi/L)												
Gross Alpha	15	7.5	2.36	2	3.2	1	7.5	3.75	3.75	7.5	7.5	7.5
Volatile Organic Compounds (µg/L)												
Acetone	700 ⁽⁴⁾	175	350	350	350	350	350	175	175	350	350	350
Benzene	5	1.25	2.5	2.5	2.5	2.5	2.5	1.25	1.25	2.5	2.5	2.5
2-Butanone (MEK)	4,000 ⁽²⁾	1,000	2,000	2,000	2,000	2,000	2,000	1,000	1,000	2,000	2,000	2,000
Carbon Tetrachloride	5	1.25	2.5	2.5	2.5	2.5	2.5	1.25	1.25	2.5	2.5	2.5
Chloroform	70 ⁽⁴⁾	17.5	35	35	35	35	35	17.5	17.5	35	35	35
Chloromethane	30 ⁽²⁾	7.5	15	15	15	15	15	7.5	7.5	15	15	15
Dichloromethane	5 ⁽³⁾	1.25	2.5	2.5	2.5	2.5	2.5	1.25	1.25	2.5	2.5	2.5
Naphthalene	100 ⁽²⁾	25	50	50	50	50	50	25	25	50	50	50
Tetrahydrofuran	46 ⁽⁴⁾	11.5	23	23	23	23	23	11.5	11.5	23	23	23
Toluene	1,000	250	500	500	500	500	500	250	250	500	500	500
Xylenes (total)	10,000	2,500	5,000	5,000	5,000	5,000	5,000	2,500	2,500	5,000	5,000	5,000
Others												
Field pH (S.U.)	6.5 - 8.5	6.77 - 8.5	6.25 - 8.5	6.5 - 8.5	6.5 - 8.5	6.5 - 8.5	6.5 - 8.5	6.5 - 8.5	6.5 - 8.5	6.5 - 8.5	6.5 - 8.5	6.62 - 8.5
Fluoride (mg/L)	4	0.56	1.39	0.85	0.43	0.68	1.6	1.42	1	2	0.2	2
Chloride (mg/L)		22.1	69.23	104.41	38	76	70	71	39.16	80.5	27	57.1
Sulfate (mg/L)		838	1,938.90	2,534.10	462	2,147	3,663	3,640	1,309	2,560	2,330	2,549.02
TDS (mg/L)		1,567	3,198.77	4,257.42	1,075	3,800	6,186	5,805	2,528	4,323	4,062	4,530

Table 2 Continued. Groundwater Compliance Limits (GWCL)

Contaminant	GWQS ⁽¹⁾	Down or Lateral Gradient Wells										
		MW-17 (Class III) GWCL	MW-23 (Class III) GWCL	MW-24 (Class III) GWCL	MW-25 (Class III) GWCL	MW-26 (Class III) GWCL	MW-28 (Class III) GWCL	MW-29 (Class III) GWCL	MW-30 (Class II) GWCL	MW-31 (Class III) GWCL	MW-32 (Class III) GWCL ⁽⁷⁾	MW-35 (Class II) GWCL ⁽⁹⁾
Nutrients (mg/l)												
Ammonia (as N)	25 ⁽²⁾	0.26	0.6	7	0.77	0.92	12.5	1.3	0.14	12.5	1.17	6.25
Nitrate + Nitrite (as N)	10	5 ⁽⁸⁾	5	5	5	0.62	5	5	2.5	5	5	2.5
Heavy Metals (ug/l)												
Arsenic	50	25	25	17	25	25	21	25	12.5	25	25	12.5
Beryllium	4	2	2	2	2	2	2	2	1	2	2	1
Cadmium	5	2.5	2.5	2.5	1.5	2.5	5.2	2.5	1.25	2.5	4.72	1.25
Chromium	100	50	50	50	50	50	50	50	25	50	50	25
Cobalt	730 ⁽⁶⁾	365	365	365	365	365	47	365	182.5	365	75.21	182.5
Copper	1,300	650	650	650	650	650	650	650	325	650	650	325
Iron	11,000 ⁽⁵⁾	5,500	5,500	4,162	5,500	2,675.83	299	1,869	2,750	5,500	14,060	2,750
Lead	15	7.5	7.5	7.5	7.5	7.5	7.5	7.5	3.75	7.5	7.5	3.75
Manganese	800 ⁽⁴⁾	915.4	550	7,507	1,806	1,610	1,837	5,624	61	400	5,594.90	200
Mercury	2	1	1	1	1	1	1	1	0.5	1	1	0.5
Molybdenum	40 ⁽³⁾	20	20	20	20	20	20	20	10	20	20	10
Nickel	100 ⁽⁸⁾	50	50	50	50	50	50	50	25	50	94	25
Selenium	50	25	25	25	25	25	11.1	25	34	71	25	12.5
Silver	100	50	50	50	50	50	50	50	25	50	50	25
Thallium	2	1	1.5	1	1.1	1	1	1.2	0.5	1	1	0.5
Tin	17,000 ⁽⁴⁾	8,500	8,500	8,500	8,500	8,500	8,500	8,500	4,250	8,500	8,500	4,250
Uranium	30 ⁽³⁾	46.66	32	11.9	6.5	41.8	4.9	15	8.32	9.1	5.26	7.5
Vanadium	60 ⁽⁴⁾	30	30	30	30	30	30	30	15	30	30	15
Zinc	5,000	2,500	74	2,500	2,500	2,500	83	30	1,250	2,500	230	1,250
Radionuclides (pCi/l)												
Gross Alpha	15	2.8	2.86	7.5	7.5	4.69	2.42	2	3.75	7.5	3.33	3.75
Volatile Organic Compounds (ug/l)												
Acetone	700 ⁽⁴⁾	350	350	350	350	350	350	350	175	350	350	175
Benzene	5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	1.25	2.5	2.5	1.25
2-Butanone (MEK)	4,000 ⁽²⁾	2,000	2,000	2,000	2,000	2,000	2,000	2,000	1,000	2,000	2,000	1,000
Carbon Tetrachloride	5	2.5	2.5	2.5	2.5	5	2.5	2.5	1.25	2.5	2.5	1.25
Chloroform	70 ⁽⁴⁾	35	35	35	35	70	35	35	17.5	35	35	17.5
Chloromethane	30 ⁽²⁾	15	5.7	15	15	30	4.6	15	7.5	6.1	15	7.5
Dichloromethane	5 ⁽³⁾	2.5	2.5	2.5	2.5	5	2.5	2.5	1.25	2.5	2.5	1.25
Naphthalene	100 ⁽²⁾	50	50	50	50	50	50	50	25	50	50	25
Tetrahydrofuran	46 ⁽⁴⁾	23	23	23	23	23	23	23	11.5	23	23	11.5
Toluene	1,000	500	500	500	500	500	500	500	250	500	500	250
Xylenes (total)	10,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	2,500	5,000	5,000	2,500
Others												
Field pH (S.U.)	6.5 - 8.5	6.40 - 8.5	6.5 - 8.5	6.5 - 8.5	6.5 - 8.5	6.74 - 8.5	6.1 - 8.5	6.46 - 8.5	6.5 - 8.5	6.5 - 8.5	6.4 - 8.5	
Fluoride (mg/l)	4	2	2	0.36	0.42	2	0.73	1.1	0.51	2	2	1
Chloride (mg/l)		46.8	10	71	35	58.31	105	41	128	143	35.39	
Sulfate (mg/l)		2,860	2,524	2,903	1,933	2,082.06	2,533	2,946	972	532	2,556.70	
TDS (mg/l)		5,085.42	3,670	4,450	2,976	3,284.19	3,952	4,400	1,918	1,320	3,960	

Footnotes:

- 1) Utah Ground Water Quality Standards (GWQS) as defined in UAC R317-6, Table 2. Ad hoc GWQS also provided herein, as noted, and as allowed by UAC R317-6-2.2.
- 2) Ad hoc GWQS for ammonia (as N), molybdenum, 2-Butanone (MEK), chloromethane, and naphthalene based on EPA drinking water lifetime health advisories.
- 3) Ad hoc GWQS for nickel, uranium, and dichloromethane (methylene chloride, CAS No. 75-09-2) based on final EPA drinking water maximum concentration limits (MCL).
- 4) Ad hoc GWQS for manganese, tin, vanadium, acetone, chloroform (CAS No. 67-66-3), and tetrahydrofuran based on drinking water ad hoc lifetime health advisories prepared by or in collaboration with EPA Region 8 staff.
- 5) Ad hoc GWQS for cobalt and iron based on EPA Region 3 Risk Based Concentration limits for tap water.
- 6) Ground Water Compliance Limits (GWCL) were set after Executive Secretary review and approval of two Background Groundwater Quality Reports dated October 2007 and April 30, 2008 from the Permittee.
- 7) GWCLs listed in the table above in Normal Font are those proposed by the Permittee in the October 2007 and April 30, 2008 DUSA Background Groundwater Quality Reports, and approved by the Executive Secretary.
- 8) GWCLs listed in the table above in Bold Text are values modified by the Executive Secretary after review of GWCLs proposed in the Permittee's October 2007 and April 30, 2008 Background Groundwater Quality Reports. For wells MW-1, MW-2, MW-3, MW-5, MW-11, MW-12, MW-14, MW-15, MW-17, MW-18, MW-19, MW-26, and MW-32; these modifications are documented in the June 16, 2008 URS Completeness Review for the October, 2007 Revised Background Groundwater Quality Report for Existing Wells. For wells MW-3A, MW-23, MW-24, MW-25, MW-27, MW-28, MW-29, MW-30, and MW-31; these modifications are documented in the June 24, 2008 DRC Findings Memorandum regarding the April 30, 2008 Revised Background Groundwater Quality Report for New Wells.
- 9) Because background quality has not yet been determined at monitoring well MW-35, which was installed in September 2010 for Tailings Cell 4B, the Executive Secretary has set GWCLs equal to the fraction of the GWQS (0.25) for Class II Groundwater. After submittal and approval of the Background Groundwater Quality Report, required by Part I.H.5 of this Permit, the Executive Secretary will re-open and modify the GWCLs to be equal to the mean concentration plus two standard deviations ($X+2\sigma$) for each contaminant.

D. DISCHARGE MINIMIZATION AND BEST AVAILABLE TECHNOLOGY STANDARDS - the tailings disposal facility must be built, operated, and maintained according to the following Discharge Minimization Technology (DMT) and Best Available Technology (BAT) standards:

1. DMT Design Standards for Existing Tailings Cells 1, 2, and 3 - shall be based on existing construction as described by design and construction information provided by the Permittee, as summarized in Table 3 below for Tailings Cells 1, 2, and 3:

Table 3. DMT Engineering Design and Specifications

Tailings Cell	Report Type	Engineering Report	Design Figures	Construction Specifications
Cell 1	Design	June, 1979 D'Appolonia Consulting Engineers, Inc ⁽¹⁾	Appendix A, Sheets 2, 4, 8, 9, 12-15	Appendix B
Cell 2	Design	June, 1979 D'Appolonia Consulting Engineers, Inc ⁽¹⁾	Appendix A, Sheets 2, 4, 7-10, 12-15	Appendix B
	As-Built	February, 1982 D'Appolonia Consulting Engineers, Inc ⁽²⁾	Figures 1, 2, and 11	N/A
Cell 3	Design	May, 1981 D'Appolonia Consulting Engineers, Inc ⁽³⁾	Sheets 2-5	Appendix B
	As-Built	March, 1983 Energy Fuels Nuclear, Inc. ⁽⁴⁾	Figures 1-4	N/A

Footnotes:

- 1) D'Appolonia Consulting Engineers, Inc., June, 1979, "Engineers Report Tailings Management System White Mesa Uranium Project Blanding, Utah Energy Fuels Nuclear, Inc. Denver, Colorado", unpublished consultants report, approximately 50 pp., 2 figures, 16 sheets, 2 appendices.
- 2) D'Appolonia Consulting Engineers, Inc., February, 1982, "Construction Report Initial Phase - Tailings Management System White Mesa Uranium Project Blanding, Utah Energy Fuels Nuclear, Inc. Denver, Colorado", unpublished consultants report, approximately 7 pp., 6 tables, 13 figures, 4 appendices.
- 3) D'Appolonia Consulting Engineers, Inc., May, 1981, "Engineer's Report Second Phase Design - Cell 3 Tailings Management System White Mesa Uranium Project Blanding, Utah Energy Fuels Nuclear, Inc. Denver, Colorado", unpublished consultants report, approximately 20 pp., 1 figure, 5 sheets, and 3 appendices.
- 4) Energy Fuels Nuclear, Inc., March, 1983, "Construction Report Second Phase Tailings Management System White Mesa Uranium Project Energy Fuels Nuclear, Inc.", unpublished company report, 18 pp., 3 tables, 4 figures, 5 appendices.

a) Tailings Cell 1 - consisting of the following major design elements:

- 1) Cross-valley Dike and East Dike - constructed on the south side of the pond of native granular materials with a 3:1 slope, a 20-foot crest width, and a crest elevation of about 5,620 ft above mean sea level (amsl). A dike of similar design was constructed on the east margin of the pond, which forms a continuous earthen structure with the south dike. The remaining interior slopes are cut-slopes at 3:1 grade.
- 2) Liner System - including a single 30 mil PVC flexible membrane liner (FML) constructed of solvent welded seams on a prepared sub-base. Top elevation of the FML liner was 5,618.5 ft amsl on both the south dike and the north cut-slope. A protective soil cover layer was constructed immediately over the FML with a thickness of 12-inches on the cell floor and 18-inches on the interior sideslope.
- 3) Crushed Sandstone Underlay - immediately below the FML a nominal 6-inch thick layer of crushed sandstone was prepared and rolled smooth as a FML sub-base layer. Beneath this underlay, native sandstone and other foundation materials were graded to drain to a single low point near the upstream toe of the south cross-valley dike. Inside this layer, an east-west oriented pipe was installed to gather fluids at the upstream toe of the cross-valley dike.

- b) Tailings Cell 2 - which consists of the following major design elements:
- 1) Cross-valley Dike - constructed at the south margin of Cell 2 of native granular materials with a 3:1 slope, a 20-foot crest width, and crest elevation of about 5,615 ft amsl. The east and west interior slopes consist of cut-slopes with a 3:1 grade. The Cell 1 south dike forms the north margin of Cell 2, with a crest elevation of 5,620 ft amsl.
 - 2) Liner System - includes a single 30 mil PVC FML liner constructed of solvent welded seams on a prepared sub-base, and overlain by a slimes drain collection system. Top elevation of the FML liner in Cell 2 is 5,615.0 ft and 5,613.5 ft amsl on the north and south dikes, respectively. Said Cell 2 FML liner is independent of all other disposal cell FML liners. Immediately above the FML, a nominal 12-inch (cell floor) to 18-inch (inside sideslope) soil protective blanket was constructed of native sands from on-site excavated soils.
 - 3) Crushed Sandstone Underlay - immediately below the FML a nominal 6-inch thick layer of crushed sandstone was prepared and rolled smooth as a FML sub-base layer. Beneath this underlay, native sandstone and other foundation materials were graded to drain to a single low point near the upstream toe of the south cross-valley dike. Inside this layer, an east-west oriented pipe was installed to gather fluids at the upstream toe of the cross-valley dike.
 - 4) Slimes Drain Collection System immediately above the FML a nominal 12-inch thick protective blanket layer was constructed of native silty-sandy soil. On top of this protective blanket, a network of 1.5-inch PVC perforated pipe laterals was installed on a grid spacing interval of about 50-feet. These pipe laterals gravity drain to a 3-inch diameter perforated PVC collector pipe which also drains toward the south dike and is accessed from the ground surface via a 24-inch diameter, vertical non-perforated HDPE access pipe. Each run of lateral drainpipe and collector piping was covered with a 12 to 18-inch thick berm of native granular filter material. At cell closure, leachate head inside the pipe network will be removed via a submersible pump installed inside the 24-inch diameter HDPE access pipe.
- c) Tailings Cell 3-- consisting of the following major design elements:
- 1) Cross-valley Dike - constructed at the south margin of Cell 3 of native granular materials with a 3:1 slope, a 20-foot crest width, and a crest elevation of 5,610 ft amsl. The east and west interior slopes consist of cut-slopes with a 3:1 grade. The Cell 2 south dike forms the north margin of Cell 3, with a crest elevation of 5,615 ft amsl.
 - 2) Liner System - includes a single 30 mil PVC FML liner constructed of solvent welded seams on a prepared sub-base, and overlain by a slimes drain collection system. Top elevation of the FML liner in Cell 3 is 5,613.5 ft and 5,608.5 ft amsl on the north and south dikes, respectively. Said Cell 3 FML liner is independent of all other disposal cell FML liners.
 - 3) Crushed Sandstone Underlay - immediately below the FML a nominal 6-inch thick layer of crushed sandstone was prepared and rolled smooth as a FML sub-base layer. Beneath this underlay, native sandstone and other foundation materials were graded

to drain to a single low point near the upstream toe of the south cross-valley dike. Inside this layer, an east-west oriented pipe was installed to gather fluids at the upstream toe of the cross-valley dike.

- 4) Slimes Drain Collection Layer and System - immediately above the FML, a nominal 12-inch (cell floor) to 18-inch (inside sideslope) soil protective blanket was constructed of native sands from on-site excavated soils (70%) and dewatered and cyclone separated tailings sands from the mill (30%). On top of this protective blanket, a network of 3-inch PVC perforated pipe laterals was installed on approximately 50-foot centers. This pipe network gravity drains to a 3-inch perforated PVC collector pipe which also drains toward the south dike, where it is accessed from the ground surface by a 12-inch diameter, inclined HDPE access pipe. Each run of the 3-inch lateral drainpipe and collector pipe was covered with a 12 to 18-inch thick berm of native granular filter media. At cell closure, leachate head inside the pipe network will be removed via a submersible pump installed inside the 12-inch diameter inclined access pipe.
2. Existing Tailings Cell Construction Authorized - tailings disposal in existing Tailings Cells 1, 2, and 3 is authorized by this Permit as defined in Table 3 and Part I.D.1, above. Authorized operation and maximum disposal capacity in each of the existing tailings cells shall not exceed the levels authorized by the License. Under no circumstances shall the freeboard be less than three feet, as measured from the top of the FML. Any modification by the Permittee to any approved engineering design parameter at these existing tailings cells shall require prior Executive Secretary approval, modification of this Permit, and issuance of a construction permit.
 3. Existing Facility DMT Performance Standards - the Permittee shall operate and maintain certain mill site facilities and the existing tailings disposal cells to minimize the potential for wastewater release to groundwater and the environment, including, but not limited to the following additional DMT compliance measures:
 - a) DMT Monitoring Wells at Tailings Cell 1 - at all times the Permittee shall operate and maintain Tailings Cell 1 to prevent groundwater quality conditions in any nearby monitoring well from exceeding any Ground Water Compliance Limit established in Table 2 of this Permit.
 - b) Tailings Cells 2 and 3 - including the following performance criteria:
 - 1) Slimes Drain Maximum Allowable Head - the Permittee shall at all times maintain the average wastewater recovery head in the slimes drain access pipe to be as low as reasonably achievable (ALARA) in each tailings disposal cell, in accordance with the currently approved DMT Monitoring Plan.
 - 2) Quarterly Monthly Slimes Drain Recovery Test - ~~Prior to the date of this permit amendment, the permittee conducted monthly Slimes Drain Recovery Tests. After the date of this amendment effective July 11, 2011, the Permittee shall conduct a quarterly monthly slimes drain recovery test at each tailings cell slimes drain that meets the following minimum requirements:~~
 - i. Includes a duration of at least 90-hours, as measured from the time that pumping ceases, and

- ii. Achieves a stable water level at the end of the test, as measured by three consecutive hourly water level depth measurements, with no change in water level, as measured to the nearest 0.01 foot.
- 3) Annual Slimes Drain Compliance - shall be achieved when the average annual wastewater recovery elevation in the slimes drain access pipe, as determined pursuant to the currently approved DMT Monitoring Plan, meets the conditions in Equation 1, below:

Equation 1:

$$[\sum E_y + \sum E_{y-1} + \sum E_{y-2}] / [N_y + N_{y-1} + N_{y-2}] < [\sum E_{y-1} + \sum E_{y-2} + \sum E_{y-3}] / [N_{y-1} + N_{y-2} + N_{y-3}]$$

Where:

$\sum E_y$ = Sum of all monthly and quarterly slimes drain tailings fluid elevation measurements that meet the test performance standards found in the sub-paragraphs of Part I.D.3(b)(2), during the calendar year of interest. Hereafter, these water level measurements are referred to as slimes drain recovery elevations (SDRE). Pursuant to the applicable frequency and method of the currently approved DMT Monitoring Plan at the time of each SDRE test, these recovery tests are to be conducted monthly and the SDRE values reported in units of feet above mean sea level (amsl). However, quarterly samples, when if monthly and quarterly measurements are combined used in the above equation above with monthly samples, the quarterly values shall be multiplied by a coefficient of three (3) to equivalently compare the quarterly to the monthly SDRE tests.

$\sum E_{y-1}$ = Sum of all SDRE measurements made in the year previous to the calendar year of interest. However, when monthly and quarterly measurements are combined samples, if used in the equation above, each quarterly value with monthly samples, shall be multiplied by a coefficient of three (3) to equivalently compare the quarterly to the monthly SDRE tests.

$\sum E_{y-2}$ = Sum of all SDRE measurements made in the second year previous to the calendar year of interest. However, when monthly and quarterly measurements are combined samples, if used in the equation above, each quarterly values with monthly samples, shall be multiplied by a coefficient of three (3) to equivalently compare the quarterly to the monthly SDRE tests.

$\sum E_{y-3}$ = Sum of all SDRE measurements made in the third year previous to the calendar year of interest. However, when monthly and quarterly measurements are combined samples, if used in the equation above, each quarterly value with monthly samples, shall be multiplied by a coefficient of three (3) to equivalently compare the quarterly to the monthly SDRE tests.

N_y = Total number of SDRE tests that meet the test performance standards found in Part I.D.3(b)(2), conducted during the calendar year of interest. However, when monthly and quarterly measurements are tests, if used in the equation above, each quarterly test with monthly tests, shall be counted as three (3) separate tests, to equivalently compare the quarterly to the monthly number of tests.

N_{y-1} = Total number of SDRE tests that meet the test performance standards found in Part I.D.3(b)(2), conducted in the year previous to the calendar year of interest. However, when monthly and quarterly measurements are tests, if used in the equation above, each quarterly with monthly tests, shall be counted as three (3) separate tests, to equivalently compare the quarterly to the monthly number of tests.

N_{y-2} = Total number of SDRE tests that meet the test performance standards found in Part I.D.3(b)(2), conducted in the second year previous to the calendar year of interest. However, when monthly and quarterly measurements are tests, if used in the equation above, each quarterly with monthly tests, shall be counted as three (3) separate tests, to equivalently compare the quarterly to the monthly number of tests.

N_{y-3} = Total number of SDRE tests that meet the test performance standards found in Part I.D.3(b)(2), conducted in the third year previous to the calendar year of interest. However, when monthly and quarterly measurements are tests, if used in the equation above, each quarterly with monthly tests, shall be counted as three (3) separate tests, to equivalently compare the quarterly to the monthly number of tests.

Prior to January 1, 2013, the following values for E and N values in Equation 1 shall be based on SDRE data from the following calendar years.

Report for Calendar Year	Source of Data By Calendar Year for Equation 1 Variables (right side)					
	E_{y-1}	E_{y-2}	E_{y-3}	N_{y-1}	N_{y-2}	N_{y-3}
2010	2009	2009	2009	2009	2009	2009
2011	2010	2009	2009	2010	2009	2009
2012	2011	2010	2009	2011	2010	2009

Failure to satisfy conditions in Equation 1 shall constitute DMT failure and non-compliance with this Permit. For Cell 3, this requirement shall apply after initiation of de-watering operations.

- c) Maximum Tailings Waste Solids Elevation - upon closure of any tailings cell, the Permittee shall ensure that the maximum elevation of the tailings waste solids does not exceed the top of the FML liner.
- d) DMT Monitoring Wells - at all times the Permittee shall operate and maintain Tailings Cells 2 and 3 to prevent groundwater quality conditions in any nearby monitoring well from exceeding any Ground Water Compliance Limit established in Table 2 of this Permit.
- e) Roberts Pond - the Permittee shall operate this wastewater pond so as to provide a minimum 2-foot freeboard at all times. Under no circumstances shall the water level in the pond exceed an elevation of 5,624 feet amsl. In the event that the wastewater elevation exceeds this maximum level, the Permittee shall remove the excess wastewater and place it into containment in Tailings Cell 1 within 72-hours of discovery. At the time of mill site closure, the Permittee shall reclaim and decommission the Roberts Pond in compliance with a final Reclamation Plan approved under the License (hereafter Reclamation Plan).
- f) Feedstock Storage Area - open-air or bulk storage of all feedstock materials at the facility awaiting mill processing shall be limited to the eastern portion of the mill site area described in Table 4, below. Storage of feedstock materials at the facility outside this area, shall meet the requirements in Part I.D.11. At the time of mill site closure, the Permittee shall reclaim and decommission the Feedstock Storage Area in compliance with an approved Reclamation Plan. The Permittee shall maintain a minimum 4-foot wide buffer zone on the inside margin of the Feedstock Storage Area between the storage area fence and the Feedstock which shall be absent of feed material in order to assure that materials do not encroach on the boundary of the storage area.

Table 4. Feedstock Storage Area Coordinates ⁽¹⁾

Corner	Northing (ft)	Easting (ft)
Northeast	323,595	2,580,925
Southeast	322,140	2,580,920
Southwest	322,140	2,580,420
West 1	322,815	2,580,410
West 2	323,040	2,580,085
West 3	323,120	2,580,085
West 4	323,315	2,580,285
West 5	323,415	2,579,990
Northwest	323,600	2,579,990

Footnote:

1) Approximate State Plane Coordinates beginning from the extreme northeast corner and progressing clockwise around the feedstock area (from 6/22/01 DUSA Response, Attachment K, Site Topographic Map, Revised June, 2001.)

- g) Mill Site Chemical Reagent Storage - for all chemical reagents stored at existing storage facilities and held for use in the milling process, the Permittee shall provide secondary containment to capture and contain all volumes of reagent(s) that might be released at any individual storage area. Response to spills, cleanup thereof, and required reporting shall comply with the provisions of the approved Emergency Response Plan as found in the currently approved Stormwater Best Management Practices Plan. For any new construction of reagent storage facilities, said secondary containment and control shall prevent any contact of the spilled or otherwise released reagent or product with the ground surface.
4. Best Available Technology Requirements for New Construction - any construction, modification, or operation of new waste or wastewater disposal, treatment, or storage facilities shall require submittal of engineering design plans and specifications, and prior Executive Secretary review and approval. All engineering plans or specifications submitted shall demonstrate compliance with all Best Available Technology (BAT) requirements stipulated by the Utah Ground Water Quality Protection Regulations (UAC R317-6). Upon Executive Secretary approval this Permit may be re-opened and modified to include any necessary requirements.
5. BAT Design Standards for Tailings Cell 4A - the BAT design standard for Tailings Cell 4A shall be defined by and construction conform to the requirements of the June 25, 2007 Executive Secretary design approval letter for the relining of former existing Tailings Cell No. 4A, and as summarized by the engineering drawings, specifications, and description in Table 5, below:

Table 5. Approved Tailings Cell 4A Engineering Design and Specifications

Engineering Drawings			
Name	Date	Revision No.	Title
Sheet 1 of 7	June, 2007		Title Sheet
Sheet 2 of 7	June 15, 2007	Rev. 1	Site Plan
Sheet 3 of 7	June 15, 2007	Rev. 1	Base Grading Plan
Sheet 4 of 7	June 15, 2007	Rev. 1	Pipe Layout Plan
Sheet 5 of 7	June 15, 2007	Rev. 1	Lining System Details I
Sheet 6 of 7	June 15, 2007	Rev. 1	Lining System Details II
Sheet 7 of 7	June 15, 2007	Rev. 1	Lining System Details III

Figure 1	August, 2008	-	Spillway Splash Pad Anchor
Engineering Specifications			
Date	Document Title		Prepared by
June, 2007	Revised Technical Specifications for the Construction of Cell 4A Lining System		Geosyntec Consultants
June, 2007	Revised Construction Quality Assurance Plan for the Construction of Cell 4A Lining System		Geosyntec Consultants
March 27, 2007	Revised Geosynthetic Clay Liner Hydration Demonstration Work Plan ⁽¹⁾		Geosyntec Consultants
November 27, 2006	Cell Seismic Study ⁽²⁾		MFG Consulting Scientists and Engineers
October 6, 2006	Calculation of Action Leakage Rate Through the Leakage Detection System Underlying a Geomembrane Liner		Geosyntec Consultants
June 22, 2006	Slope Stability Analysis Cell 4A - Interim Conditions		Geosyntec Consultants
June 23, 2006	Settlement Evaluation of Berms ⁽²⁾		Geosyntec Consultants
August 22, 2006	Pipe Strength Calculations		Geosyntec Consultants
September 27, 2007	DMC Cell 4A - GCL Hydration		Geosyntec Consultants

Footnotes:

- 1) As qualified by conditions found in May 2, 2007 Division of Radiation Control letter.
- 2) As clarified by February 8, 2007 Division of Radiation Control Round 6 Interrogatory.

Tailings Cell 4A Design and Construction - approved by the Executive Secretary will consist of the following major elements:

- a) Dikes - consisting of existing earthen embankments of compacted soil, constructed by the Permittee between 1989 and 1990, and composed of four dikes, each including a 15-foot wide road at the top (minimum). On the north, east, and south margins these dikes have slopes of 3H to 1V. The west dike has an interior slope of 2H to 1V. Width of these dikes varies; each has a minimum crest width of at least 15 feet to support an access road. Base width also varies from 89-feet on the east dike (with no exterior embankment), to 211-feet at the west dike.
- b) Foundation - including existing subgrade soils over bedrock materials. Foundation preparation included excavation and removal of contaminated soils, compaction of imported soils to a maximum dry density of 90%. Floor of Cell 4A has an average slope of 1% that grades from the northeast to the southwest corners.
- c) Tailings Capacity - the floor and inside slopes of Cell 4A encompass about 40 acres and have a maximum capacity of about 1.6 million cubic yards of tailings material storage (as measured below the required 3-foot freeboard).
- d) Liner and Leak Detection Systems - including the following layers, in descending order:
 - 1) Primary Flexible Membrane Liner (FML) - consisting of impermeable 60 mil high density polyethylene (HDPE) membrane that extends across both the entire cell floor and the inside side-slopes, and is anchored in a trench at the top of the dikes on all four sides. The primary FML will be in direct physical contact with the tailings material over most of the Cell 4A floor area. In other locations, the primary FML will be in contact with the slimes drain collection system (discussed below).

- 2) Leak Detection System - includes a permeable HDPE geonet fabric that extends across the entire area under the primary FML in Cell 4A, and drains to a leak detection sump in the southwest corner. Access to the leak detection sump is via an 18-inch inside diameter (ID) PVC pipe placed down the inside slope, located between the primary and secondary FML liners. At its base this pipe will be surrounded with a gravel filter set in the leak detection sump, having dimensions of 10 feet by 10 feet by 2 feet deep. In turn, the gravel filter layer will be enclosed in an envelope of geotextile fabric. The purpose of both the gravel and geotextile fabric is to serve as a filter.
 - 3) Secondary FML - consisting of an impermeable 60-mil HDPE membrane found immediately below the leak detection geonet. Said FML also extends across the entire Cell 4A floor, up the inside side-slopes and is also anchored in a trench at the top of all four dikes.
 - 4) Geosynthetic Clay Liner - consisting of a manufactured geosynthetic clay liner (GCL) composed of 0.2-inch of low permeability bentonite clay centered and stitched between two layers of geotextile. Prior to disposal of any wastewater in Cell 4A, the Permittee shall demonstrate that the GCL has achieved a moisture content of at least 50% by weight. This item is a revised requirement per DRC letter to DUSA dated September 28, 2007.
- e) Slimes Drain Collection System - including a two-part system of strip drains and perforated collection pipes both installed immediately above the primary FML, as follows:
- 1) Horizontal Strip Drain System - is installed in a herringbone pattern across the floor of Cell 4A that drain to a "backbone" of perforated collection pipes. These strip drains are made of a prefabricated two-part geo-composite drain material (solid polymer drainage strip) core surrounded by an envelope of non-woven geotextile filter fabric. The strip drains are placed immediately over the primary FML on 50-foot centers, where they conduct fluids downgradient in a southwesterly direction to a physical and hydraulic connection to the perforated slimes drain collection pipe. A series of continuous sand bags, filled with filter sand cover the strip drains. The sand bags are composed of a woven polyester fabric filled with well graded filter sand to protect the drainage system from plugging.
 - 2) Horizontal Slimes Drain Collection Pipe System - includes a "backbone" piping system of 4-inch ID Schedule 40 perforated PVC slimes drain collection (SDC) pipe found at the downgradient end of the strip drain lines. This pipe is in turn overlain by a berm of gravel that runs the entire diagonal length of the cell, surrounded by a geotextile fabric cushion in immediate contact with the primary FML. In turn, the gravel is overlain by a layer of non-woven geotextile to serve as an additional filter material. This perforated collection pipe serves as the "backbone" to the slimes drain system and runs from the far northeast corner downhill to the far southwest corner of Cell 4A where it joins the slimes drain access pipe.
 - 3) Slimes Drain Access Pipe - consisting of an 18-inch ID Schedule 40 PVC pipe placed down the inside slope of Cell 4A at the southwest corner, above the primary FML. Said pipe then merges with another horizontal pipe of equivalent diameter and

material, where it is enveloped by gravel and woven geotextile that serves as a cushion to protect the primary FML. A reducer connects the horizontal 18-inch pipe with the 4-inch SDC pipe. At some future time, a pump will be set in this 18-inch pipe and used to remove tailings wastewaters for purposes of de-watering the tailings cell.

- f) Cell 4A North Dike Splash Pads - three 20-foot wide splash pads will be constructed on the north dike to protect the primary FML from abrasion and scouring by tailings slurry. These pads will consist of an extra layer of 60 mil HDPE membrane that will be installed in the anchor trench and placed down the inside slope of Cell 4A, from the top of the dike, under the inlet pipe, and down the inside slope to a point 5-feet beyond the toe of the slope.
 - g) Cell 4A Emergency Spillway - a concrete lined spillway will be constructed near the western corner of the north dike to allow emergency runoff from Cell 3 into Cell 4A. This spillway will be limited to a 6-inch reinforced concrete slab set directly over the primary FML in a 4-foot deep trapezoidal channel. No other spillway or overflow structure will be constructed at Cell 4A. All stormwater runoff and tailings wastewaters not retained in Cells 2 and 3, will be managed and contained in Cell 4A, including the Probable Maximum Precipitation and flood event.
6. BAT Performance Standards for Tailings Cell 4A - the Permittee shall operate and maintain Tailings Cell 4A so as to prevent release of wastewater to groundwater and the environment in accordance with the currently approved Cell 4A BAT, Monitoring, Operations and Maintenance Plan. Any failure to achieve or maintain the required BAT performance standards shall constitute a violation of the Permit and shall be reported to the Executive Secretary in accordance with Part I.G.3. Performance standards for Tailings Cell 4A shall include the following:
- a) Leak Detection System (LDS) Maximum Allowable Daily Head - the fluid head in the LDS shall not exceed 1 foot above the lowest point on the lower flexible membrane liner on the cell floor. For purposes of compliance this elevation will equate to a maximum distance of 2.28 feet above the LDS transducer. At all times the Permittee shall operate the LDS pump and transducer in a horizontal position at the lowest point of the LDS sump floor.
 - b) LDS Maximum Allowable Daily Leak Rate - shall not exceed 24,160 gallons/day.
 - c) Slimes Drain Monthly and Annual Average Recovery Head Criteria - after the Permittee initiates pumping conditions in the slimes drain layer in Cell 4A, the Permittee will provide: 1) continuous declining fluid heads in the slimes drain layer, in a manner equivalent to the requirements found in Part I.D.3(I.D.3-(b)), and 2) a maximum head of 1.0 feet in the tailings (as measured from the lowest point of upper flexible membrane liner) in 6.4 years or less.
 - d) Maximum Weekly Wastewater Level - under no circumstance shall the freeboard be less than 3-feet in Cell 4A, as measured from the top of the upper FML.
7. Definition of 11e.(2) Waste - for purposes of this Permit, 11e.(2) waste is defined as: "... tailings or wastes produced by the extraction or concentration of uranium or thorium from any ore processed primarily for its source material content", as defined in Section 11e.(2) of

the U.S. Atomic Energy Act of 1954, as amended; which includes other process related wastes and waste streams described by a March 7, 2003 NRC letter from Paul H. Lohaus to William J. Sinclair.

8. Closed Cell Performance Requirements - before reclamation and closure of any tailings disposal cell, the Permittee shall ensure that the final design, construction, and operation of the cover system at each tailings cell will comply with all requirements of an approved Reclamation Plan, and will for a period of not less than 200 years meet the following minimum performance requirements:
 - a) Minimize infiltration of precipitation or other surface water into the tailings, including, but not limited to the radon barrier,
 - b) Prevent the accumulation of leachate head within the tailings waste layer that could rise above or over-top the maximum FML liner elevation internal to any disposal cell, i.e. create a "bathtub" effect, and
 - c) Ensure that groundwater quality at the compliance monitoring wells does not exceed the Ground Water Quality Standards or Ground Water Compliance Limits specified in Part I.C.1 and Table 2 of this Permit.
9. Facility Reclamation Requirements - upon commencement of decommissioning, the Permittee shall reclaim the mill site and all related facilities, stabilize the tailings cells, and construct a cover system over the tailings cells in compliance with all engineering design and specifications in an approved Reclamation Plan. The Executive Secretary reserves the right to require modifications of the Reclamation Plan for purposes of compliance with the Utah Ground Water Quality Protection Regulations, including but not limited to containment and control of contaminants, or discharges, or potential discharges to Waters of the State.
10. Stormwater Management and Spill Control Requirements - the Permittee will manage all contact and non-contact stormwater and control contaminant spills at the facility in accordance with the currently approved Stormwater Best Management Practices Plan. Said plan includes the following minimum provisions:
 - a) Protect groundwater quality or other waters of the state by design, construction, and/or active operational measures that meet the requirements of the Ground Water Quality Protection Regulations found in UAC R317-6-6.3(G) and R317-6-6.4(C),
 - b) Prevent, control and contain spills of stored reagents or other chemicals at the mill site,
 - c) Cleanup spills of stored reagents or other chemicals at the mill site immediately upon discovery, and
 - d) Report reagent spills or other releases at the mill site to the Executive Secretary in accordance with UAC 19-5-114.

Reconstruction of stormwater management and/or chemical reagent storage facilities, existing at the time of original Permit issuance, may be required by the Executive Secretary after occurrence of a major spill or catastrophic failure, pursuant to Part IV.N.3 of this Permit.

11. BAT Requirements for Feedstock Material Stored Outside the Feedstock Storage Area - the Permittee shall store and manage feedstock materials outside the ore storage pad in accordance with the following minimum performance requirements:
- a) Feedstock materials will be stored at all times in water-tight containers, and
 - b) Aisle ways will be provided at all times to allow visual inspection of each and every feedstock container, or
 - c) Each and every feedstock container will be placed inside a water-tight overpack prior to storage, or
 - d) Feedstock containers shall be stored on a hardened surface to prevent spillage onto subsurface soils, and that conforms with the following minimum physical requirements:
 - 1) A storage area composed of a hardened engineered surface of asphalt or concrete, and
 - 2) A storage area designed, constructed, and operated in accordance with engineering plans and specifications approved in advance by the Executive Secretary. All such engineering plans or specifications submitted shall demonstrate compliance with Part I.D.4,
 - 3) A storage area that provides containment berms to control stormwater run-on and run-off, and
 - 4) Stormwater drainage works approved in advance by the Executive Secretary, or
 - 5) Other storage facilities and means approved in advance by the Executive Secretary.
12. BAT Design Standards for Tailings Cell 4B - the BAT design standard for Tailings Cell 4B shall be defined by and constructed in accordance with the requirements as summarized by the engineering drawings, specifications, and description in Table 6, below:

Table 6. Approved Tailings Cell 4B Engineering Design and Specifications

Engineering Drawings			
Name	Date	Revision No.	Title
Sheet 1 of 8	January 2009	Rev. 1	Cover Sheet
Sheet 2 of 8	January 2009	Rev. 1	Site Plan
Sheet 3 of 8	January 2009	Rev. 1	Base Grading Plan
Sheet 4 of 8	January 2009	Rev. 1	Pipe Layout and Details
Sheet 5 of 8	December 2007	Rev. 0	Lining System Details I
Sheet 6 of 8	January 2009	Rev. 1	Lining System Details II
Sheet 7 of 8	January 2009	Rev. 1	Lining System Details III
Sheet 8 of 8	January 2009	Rev. 1	Lining System Details IV
Figure 1	January 2009	-	Mill Site Drainage Basins (supporting reference)
Engineering Specifications			
Date	Document Title		Prepared by
January 2009	Slope Stability Analysis Calculation Package		Geosyntec Consultants
January 2009	Seismic Deformation Analysis Calculation Package		Geosyntec Consultants
January 2009	Revised Pipe Strength Analysis Calculation Package		Geosyntec Consultants
January 2009	Revised Comparison of Flow Through Compacted Clay Liner and Geosynthetic Clay Liner		Geosyntec Consultants

	Calculation Package	
January 2009	Revised Action Leakage Rate Calculation Package	Geosyntec Consultants
August 2009	Blasting - Locations and Profiles, Attachment: Figures 1 and 2	Geosyntec Consultants
August 2009	(Revised) Technical Specifications, with the exception of Section 02200 (Earthwork)	Geosyntec Consultants
August 2009	Cell 4B Capacity Calculations	Geosyntec Consultants
August 2009	Revised Cushion Fabric Calculations	
August 2009	Construction Quality Assurance Plan for the Construction of Cell 4B Lining System	Geosyntec Consultants
September 2009	(Revised) Technical Specification Section 02200 (Earthwork)	Geosyntec Consultants
August 6, 2009	Blast Plan, KGL and Associates and Blast Plan Review, Geosyntec Consultants letter dated September 10, 2009	KGL and Associates and Geosyntec Consultants
September 2009	Probable Maximum Precipitation (PMP) Event Computation	Geosyntec Consultants
January 2009	Slope Stability Analysis Calculation Package	Geosyntec Consultants

Tailings Cell 4B Design and Construction - approved by the Executive Secretary will consist of the following major elements:

- a) Dikes - consisting of newly constructed dikes on the south and west side of the cell, each including a 20-foot wide road at the top (minimum) to support an access road. The grading plan for the Cell 4B excavation includes interior slopes of 2H to 1V. The exterior slopes of the southern and western dikes will have typical slopes of 3H to 1V. Limited portions of the Cell 4B interior sideslopes in the northwest corner and southeast corner of the cell, (where the slimes drain and leak detection sump will be located will also have a slope of 3H to 1V. The base width of the southern dikes varies from approximately 92 feet at the western end to approximately 190 feet at the eastern end of the dike, with no exterior embankment present on any other side of the cell.
- b) Foundation - including existing subgrade soils over bedrock materials. Foundation preparation included excavation and removal of contaminated soils, compaction of imported soils to a maximum dry density of 90% at a moisture content between +3% and -3% of optimum moisture content, as determined by ASTM D-1557. The floor of Cell 4B has an average slope of 1% that grades from the northwest corner to the southeast corner.
- c) Tailings Capacity - the floor and inside slopes of Cell 4B encompass about 44 acres, and the cell will have a water surface area of 40 acres and a maximum capacity of about 1.9 million cubic yards of tailings material storage (as measured below the required 3-foot freeboard).
- d) Liner and Leak Detection Systems - including the following layers, in descending order:
 - 1) Primary Flexible Membrane Liner (FML) - consisting of 60-mil high density polyethylene (HDPE) membrane that extends across both the entire cell floor and the inside side-slopes, and is anchored in a trench at the top of the dikes on all four sides. The primary FML will be in direct physical contact with the tailings material over most of the Cell 4B floor area. In other locations, the primary FML will be in contact with the slimes drain collection system (discussed below).

- 2) Leak Detection System - includes a permeable HDPE geonet that extends across the entire area under the primary FML in Cell 4B, and drains to a leak detection sump in the southeast corner. Access to the leak detection sump is via an 18-inch inside diameter (ID) PVC pipe placed down the inside slope, located between the primary and secondary FML liners. At its base this pipe will be surrounded with a gravel filter set in a sump having dimensions of 15 feet by 10 feet by 2 feet deep that contains a leak detection system sump area. In turn, the gravel filter layer will be enclosed in an envelope of geotextile fabric. The purpose of both the gravel and geotextile fabric is to serve as a filter.
 - 3) Secondary FML - consisting of a 60-mil HDPE membrane found immediately below the leak detection geonet. Said FML also extends across the entire Cell 4B floor, up the inside side-slopes and is also anchored in a trench at the top of all four dikes.
 - 4) Geosynthetic Clay Liner - consisting of a manufactured geosynthetic clay liner (GCL) composed of 0.2-inch of low permeability bentonite clay centered and stitched between two layers of geotextile. Prior to disposal of any wastewater in Cell 4B, the Permittee shall demonstrate that the GCL has achieved a moisture content of at least 50% by weight.
- e) Slimes Drain Collection System - including a two-part system of strip drains and perforated collection pipes both installed immediately above the primary FML, as follows:
- 1) Horizontal Strip Drain System - is installed in a herringbone pattern across the floor of Cell 4B that drain to a "backbone" of perforated collection pipes. These strip drains are made of a prefabricated two-part geo-composite drain material (solid polymer drainage strip) core surrounded by an envelope of non-woven geotextile filter fabric. The strip drains are placed immediately over the primary FML on 50-foot centers, where they conduct fluids downgradient in a southwesterly direction to a physical and hydraulic connection to the perforated slimes drain collection pipe. A series of continuous sand bags, filled with filter sand cover the strip drains. The sand bags are composed of a woven polyester fabric filled with well graded filter sand to protect the drainage system from plugging.
 - 2) Horizontal Slimes Drain Collection Pipe System - includes a "backbone" piping system of 4-inch ID Schedule 40 perforated PVC slimes drain collection (SDC) pipe found at the downgradient end of the strip drain lines. This pipe is in turn overlain by a berm of gravel that runs the entire diagonal length of the cell, surrounded by a geotextile fabric cushion in immediate contact with the primary FML. In turn, the gravel is overlain by a layer of non-woven geotextile to serve as an additional filter material. This perforated collection pipe serves as the "backbone" to the slimes drain system and runs from the far northwest corner downhill to the far southeast corner of Cell 4B where it joins the slimes drain access pipe.
 - 3) Slimes Drain Access Pipe - consisting of an 18-inch ID Schedule 40 PVC pipe placed down the inside slope of Cell 4B at the southeast corner, above the primary FML. Said pipe then merges with another horizontal pipe of equivalent diameter and material, where it is enveloped by gravel and woven geotextile that serves as a cushion to protect the primary FML. A reducer connects the horizontal 18-inch pipe

with the 4-inch SDC pipe. At some future time, a pump will be set in this 18-inch pipe and used to remove tailings wastewaters for purposes of de-watering the tailings cell.

- f) Cell 4B North and East Dike Splash Pads - Nine 20-foot-wide splash pads will be constructed on the north and east dikes to protect the primary FML from abrasion and scouring by tailings slurry. These pads will consist of an extra layer of 60 mil HDPE membrane that will be installed in the anchor trench and placed down the inside slope of Cell 4B, from the top of the dike, under the inlet pipe, and down the inside slope to a point at least 5 feet onto the Cell 4B floor beyond the toe of the slope.
 - g) Cell 4B Emergency Spillway - a concrete lined spillway will be constructed near the southeastern corner of the east dike to allow emergency runoff from Cell 4A into Cell 4B. This spillway will be limited to a 6-inch reinforced concrete slab, with a welded wire fabric installed within it at its midsection, set atop a cushion geotextile placed directly over the primary FML in a 4-foot deep trapezoidal channel. A 100-foot wide, 60-mil HDPE membrane splash pad will be installed beneath the emergency spillway. No other spillway or overflow structure will be constructed at Cell 4B. All stormwater runoff and tailings wastewaters not retained in Cells 2 and 3, and 4A will be managed and contained in Cell 4B, including the Probable Maximum Precipitation and flood event.
13. BAT Performance Standards for Tailings Cell 4B - the Permittee shall operate and maintain Tailings Cell 4B so as to prevent release of wastewater to groundwater and the environment in accordance with the currently approved Cell 4B BAT, Monitoring, Operations and Maintenance Plan. Any failure to achieve or maintain the required BAT performance standards shall constitute a violation of the Permit and shall be reported to the Executive Secretary in accordance with Part I.G.3. Performance standards for Tailings Cell 4B shall include the following:
- a) Leak Detection System (LDS) Maximum Allowable Daily Head - the fluid head in the LDS shall not exceed 1 foot above the lowest point on the lower flexible membrane liner on the cell floor. At all times the Permittee shall operate the LDS pump and transducer in a horizontal position at the lowest point of the LDS sump floor.
 - b) LDS Maximum Allowable Daily Leak Rate - shall not exceed 26,145 gallons/day.
 - c) Slimes Drain Monthly and Annual Average Recovery Head Criteria - after the Permittee initiates pumping conditions in the slimes drain layer in Cell 4B, the Permittee will provide: 1) continuous declining fluid heads in the slimes drain layer, in a manner equivalent to the requirements found in Part I.D.3(b), and 2) a maximum head of 1.0 feet in the tailings (as measured from the lowest point of upper flexible membrane liner) in 5.5 years or less.
 - d) Maximum Weekly Wastewater Level - under no circumstance shall the freeboard be less than 3-feet in Cell 4B, as measured from the top of the upper FML.
14. BAT Performance Standards for the New Decontamination Pad - the Permittee shall operate and maintain the New Decontamination Pad (NDP) to prevent release of wastewater to

groundwater and the environment in accordance with the currently approved DMT Monitoring Plan. Any failure to achieve or maintain the required BAT performance standards shall constitute a violation of the Permit and shall be reported to the Executive Secretary in accordance with Part I.G.3. Performance standards for the NDP shall include, but are not limited to, the following:

- a) NDP LDS Access Pipes - the water level shall not exceed 0.10 foot above the concrete floor in any LDS access pipe, at any time. Compliance will be defined as a depth to standing water present in any of the LDS access pipes of more than or equal to 6.2 feet as measured from the water measuring point (top of access pipe).
- b) Soil and debris will be removed from the wash pad of the NDP, in accordance with the currently approved DMT Monitoring Plan. Cracks in the wash pad greater than 1/8 inch (width) will be repaired within five working days of discovery.

E. GROUND WATER COMPLIANCE AND TECHNOLOGY PERFORMANCE MONITORING - beginning with the effective date and lasting through the term of this Permit or as stated in an approved closure plan, the Permittee shall sample groundwater monitoring wells, tailing cell wastewaters, seeps and springs, monitor groundwater levels, monitor water levels of process solutions, and monitor and keep records of the operation of the facility, as follows:

1. Routine Groundwater Compliance Monitoring - the Permittee shall monitor upgradient, lateral gradient, and downgradient groundwater monitoring wells completed in the shallow aquifer in the vicinity of all potential discharge sources that could affect local groundwater conditions at the facility, as follows:

- a) Ground Water Monitoring Quality Assurance Plan - all groundwater monitoring and analysis performed under this Permit shall be conducted in accordance with a Quality Assurance Plan (QAP) currently approved by the Executive Secretary. Any non-conformance with QAP requirements in a given quarterly groundwater monitoring period will be corrected and reported to the Executive Secretary on or before submittal of the next quarterly groundwater monitoring report pursuant to Part I.F.1.
- b) Quarterly Monitoring - the Permittee shall monitor on a quarterly basis all monitoring wells listed in Table 2 of this Permit where local groundwater average linear velocity has been found by the Executive Secretary to be equal to or greater than 10 feet/year. For purposes of this Permit, quarterly monitoring is required at the following wells:
 - 1) Upgradient Wells: none
 - 2) Lateral or Downgradient Wells: MW-11, MW-14, MW-25, MW-26 (formerly TW4-15), MW-30, MW-31, and MW-35.
 - 3) Future Cell 4B Downgradient Wells to be Installed - quarterly monitoring shall begin within 30 calendar days of installation of new groundwater monitoring wells MW-36, MW-37, or any other well required by Part I.H.4 of this Permit, and continue until otherwise determined by the Executive Secretary pursuant to Part I.H.5.
- c) Semi-annual Monitoring - the Permittee shall monitor on a semi-annual basis all monitoring wells listed in Table 2 of this Permit where local groundwater average linear velocity has been found by the Executive Secretary to be less than 10 feet/year. For purposes of this Permit, semi-annual monitoring is required at the following wells:
 - 1) Upgradient Wells: MW-1, MW-18, MW-19, and MW-27.
 - 2) Lateral or Downgradient Wells: MW-2, MW-3, MW-3A, MW-5, MW-12, MW-15, MW-17, MW-23, MW-24, MW-28, MW-29, and MW-32 (formerly TW4-17).
 - 3) General Monitoring Wells: MW-20 and MW-22
- d) Compliance Monitoring Parameters - all groundwater samples collected shall be analyzed for the following parameters:
 - 1) Field Parameters - depth to groundwater, pH, temperature, specific conductance, and redox potential (Eh).
 - 2) Laboratory Parameters

- i. GWCL Parameters - all contaminants specified in Table 2.
 - ii. General Inorganics - chloride, sulfate, carbonate, bicarbonate, sodium, potassium, magnesium, calcium, and total anions and cations.
- e) Special Provisions for Groundwater Monitoring - the Permittee shall ensure that all groundwater monitoring conducted and reported complies with the following requirements:
 - 1) Depth to Groundwater Measurements - shall always be made to the nearest 0.01 foot.
 - 2) Minimum Detection Limits - all groundwater quality analyses reported shall have a minimum detection limit or reporting limit that is less than its respective Ground Water Compliance Limit concentration defined in Table 2.
 - 3) Gross Alpha Counting Variance - all gross alpha analysis shall be reported with an error term. All gross alpha analysis reported with an activity equal to or greater than the GWCL, shall have a counting variance that is equal to or less than 20% of the reported activity concentration. An error term may be greater than 20% of the reported activity concentration when the sum of the activity concentration and error term is less than or equal to the GWCL.
 - 4) All equipment used for purging and sampling of groundwater shall be made of inert materials.
2. Groundwater Monitoring: General Monitoring Wells MW-20 and MW-22 - the Permittee shall monitor wells MW-20 and MW-22 on a semi-annual basis. Said sampling shall comply with the following Permit requirements:
 - a) Routine groundwater compliance monitoring requirements of Part I.E.1.
 - b) Groundwater head monitoring requirements of Part I.E.3
 - c) Well monitoring procedure requirements of Part I.E.5.
3. Groundwater Head Monitoring - on a quarterly basis and at the same frequency as groundwater monitoring required by Part I.E.1, the Permittee shall measure depth to groundwater in the following wells and/or piezometers:
 - a) Point of Compliance Wells - identified in Table 2 and Part I.E.1 of this Permit.
 - b) Piezometers - P-1, P-2, P-3, P-4, and P-5.
 - c) Head Monitoring Well - MW-34.
 - d) General Monitoring Wells - MW-20 and MW-22.
 - e) Contaminant Investigation Wells - any well required by the Executive Secretary as a part of a contaminant investigation or groundwater corrective action.
 - f) Any other wells or piezometers required by the Executive Secretary.
4. Groundwater Monitoring Well Design and Construction Criteria - all new groundwater monitoring wells installed at the facility shall comply with the following design and construction criteria:

- a) Located as close as practical to the contamination source, tailings cell, or other potential origin of groundwater pollution.
 - b) Screened and completed in the shallow aquifer.
 - c) Designed and constructed in compliance with UAC R317-6-6.3(I)(6), including the EPA RCRA Ground Water Monitoring Technical Enforcement Guidance Document, 1986, OSWER-9950.1.
 - d) Aquifer tested to determine local hydraulic properties, including but not limited to hydraulic conductivity.
5. Monitoring Procedures for Wells - beginning with the date of Permit issuance, all monitoring shall be conducted by the Permittee in conformance with the following procedures:
- a) Sampling - grab samples shall be taken of the groundwater, only after adequate removal or purging of standing water within the well casing has been performed.
 - b) Sampling Plan - all sampling shall be conducted to ensure collection of representative samples, and reliability and validity of groundwater monitoring data.
 - c) Laboratory Approval - all analyses shall be performed by a laboratory certified by the State of Utah to perform the tests required.
 - d) Damage to Monitoring Wells - if any monitor well is damaged or is otherwise rendered inadequate for its intended purpose, the Permittee shall notify the Executive Secretary in writing within five calendar days of discovery.
 - e) Field Monitoring Equipment Calibration and Records - immediately prior to each monitoring event, the Permittee shall calibrate all field monitoring equipment in accordance with the respective manufacturer's procedures and guidelines. The Permittee shall make and preserve on-site written records of such equipment calibration in accordance with Part II.G and H of this Permit. Said records shall identify the manufacturer's and model number of each piece of field equipment used and calibration.
6. White Mesa Seeps and Springs Monitoring - the Permittee shall conduct annual monitoring of all seeps and springs identified in the currently approved Sampling Plan for Seeps and Springs in the Vicinity of the White Mesa Uranium Mill. Said monitoring shall include, but is not limited to:
- a) Field Measurements - including: pH, temperature, and specific conductivity.
 - b) Water Quality Sampling and Analysis - the Permittee shall collect grab samples and perform laboratory analysis of all water quality parameters identified in Table 2 of this Permit.
 - c) Certified Laboratory Analysis - all laboratory analysis will be conducted by a Utah certified laboratory.
 - d) Analytical Methods - all laboratory analysis shall be conducted using analytical methods listed in the currently approved QAP pursuant to Part I.E.1 of this Permit.
 - e) Minimum Detection Limits - all seeps or springs water quality analyses reported shall have a minimum detection limit or reporting limit that is less than or equal to the respective:

- 1) Ground Water Quality Standards concentrations defined in Table 2 of this Permit, and
 - 2) For TDS, Sulfate, and Chloride, the Minimum Detection Limit for those constituents for seeps and springs monitoring will be as follows: 10 mg/L, 1 mg/L, and 1 mg/L, respectively.
 - f) Quality Control Samples - the Permittee will conduct quality control (QC) sampling and analysis as a part of all seeps and springs sampling, in accordance with the requirements of Section 4.3 of the currently approved QAP; pursuant to Part I.E.1 of this Permit. Said QC samples shall include, but are not limited to: trip blanks, duplicate samples, and equipment rinse blanks.
 - g) Prior Notification - at least 15 calendar days before any fieldwork or water quality sample collection, the Permittee shall provide written notice to allow the Executive Secretary to observe or split sample any or all seeps or springs.
7. DMT Performance Standards Monitoring - the Permittee shall perform technology performance monitoring in accordance with the currently approved DMT Monitoring Plan to determine if DMT is effective in minimizing and controlling the release of contaminants pursuant to the provisions of Parts I.D.1 and I.D.3 of this Permit, including, but not limited to the following activities:
- a) Weekly Tailings Wastewater Pool Elevation Monitoring: Cells 1 and 3 - the Permittee shall monitor and record weekly the elevation of wastewater in Tailings Cells 1 and 3 to ensure compliance with the maximum wastewater elevation criteria mandated by Condition 10.3 of the License. Said measurements shall be made from a wastewater level gauge or elevation survey to the nearest 0.01 foot.
 - b) ~~Quarterly~~ Monthly Slimes Drain Water Level Monitoring: Cells 2 and 3 - the Permittee shall monitor and record ~~quarterly~~ ~~monthly~~ the depth to wastewater in the slimes drain access pipes as described in Part I.D.3 of this Permit and the currently approved DMT Monitoring Plan at Tailings Cells 2 and 3 to determine the recovery head. For purposes of said monitoring, the Permittee shall at each tailings cell:
 - 1) Perform at least 12 separate slimes drain recovery tests at each disposal cell in each quarterly period of each calendar year that meets the requirements of Part I.D.3,
 - 2) Designate, operate, maintain, and preserve one water level measuring point at the centerline of the slimes drain access pipe that has been surveyed and certified by a Utah licensed engineer or land surveyor,
 - 3) Make all slimes drain recovery head test (depth to fluid) measurements from the same designated water level measuring point, and
 - 4) Record and report all fluid depth measurements to the nearest 0.01 foot.
 - 5) For Cell 3 these requirements shall apply upon initiation of tailings de-watering operations.
 - c) Weekly Wastewater Level Monitoring: Roberts Pond - the Permittee shall monitor and record weekly wastewater levels at the Roberts Pond to determine compliance with the

DMT operations standards in Part I.D.3. Said measurements shall be made in accordance to the currently approved DMT Monitoring Plan.

- d) Weekly Feedstock Storage Area Inspection - the Permittee shall conduct weekly inspections of all feedstock storage to: 1) Confirm the bulk feedstock materials are maintained within the approved Feedstock Storage Area defined by Table 4, and 2) Verify that all alternate feedstock materials located outside the Feedstock Area defined in Table 4, are stored in accordance with the requirements found in Part I.D.11.
- e) Feedstock Material Stored Outside the Feedstock Storage Area Inspections
 - 1) Weekly Inspection - the Permittee will conduct weekly inspections to verify that each feed material container complies with the requirements of Part I.D.11.
 - 2) Hardened Surface Storage Area - in the event the Permittee constructs a hardened surface storage area for feed materials, pursuant to Part I.D.11, prior Executive Secretary approval will be secured for the following:
 - i. Engineering Design and Specifications - in accordance with the requirements of Part I.D.4, and
 - ii. Operation and Maintenance Plan.
- f) Inspections of Tailing Cell and Pond Liner Systems - the Permittee shall inspect the liner system at Tailing Cells 1, 2, and 3 on a daily basis pursuant to the requirements of Sections 2.1 and 2.2 of the currently approved DMT Monitoring Plan. The Permittee shall conduct visual inspections at the Roberts Pond on a weekly basis. In the event that any liner defect or damage is identified during a liner system inspection, the Permittee shall: 1) report and repair said defect or damage pursuant to Part I.G.3 by implementation of the currently approved Liner Maintenance Provisions, and 2) report all repairs made pursuant to Part I.F.2.
- g) Weekly New Decontamination Pad Inspection - the Permittee shall conduct weekly inspections of the New Decontamination Pad as described in Part I.D.14 of this Permit and the currently approved DMT Monitoring Plan.
- 8. Cell 4A BAT Performance Standards Monitoring and Maintenance - in accordance with the currently approved Cell 4A BAT, Monitoring, Operations and Maintenance Plan, the Permittee shall immediately implement all monitoring and recordkeeping requirements therein. The Cell 4A BAT monitoring includes the following:
 - a) Weekly Leak Detection System (LDS) Monitoring - including:
 - 1) Leak Detection System Pumping and Monitoring Equipment - the Permittee shall provide continuous operation of the leak detection system pumping and monitoring equipment, including, but not limited to, the submersible pump, pump controller, head monitoring, and flow meter equipment approved by the Executive Secretary. Failure of any LDS pumping or monitoring equipment not repaired and made fully operational within 24-hours of discovery shall constitute failure of BAT, and a violation of this Permit.
 - 2) Maximum Allowable Head - the Permittee shall measure the fluid head above the lowest point on the secondary flexible membrane by the use of procedures and equipment approved by the Executive Secretary. Under no circumstance shall fluid

head in the leak detection system sump exceed a 1-foot level above the lowest point in the lower flexible membrane liner on the cell floor. For purposes of compliance monitoring this 1-foot distance shall equate to 2.28 feet above the leak detection system transducer.

- 3) Maximum Allowable Daily LDS Flow Rates - the Permittee shall measure the volume of all fluids pumped from the LDS. Under no circumstances shall the average daily LDS flow volume exceed 24,160 gallons/day.
 - 4) 3-foot Minimum Vertical Freeboard Criteria - the Permittee shall operate and maintain wastewater levels to provide a 3-foot Minimum of vertical freeboard in Tailings Cell 4A. Said measurements shall be made to the nearest 0.1 foot.
 - b) Quarterly Slimes Drain Recovery Head Monitoring - immediately after the Permittee initiates pumping conditions in the Tailings Cell 4A slimes drain system, ~~monthly~~ quarterly recovery head tests and fluid level measurements will be made in accordance with the requirements of Parts I.D.3 and I.E.7(b) of this Permit and the currently approved Cell 4A BAT, Monitoring, Operations and Maintenance Plan.
 - c) Liner Maintenance and Repair - all repairs to the liner shall be completed in accordance with Section 9.4 of the approved June 2007 Geosyntec Consultants Cell 4A Construction Quality Assurance Plan (CQA/QC Plan) as found in Table 5 of this Permit. Repairs shall be performed by qualified liner repair personnel and shall be reported in a Liner Repair Report, certified by a Utah licensed Professional Engineer. The Liner Repair Report shall be submitted to for Executive Secretary approval in accordance with Part I.F.3 of the Permit. Any leak, hole, or other damage to the liner will be reported to the Executive Secretary pursuant to the requirements found in Part I.G.3.
9. On-site Chemicals Inventory - the Permittee shall monitor and maintain a current inventory of all chemicals used at the facility at rates equal to or greater than 100 kg/yr. Said inventory shall be maintained on-site, and shall include, but is not limited to:
- a) Identification of chemicals used in the milling process and the on-site laboratory, and
 - b) Determination of volume and mass of each raw chemical currently held in storage at the facility.
10. Tailings Cell Wastewater Quality Monitoring - on an annual basis, the Permittee shall collect wastewater quality samples from each wastewater source at each tailings cell at the facility, including, but not limited to:
- a) One surface impounded wastewater location at each of Tailings Cells 1, 3, 4A, and 4B.
 - b) One slimes drain wastewater access pipe at each of Tailings Cells 2, 3, 4A, and 4B. For Cells 3, 4A, and 4B, this requirement shall apply immediately after initiation of de-watering operations at these cells, and
 - c) One leak detection wastewater access pipe at Tailings Cells 4A and 4B.
 - d) All such sampling shall be conducted in August of each calendar year in compliance with the currently approved White Mesa Uranium Mill Tailing and Slimes Drain Sampling Program. Said annual monitoring shall include, but is not limited to:
 - 1) Field Measurements - including: pH, temperature, and specific conductivity.

- 2) Water Quality Sampling and Analysis - the Permittee shall collect grab samples and perform laboratory analysis of all:
 - i. Water quality parameters identified in Table 2 of this Permit, and
 - ii. Semi-volatile compounds identified in EPA Method 8270D.
- 3) Certified Laboratory Analysis - all laboratory analysis will be conducted by a Utah certified laboratory.
- 4) Analytical Methods - all laboratory analysis shall be conducted using analytical methods listed in the currently approved QAP pursuant to Part I.E.1 of this Permit.
- 5) Minimum Detection Limits - all water quality analyses reported shall have a minimum detection limit or reporting limit that is less than or equal to the respective:
 - i. Ground Water Quality Standards concentrations defined in Table 2 of this Permit,
 - ii. For TDS, Sulfate, and Chloride, the Minimum Detection Limit for those constituents for Tailing Cell wastewater monitoring will be as follows: 1,000 mg/L, 1,000 mg/L, and 1 mg/L, respectively, and
 - iii. Lower limits of quantitation for groundwater for semi-volatile organic compounds listed in Table 2 of EPA Method 8270D, Revision 4, dated February, 2007.
- 6) Quality Control Samples - the Permittee will conduct quality control (QC) sampling and analysis as a part of all tailings wastewater sampling, in accordance with the requirements of Section 4.3 of the currently approved QAP; pursuant to Part I.E.1 of this Permit. Said QC samples shall include, but are not limited to: trip blanks, duplicate samples, and equipment rinse blanks.
- 7) Prior Notification - at least 30 calendar days before any water quality sample collection, the Permittee shall provide written notice to allow the Executive Secretary to observe or split sample any tailings cell, slimes drain, or leak detection wastewaters.
- 8) Sample Omission - in the course of each annual sampling event, the Permittee shall sample and analyze all tailings cell, slimes drain, and leak detection wastewater sources identified in the currently approved Tailings and Slimes Drain Sampling Program (pp. 1-3), or as required by this Permit, whichever is greater. The Permittee shall not omit sampling of any of tailings cell wastewater source during said annual event, without prior written approval from the Executive Secretary.
11. Groundwater Monitoring Modifications - before any modification of groundwater monitoring or analysis procedures, methods, or equipment, the Permittee must obtain prior written approval from the Executive Secretary.
12. Cell 4B BAT Performance Standards Monitoring and Maintenance - immediately following Executive Secretary approval of the Cell 4B BAT, Monitoring, Operations and Maintenance Plan, the Permittee shall immediately implement all monitoring and recordkeeping requirements therein. The Cell 4B BAT monitoring shall include the following:
 - a) Weekly Leak Detection System (LDS) Monitoring - including:

- 1) Leak Detection System Pumping and Monitoring Equipment - the Permittee shall provide continuous operation of the leak detection system pumping and monitoring equipment, including, but not limited to, the submersible pump, pump controller, head monitoring, and flow meter equipment approved by the Executive Secretary. Failure of any LDS pumping or related monitoring equipment not repaired and made fully operational within 24-hours of discovery shall constitute failure of BAT, and a violation of this Permit.
 - 2) Maximum Allowable Head - the Permittee shall measure the fluid head above the lowest point on the secondary flexible membrane by the use of procedures and equipment approved by the Executive Secretary. Under no circumstance shall fluid head in the leak detection system (LDS) sump exceed a 1-foot level above the lowest point in the lower flexible membrane liner on the cell floor. Any occurrence of leak detection system fluids above this 1-foot limit shall constitute failure of BAT, and a violation of this Permit.
 - 3) Maximum Allowable Daily LDS Flow Rates - the Permittee shall measure the volume of all fluids pumped from the LDS. Under no circumstances shall the average daily LDS flow volume exceed 26,145 gallons/day.
 - 4) 3-foot Minimum Vertical Freeboard Criteria - the Permittee shall operate and maintain wastewater levels to provide a 3-foot Minimum of vertical freeboard in Tailings Cell 4B. Said measurements shall be made to the nearest 0.1 foot.
- b) Quarterly Slimes Drain Recovery Head Monitoring - immediately after the Permittee initiates pumping conditions in the Tailings Cell 4B slimes drain system, ~~monthly~~ quarterly recovery head tests and fluid level measurements will be made in accordance with the requirements of Parts I.D.3 and I.E.7(b) of this Permit and the currently approved Cell 4B BAT, Monitoring, Operations and Maintenance Plan.
 - c) Liner Maintenance and Repairs - all repairs to the liner shall be completed in accordance with Section 10.4 of the approved August 2009 Geosyntec Consultants Cell 4B Construction Quality Assurance Plan (CQA/QC Plan) as found in Table 6 of this Permit. Repairs shall be performed by qualified liner repair personnel and shall be reported in a Liner Repair Report, certified by a Utah licensed Professional Engineer. The Liner Repair Report shall be submitted for Executive Secretary approval in accordance with Part I.F.3 of the Permit. Any leak, hole, or other damage to the liner will be reported pursuant to the requirements found in Part I.G.3.

F. REPORTING REQUIREMENTS - The following reporting procedures for routine and compliance reports must be met.

1. Routine Groundwater Monitoring Reports - the Permittee shall submit quarterly monitoring reports of field and laboratory analyses of all well monitoring and samples described in Parts I.E.1, I.E.2, I.E.3, and I.E.5 of this Permit for Executive Secretary review and approval. Reports shall be submitted according to the following schedule:

Table 7. Groundwater Monitoring Reporting Schedule

Quarter	Period	Due Date
First	January - March	June 1
Second	April - June	September 1
Third	July - September	December 1
Fourth	October - December	March 1

Failure to submit the reports by the due date shall be deemed as noncompliance with this Permit. Said monitoring reports shall include, but are not limited to, the following minimum information:

- a) Field Data Sheets - or copies thereof that provide the following: well name, date and time of well purging, date and time of well sampling, type and condition of well pump, depth to groundwater before purging and sampling, calculated well casing volume, volume of water purged before sampling, volume of water collected for analysis, types of sample containers and preservatives.
 - b) Laboratory Results - or copies thereof that provide the following: date and time sampled, date received by laboratory, and for each parameter analyzed, the following information: laboratory result or concentration, units of measurement, minimum detection limit or reporting limit, analytical method, date of analysis, counting error for radiological analyses, total cations and anions for inorganic analysis.
 - c) Water Table Contour Map - which provides the location and identity of all wells sampled that quarter, the measured groundwater elevation at each well measured in feet above mean sea level, and isocontour lines to delineate groundwater flow directions observed during the quarterly sampling event.
 - d) Quality Assurance Evaluation and Data Validation - including a written description and findings of all quality assurance and data validation efforts conducted by the Permittee in compliance with the currently approved Groundwater Monitoring Quality Assurance Plan. Said report shall verify the accuracy and reliability of the groundwater quality compliance data, after evaluation of sample collection techniques and equipment, sample handling and preservation, analytical methods used, etc
 - e) Non-conformance disclosure - with each quarterly groundwater monitoring report the Permittee shall fully and completely disclose all non-conformance with requirements of the currently approved QAP, mandated by Part I.E.1(a).
 - f) Electronic Data Files and Format - in addition to written results required for every sampling report, the Permittee shall provide an electronic copy of all laboratory results for groundwater quality monitoring conducted. Said electronic files shall consist of Comma Separated Values (CSV) format, or as otherwise approved by the Executive Secretary.
 - g) Time Concentration Plots - with each quarterly groundwater monitoring report the Permittee shall submit time concentration plots for each monitoring well for the following constituents: chloride, fluoride, sulfate, and uranium.
2. Routine DMT Performance Standards Monitoring Report - the Permittee shall provide quarterly monitoring reports of all DMT performance standards monitoring required by Parts

I.D.3 and I.E.7 of this Permit. DMT monitoring shall be conducted in compliance with this Permit and the currently approved DMT Monitoring Plan. When a liner repair is performed at the Roberts Pond or any DMT impoundment, a Repair Report is required by the Liner Maintenance Provisions. This Repair Report shall be included with the next quarterly DMT Report. Said monitoring reports and results shall be submitted for Executive Secretary approval on the schedule provided in Table 7, above.

3. Routine Cell 4A and 4B BAT Performance Standards Monitoring Reports - the Permittee shall provide quarterly monitoring reports of all BAT performance standards monitoring required by Parts I.E.8 and I.E.12 of this Permit. BAT Monitoring at Cells 4A and 4B shall be conducted in compliance with the currently approved BAT Monitoring, Operations and Maintenance Plan. When a liner repair is performed at Tailings Cell 4A or 4B, a Repair Report is required by Parts I.E.8(c) and I.E.12(c) of the Permit. This Repair Report shall be included with the next quarterly BAT Report. Said monitoring report and results shall be submitted for Executive Secretary approval on the schedule provided in Table 7 above. At a minimum, reporting of BAT monitoring for Cells 4A and 4B will include:
 - a) LDS Monitoring - including:
 - 1) Report on the operational status of the LDS pumping and monitoring equipment during the quarter, including identification of any intervals of non-operational status and repairs.
 - 2) Measurement of the weekly fluid head at the lowest point of the secondary membrane.
 - 3) Measurement of the volume of all fluids pumped from the LDS.
 - b) Measurement of the weekly wastewater fluids elevation in the Cells 4A and 4B to determine freeboard.
 - c) Slimes Drain Recovery Head Monitoring as per the requirements of Parts I.D.6 and I.E.8(b).
4. DMT and BAT Performance Upset Reports - the Permittee shall report any non-compliance with the DMT or BAT performance criteria of Part I.D in accordance with the requirements of Part I.G.3 of this Permit.
5. Other Information - when the Permittee becomes aware of a failure to submit any relevant facts in the permit application or submittal of incorrect information in a permit application or in any report to the Executive Secretary, the Permittee shall submit such facts or information within 10 calendar days of discovery.
6. Groundwater Monitoring Well As-Built Reports - as-built reports for new groundwater monitoring wells shall be submitted for Executive Secretary approval within 60 calendar days of well completion, and at a minimum will include the following information:
 - a) Geologic Logs - that detail all soil and rock lithologies and physical properties of all subsurface materials encountered during drilling. Said logs shall be prepared by a

Professional Geologist licensed by the State of Utah, or otherwise approved beforehand by the Executive Secretary.

- b) Well Completion Diagram - that detail all physical attributes of the well construction, including:
 - 1) Total depth and diameters of boring,
 - 2) Depth, type, diameter, and physical properties of well casing and screen, including well screen slot size,
 - 3) Depth intervals, type and physical properties of annular filterpack and seal materials used,
 - 4) Design, type, diameter, and construction of protective surface casing, and
 - 5) Survey coordinates prepared by a State of Utah licensed engineer or land surveyor, including horizontal coordinates and elevation of water level measuring point, as measured to the nearest 0.01 foot.
 - c) Aquifer Permeability Data - including field data, data analysis, and interpretation of slug test, aquifer pump test or other hydraulic analysis to determine local aquifer hydraulic conductivity in each well.
7. White Mesa Seeps and Springs Monitoring Reports - a seeps and springs monitoring report shall be submitted for Executive Secretary review and approval with the 3rd Quarter Routine Groundwater Monitoring Report due on December 1, of each calendar year. Said report shall include, but is not limited to:
- a) Field Measurement Results and Worksheets - for each sample collected that comply with the requirements of Part I.F.1(a) of this Permit,
 - b) Laboratory Results - for each sample collected that comply with the requirements of Part I.F.1(b) of this Permit,
 - c) Water Table Contour Map - that includes groundwater elevations for each well at the facility and the elevations of the phreatic surfaces observed at each of the seeps and springs sampled. The contour map will include all water level data measurements from seeps, springs, and monitoring wells at the site from the 3rd Quarter Routine Groundwater Monitoring event of each year. The contour map shall be at a map scale, such that, all seeps and springs listed in the approved Sampling Plan for Seeps and Springs in the Vicinity of the White Mesa Uranium Mill and the monitoring wells on site may be seen on one map,
 - d) Data Evaluation - and interpretation of all groundwater quality data collected,
 - e) Quality Assurance Evaluation and Data Validation - for the seeps and springs water quality data that meets the requirements of Part I.F.1(d),
 - f) Electronic Data Files and Format - that meet the requirements of Part I.F.1(e) of this Permit, and
 - g) Survey data for the seeps and springs shall be based on an elevation survey, conducted under the direction of and certified by a Utah licensed professional engineer or land surveyor. The survey will include State Plan Coordinates (northings and eastings) and

vertical elevations. The surveyed coordinates and elevations of the seeps and springs shall be within 1 foot of the highest point of the saturated seepage face on the day of the survey. This survey data must be obtained before any samples are collected.

8. Chemicals Inventory Report - at the time of Permit renewal the Permittee shall submit a report to update the facilities chemical inventory report required by Part I.H.1. Said report shall provide all inventory information gathered pursuant to Part I.E.9.
9. Tailings Cell Wastewater Quality Reports - all annual wastewater quality sampling and analysis required by Part I.E.10 shall be reported to the Executive Secretary with the 3rd Quarter groundwater quality report due on December 1, of each calendar year. Said report shall include:
 - a) Data evaluation and interpretation of all wastewater quality samples collected,
 - b) All information required by Part I.F.1(a), (b), (d), and (e) of this Permit, and
 - c) For slimes drain samples, the Permittee shall report depth to wastewater measurements from the water level measurement point. Said wastewater level shall be measured immediately before sample collection.
10. Revised Hydrogeologic Report - pursuant to Part IV.D of this Permit, and at least 180 calendar days prior to Permit expiration, the Permittee shall submit for Executive Secretary approval a revised hydrogeologic report for the facility and surrounding area. Said report shall provide a comprehensive update and evaluation of:
 - a) Local hydrogeologic conditions in the shallow aquifer, including, but not limited to: local geologic conditions; time relationships and distribution of shallow aquifer head measurements from facility wells and piezometers; local groundwater flow directions; and distribution of aquifer permeability and average linear groundwater velocity across the site, and
 - b) Well specific groundwater quality conditions measured at facility monitoring wells for all groundwater monitoring parameters required by this Permit, including, but not limited to: temporal contaminant concentrations and trends from each monitoring well; statistical tests for normality of each contaminant and well, including univariate or equivalent tests; calculation of the mean concentration and standard deviation for each well and contaminant.
11. Annual Slimes Drain Recovery Head Report - on or before March 1 of each year the Permittee shall submit for Executive Secretary approval an annual slimes drain recovery head report for Tailings Cells 2 and 3. Said report shall conform to the requirements of Part I.D.3(b), I.E.7(b), and II.G of this Permit, and:
 - a) Provide the individual ~~monthly~~ slimes drain recovery head monitoring data for the previous calendar year, including, but not limited to: date and time for the start and end of recovery test, initial water level, final depth to stable water level and equivalent recovery water level elevation.
 - b) Calculate the average slimes drain recovery head for the previous calendar year.

- c) Include a time series chart to show trends of the monthly recovery water level elevations at each slimes drain.
 - d) Include the results of a quality assurance evaluation and data validation. Said examination shall provide written descriptions and findings that:
 - 1) Evaluate all data collected, data collection methods, and all related calculations required by this Permit, and
 - 2) Verify the accuracy and reliability of both the data and calculations reported.
 - e) Demonstrate compliance status with the requirements of Part I.D.3(b) and I.E.7(b) of this Permit.
12. Decontamination Pads Annual Inspection Report - the New Decontamination Pad and Existing Decontamination Pad will be taken out of service and inspected annually during the second quarter of each year, to ensure integrity of the concrete wash pad surfaces. If physical defects in the wash pad as defined by Part I.D.14 of the Permit are identified during the inspection, repairs shall be made prior to resuming the use of the facility. Said defects include, but are not limited to concrete deterioration, cracking, subsidence, etc. The results of the annual inspection and all repairs will be documented on inspection forms in accordance with the currently approved DMT Monitoring Plan. The inspection forms and documentation of all repairs completed shall be included in the 2nd Quarter DMT Monitoring Report due September 1, of each calendar year.

G. OUT OF COMPLIANCE STATUS

1. Accelerated Monitoring Status - is required if the concentration of a pollutant in any compliance monitoring sample exceeds a GWCL in Table 2 of the Permit; the facility shall then:
 - a) Notify the Executive Secretary in writing within 30 calendar days of receipt of data, and
 - b) Immediately initiate accelerated sampling of the pollutant as follows:
 - 1) Quarterly Baseline Monitoring Wells - for wells defined by Part I.E.1(b) the Permittee shall initiate monthly monitoring.
 - 2) Semi-annual Baseline Monitoring Wells - for wells defined by Part I.E.1(c) the Permittee shall initiate quarterly monitoring.

Said accelerated monitoring shall continue at the frequencies defined above until the compliance status of the facility can be determined by the Executive Secretary.
2. Violation of Permit Limits - out-of-compliance status exists when the concentration of a pollutant in two consecutive samples from a compliance monitoring point exceeds a GWCL in Table 2 of this Permit.
3. Failure to Maintain DMT or BAT Required by Permit
 - a) Permittee to Provide Information - in the event that the Permittee fails to maintain DMT or BAT or otherwise fails to meet DMT or BAT standards as required by the Permit, the Permittee shall submit to the Executive Secretary a notification and description of the failure according to R317-6-6.16(C)(1). Notification shall be given orally within 24-

hours of the Permittee's discovery of the failure of DMT or BAT, and shall be followed up by written notification, including the information necessary to make a determination under R317-6-6.16(C)(2), within five calendar days of the Permittee's discovery of the failure of best available technology.

- b) The Executive Secretary shall use the information provided under R317-6-6.16.C(1) and any additional information provided by the Permittee to determine whether to initiate a compliance action against the Permittee for violation of Permit conditions. A compliance action shall not be initiated, if the Executive Secretary determines that the Permittee has met the standards for an affirmative defense, as specified in R317-6-6.16(C)(3)(c).
 - c) Affirmative Defense - in the event a compliance action is initiated against the Permittee for violation of Permit conditions relating to best available technology or DMT, the Permittee may affirmatively defend against that action by demonstrating the following:
 - 1) The Permittee submitted notification according to R317-6-6.13,
 - 2) The failure was not intentional or caused by the Permittee's negligence, either in action or in failure to act,
 - 3) The Permittee has taken adequate measures to meet Permit conditions in a timely manner or has submitted to the Executive Secretary, for the Executive Secretary's approval, an adequate plan and schedule for meeting Permit conditions, and
 - 4) The provisions of UCA 19-5-107 have not been violated.
4. Facility Out of Compliance Status - if the facility is out of compliance, the following is required:
- a) The Permittee shall notify the Executive Secretary of the out of compliance status within 24-hours after detection of that status, followed by a written notice within 5 calendar days of the detection.
 - b) The Permittee shall continue accelerated sampling pursuant to Part I.G.1, unless the Executive Secretary determines that other periodic sampling is appropriate, until the facility is brought into compliance.
 - c) The Permittee shall prepare and submit within 30 calendar days to the Executive Secretary a plan and a time schedule for assessment of the sources, extent and potential dispersion of the contamination, and an evaluation of potential remedial action to restore and maintain groundwater quality to insure that Permit limits will not be exceeded at the compliance monitoring point and that DMT or BAT will be reestablished.
 - d) The Executive Secretary may require immediate implementation of the currently approved contingency plan in order to regain and maintain compliance with the Permit limit standards at the compliance monitoring point or to reestablish DMT or BAT as defined in the Permit.
 - e) Where it is infeasible to reestablish DMT or BAT as defined in the Permit, the Permittee may propose an alternative DMT or BAT for approval by the Executive Secretary.

H. COMPLIANCE SCHEDULE REQUIREMENTS. The Permittee will comply with the schedules as described and summarized below:

1. On-site Chemicals Inventory Report - the Permittee shall complete a historical review, and conduct an inventory of all chemical compounds or reagents stored, used, or currently in use at the facility. Said report shall include:
 - a) Identification of all chemicals used in the milling and milling related processes at White Mesa, and
 - b) Determination of the total volumes currently in use and historically used, as data is available. At the time of Permit renewal, the Permittee shall submit an updated inventory report pursuant to Part I.F.8.

2. Infiltration and Contaminant Transport Modeling Work Plan and Report - the Permittee shall submit for Executive Secretary approval an infiltration and contaminant transport modeling report that demonstrates the long-term ability of the tailings cells cover system to adequately contain and control tailings contaminants and protect nearby groundwater quality of the uppermost aquifer. Said report shall demonstrate how the tailings cell engineering design and specifications will comply with the minimum performance requirements of Part I.D.8 of this Permit. The Permittee shall submit an infiltration and contaminant modeling for Executive Secretary approval, that:
 - a) Identifies all applicable and pertinent historic studies and modeling reports relevant to tailings cell cover design and tailings cell system performance.
 - b) Determines and justifies all information necessary for infiltration and contaminant transport modeling, including but not limited to representative input values for vadose zone and aquifer soil-water partitioning (K_d) coefficients, tailings source term concentrations, tailings waste leach rates, vadose zone and aquifer groundwater velocities, vadose zone and aquifer dispersivity, contaminant half-life or other rates of decay, etc. In the event that any required information is not currently available, the Permittee may select conservative assumptions for use in the required infiltration and contaminant transport models.
 - c) Identifies and adequately describes all computer models used to simulate long-term performance of the tailings cells cover system. All predictive models used shall be publicly available computer codes that adequately represent field characteristics and physical processes at the tailings disposal site. Said description will also include specific information on model design, including, but not limited to: governing equations and their applicability to site conditions, grid design, duration of simulation, and selection of time steps.
 - d) Determines the conceptual model used and justifies why it is representative or conservative of actual field conditions at the site. Said conceptual model will identify the physical domain(s) and geometries simulated including the tailings cell design and construction, all boundary and initial conditions assigned in the model(s), and the shallow aquifer locations where future potential contaminant concentrations have been predicted.

- e) Justifies how the infiltration and contaminant transport problem has been adequately conceptualized, planned, and executed to demonstrate compliance with the requirements of Part I.D.8 of this Permit.
- f) Provides, describes and justifies the following:
 - 1) Model Results - including electronic input and output files from all infiltration, groundwater flow and contaminant transport models used the report.
 - 2) Model Calibration - including description of results and efforts used to demonstrate how the model adequately reproduced field measured heads, flows, and contaminant concentrations.
 - 3) Steady State Conditions - including a demonstration that the models achieved a steady state condition during the simulation. This includes, but is not limited to disclosure, evaluation and justification of water and mass balance error values reported by the models.
 - 4) Sensitivity Analyses - including description of various model simulations run and evaluated to define the range of model uncertainty. Such uncertainty includes, but is not limited to: boundary and initial conditions, model input values, and spatial and temporal distribution of model parameters used in the problem domain.
 - 5) Post-model Audit Plan - including plans to revisit the modeling effort at some future time to re-assess its ability to represent site characteristics and predict long-term performance of tailings cell design and construction, and groundwater protection.

The Permittee shall complete all modeling in accordance with the requirements of Part I.H.2 and submit a final report for Executive Secretary approval. In the final report, the Permittee may include supplemental information to justify modification of certain Permit requirements, including, but not limited to: the number and types of groundwater compliance monitoring parameters, tailings cell cover system engineering design and construction specifications, tailings cell operational requirements, etc. In the event the Executive Secretary requires additional information, the Permittee will provide all requested information within a time frame approved by the Executive Secretary. Upon Executive Secretary approval of the final infiltration and contaminant transport report, the Reclamation Plan may be modified to accommodate necessary changes to protect public health and the environment.

- 3. Plan for Evaluation of Deep Supply Well WW-2 - the purpose of this plan is to evaluate the annular casing seal in water supply well WW-2, and to ensure adequate well casing and annular seals, in compliance with the regulations of the Utah State Engineer (UAC R655-4-9), with special emphasis on creating both a physical barrier and hydraulic isolation between the shallow unconfined and the deep confined aquifers.

On or before January 31, 2012, the Permittee shall:

- a) Conduct an investigation of water supply well WW-2 to verify that the casing and annular seal is intact and creates both a physical barrier and hydraulic isolation between the shallow unconfined and the deep confined aquifers, said investigation shall include one or more of the following investigation techniques performed in accordance with applicable guidance from the U.S. Environmental Protection Agency: well casing video logs, cement bond logs, and/or temperature logs,

- b) Show that the well casing and annular seal have physical and hydraulic integrity to isolate the two aquifers mentioned above. In the event that hydraulic isolation of the two aquifers is uncertain or unsubstantiated for any reason, the Permittee shall repair the well casing and annular seal(s) to provide well construction that complies with the regulations of the Utah State Engineer (UAC R655-4-9). After such repairs are completed, the Permittee will conduct repeat testing using the investigation techniques required under Part I.H.3(a) to demonstrate existence of the required hydraulic isolation, and
 - c) Submit a written report for Executive Secretary approval to document the investigation and its findings, and any well repair activities. Said report shall be certified by a Utah-licensed Professional Engineer or Geologist.
4. Installation of New Groundwater Monitoring Wells - the Permittee shall install at least two additional hydraulically downgradient wells adjacent to Tailings Cell 4B, to replace existing wells MW-33 and MW-34. These replacement wells shall be installed, in accordance with the following requirements:
- a) New Compliance Monitoring Wells MW-36 and MW-37 - install at least two new compliance monitoring wells (MW-36 and MW-37), that will be located and completed as follows:
 - 1) At least one well placed on the south side of Cell 4B between existing wells MW-15 and MW-34.
 - 2) At least one well located on the west side of Cell 4B, between MW-33 and MW-35.
 - 3) All new wells must be properly designed, installed, screened / completed, and developed in accordance with Part I.E.4 of the Permit.
 - 4) All new wells will demonstrate a saturated thickness of at least 5-feet, inside the well screen, as measured from the upper geologic contact of the Brushy Basin Member of the Morrison Formation, or as approved by the Executive Secretary.
 - 5) All new wells shall provide early detection of tailings cell contamination of shallow groundwater from Tailings Cell 4B.
 - 6) All new wells shall provide discrete groundwater monitoring for tailings Cell 4B.
 - b) On or before June 30, 2011 or as otherwise approved by the Executive Secretary, the Permittee shall submit a monitoring well As-Built report for all new wells installed to document said well construction for Executive Secretary approval. Said report shall comply with the requirements of Part I.F.6. In the event the Executive Secretary requires additional information, the Permittee will provide all requested information within a time frame approved by the Executive Secretary.
 - c) The Permittee shall provide at least a 14 calendar day written notice to allow the Executive Secretary to observe all drilling and well installation activities. In the event the Executive Secretary determines that additional monitoring wells are required, these new wells will be installed and related As-Built Report(s) submitted (for approval) within a time frame approved by the Executive Secretary.
5. Background Groundwater Quality Report for Well MW-35 and New Monitoring Wells - within 30 calendar days of Executive Secretary approval of the new monitoring well As-

built Report, required by Part I.H.4, above, the Permittee shall commence a quarterly groundwater sampling program that will comply with the following Permit requirements:

- a) Routine groundwater compliance monitoring requirements of Part I.E.1.
 - b) Well monitoring procedure requirements of Part I.E.5.
 - c) After completion of eight consecutive quarters of groundwater sampling and analysis of well MW-35 and the new wells required by Part I.H.4, the Permittee shall submit a Background Report for Executive Secretary approval, that will include:
 - 1) Data preparation and statistical analysis of groundwater quality data, including, but not limited to, evaluation of data characteristics and internal data consistency, treatment of non-detectable values, and statistical methods used. These statistics shall be calculated using the Decision Tree/Flowchart used for the previous Background Reports that was conditionally approved by the DRC on August 24, 2007.
 - 2) Shallow aquifer average linear groundwater velocity calculated for the new wells, based on well specific hydraulic conductivity, hydraulic gradient, and effective aquifer porosity.
 - d) If after review of the report, and the Executive Secretary determines that additional information is required, the Permittee shall provide all requested information, resolve all issues identified, and re-submit the report for Executive Secretary review and approval within a timeframe approved by the Executive Secretary. After approval of this report, the Executive Secretary will re-open this Permit and establish an appropriate monitoring frequency in accordance with the criteria found in Part I.E.1(b) or (c), and establish Groundwater Compliance Limits in Table 2 for well MW-35 and the each of the new wells.
6. Detailed Southwest Hydrogeologic Investigation and Report - the purpose of this investigation is to define, demonstrate, and characterize: 1) hydraulic connection and local groundwater flow directions between the area near Tailings Cell 4B, and the western margin of White Mesa, including Westwater and Cottonwood Seeps, and Ruin Spring, and 2) the full physical extent of unsaturated area between former well MW-16, MW-33 and the western margin of White Mesa, as defined above. In preparation of this report, the Permittee shall:
- a) Install multiple borings and / or monitoring wells to completely enclose and define both: 1) the subsurface structural high area of the upper Brushy Basin Shale Member geologic contact and 2) the horizontal limits of saturation in the Burro Canyon Formation. Said study shall include, but is not limited to a subsurface area between Tailings Cell 4B, and the Westwater and Cottonwood Seeps, and Ruin Spring. At a minimum the characterization / definition of said subsurface area shall be based on:
 - 1) Dry wells or piezometers, completed down to a depth equal to or below the upper geologic contact of the Brushy Basin Shale Member,
 - 2) Piezometers or wells that intercept the shallow aquifer and encounter a saturation thickness of 5-feet or more. Said wells and piezometers shall have a minimum inside diameter of 3 inches. The Permittee shall complete hydraulic testing of all such wells and piezometers in accordance with Part I.F.6(c) of this Permit.

- b) Demonstrate the full geologic and physical extent of the apparent unsaturated structural high between Tailings Cell 4B and the western margin of White Mesa, including Westwater and Cottonwood Seeps and Ruin Spring.
 - c) Demonstrate the location and direction of all groundwater flow paths between Tailings Cell 4B and nearby Westwater and Cottonwood Seeps and Ruin Spring. Determine average linear groundwater velocity to said groundwater discharge locations.
 - d) Perform geologic logging of all borings / wells, and submit geologic logs performed and certified by a Utah licensed Professional Geologist.
 - e) Submit the investigation report for Executive Secretary review and approval on or before January 13, 2012. This report shall be certified by a Utah Licensed Professional Engineer or Geologist and will include but is not limited to:
 - 1) Geologic logs and well As-built diagrams that comply with the requirements of Part I.F.6.
 - 2) A revised equipotential map to describe both the physical extent of the dry zone and all groundwater flow directions near Tailings Cell 4B and Westwater and Cottonwood Seeps, and Ruin Spring. Said map shall demonstrate flowpaths (steamtubes) to all respective groundwater discharge locations at the western margin of White Mesa.
 - 3) A revised structural contour map for the upper Brushy Basin Shale for the facility and physical extent of White Mesa.
 - 4) A revised saturation thickness map based on contemporaneous groundwater head data for the Burro Canyon aquifer for the facility and physical extent of White Mesa.
 - 5) Appropriate geologic and hydrogeologic maps and cross-sections (to scale).
 - 6) Results and interpretation of aquifer permeability testing as per Part I.F.6(c) of this Permit.
 - g) The Permittee shall provide at least a 14 calendar day written notice to allow the Executive Secretary to observe all drilling and well installation activities.
 - h) In the event the Executive Secretary determines that additional information is required, this information will be submitted within a time frame approved by the Executive Secretary.
7. Modification to the DMT Monitoring and Cell 4A and Cell 4B BAT O&M Plans – on or before August 1, 2011, the Permittee shall submit proposed modifications, as needed, to the currently approved DMT Monitoring and Cell 4A and Cell 4B BAT O&M Plans for Executive Secretary approval. Said changes shall conform to the quarterly monitoring requirements of Parts I.D.3(b), I.D.6(c), I.D.13(c), I.E.7(b), I.E.8(b), I.E.12(b), and I.F.11 of this Permit Amendment, on or before 45 days after of the signed date of this Permit Amendment.

PART II. REPORTING REQUIREMENTS

- A. REPRESENTATIVE SAMPLING. Samples taken in compliance with the monitoring requirements established under Part I shall be representative of the monitored activity.
- B. ANALYTICAL PROCEDURES. Water sample analysis must be conducted according to test procedures specified under UAC R317-6-6.3.12 unless other test procedures have been specified in this Permit.
- C. PENALTIES FOR TAMPERING. The Act provides that any person who falsifies, tampers with, or knowingly renders inaccurate, any monitoring device or method required to be maintained under this Permit shall, upon conviction, be punished by a fine of not more than \$10,000 per violation, or by imprisonment for not more than six months per violation, or by both.
- D. REPORTING OF MONITORING RESULTS. Monitoring results obtained during reporting periods specified in the Permit, shall be submitted to the Executive Secretary, Utah Division of Water Quality at the following address no later than the date specified following the completed reporting period:

Attention: Compliance and Monitoring Program
State of Utah
Division of Water Quality
Department of Environmental Quality
Salt Lake City, Utah 84114-4870

The quarterly due dates for reporting are: June 1, September 1, December 1, and March 1.

- E. COMPLIANCE SCHEDULES. Reports of compliance or noncompliance with, or any progress reports on interim and final requirements contained in any Compliance Schedule of this Permit shall be submitted no later than 14 calendar days following each schedule date.
- F. ADDITIONAL MONITORING BY THE PERMITTEE. If the Permittee monitors any pollutant more frequently than required by this Permit, using approved test procedures as specified in this Permit, the results of this monitoring shall be included in the calculation and reporting of the data submitted. Such increased frequency shall also be indicated.
- G. RECORDS CONTENTS.
 - 1. Records of monitoring information shall include:
 - a) The date, exact place, and time of sampling, observations, or measurements;
 - b) The individual(s) who performed the sampling, observations, or measurements;
 - c) The date(s) and time(s) analyses were performed;
 - d) The name of the certified laboratory which performed the analyses;
 - e) The analytical techniques or methods used; and,
 - f) The results of such analyses.

- H. **RETENTION OF RECORDS.** The Permittee shall retain records of all monitoring information, including all calibration and maintenance records and copies of all reports required by this Permit, and records of all data used to complete the application for this Permit, for a period of at least five years from the date of the sample, measurement, report or application. This period may be extended by request of the Executive Secretary at any time.
- I. **NOTICE OF NONCOMPLIANCE REPORTING.**
1. The Permittee shall verbally report any noncompliance which may endanger public health or the environment as soon as possible, but no later than 24-hours from the time the Permittee first became aware of the circumstances. The report shall be made to the Utah Department of Environmental Quality 24-hour number, (801) 538-6333, or to the Division of Water Quality, Ground Water Protection Section at (801) 538-6146, during normal business hours (8:00 am - 5:00 pm Mountain Time).
 2. A written submission shall also be provided to the Executive Secretary within five calendar days of the time that the Permittee becomes aware of the circumstances. The written submission shall contain:
 - a) A description of the noncompliance and its cause;
 - b) The period of noncompliance, including exact dates and times;
 - c) The estimated time noncompliance is expected to continue if it has not been corrected; and,
 - d) Steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance.
 3. Reports shall be submitted to the addresses in Part II.D, Reporting of Monitoring Results.
- J. **OTHER NONCOMPLIANCE REPORTING.** Instances of noncompliance not required to be reported within 5 calendar days, shall be reported at the time that monitoring reports for Part II.D are submitted.
- K. **INSPECTION AND ENTRY.** The Permittee shall allow the Executive Secretary, or an authorized representative, upon the presentation of credentials and other documents as may be required by law, to:
1. Enter upon the Permittee's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of the Permit;
 2. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this Permit;
 3. Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this Permit; and,
 4. Sample or monitor at reasonable times, for the purpose of assuring Permit compliance or as otherwise authorized by the Act, any substances or parameters at any location.

PART III. COMPLIANCE RESPONSIBILITIES

- A. **DUTY TO COMPLY.** The Permittee must comply with all conditions of this Permit. Any Permit noncompliance constitutes a violation of the Act and is grounds for enforcement action; for permit termination, revocation and re-issuance, or modification; or for denial of a permit renewal application. The Permittee shall give advance notice to the Executive Secretary of the Division of Water Quality of any planned changes in the permitted facility or activity which may result in noncompliance with Permit requirements.
- B. **PENALTIES FOR VIOLATIONS OF PERMIT CONDITIONS.** The Act provides that any person who violates a Permit condition implementing provisions of the Act is subject to a civil penalty not to exceed \$10,000 per day of such violation. Any person who willfully or negligently violates Permit conditions is subject to a fine not exceeding \$25,000 per day of violation. Any person convicted under Section 19-5-115 of the Act a second time shall be punished by a fine not exceeding \$50,000 per day. Nothing in this Permit shall be construed to relieve the Permittee of the civil or criminal penalties for noncompliance.
- C. **NEED TO HALT OR REDUCE ACTIVITY NOT A DEFENSE.** It shall not be a defense for a Permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this Permit.
- D. **DUTY TO MITIGATE.** The Permittee shall take all reasonable steps to minimize or prevent any discharge in violation of this Permit which has a reasonable likelihood of adversely affecting human health or the environment.
- E. **PROPER OPERATION AND MAINTENANCE.** The Permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the Permittee to achieve compliance with the conditions of this Permit. Proper operation and maintenance also includes adequate laboratory controls and quality assurance procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems which are installed by a Permittee only when the operation is necessary to achieve compliance with the conditions of the Permit.

PART IV. GENERAL REQUIREMENTS

- A. **PLANNED CHANGES.** The Permittee shall give notice to the Executive Secretary as soon as possible of any planned physical alterations or additions to the permitted facility. Notice is required when the alteration or addition could significantly change the nature of the facility or increase the quantity of pollutants discharged.
- B. **ANTICIPATED NONCOMPLIANCE.** The Permittee shall give advance notice of any planned changes in the permitted facility or activity which may result in noncompliance with Permit requirements.
- C. **PERMIT ACTIONS.** This Permit may be modified, revoked and reissued, or terminated for cause. The filing of a request by the Permittee for a permit modification, revocation and re-issuance, or termination, or a notification of planned changes or anticipated noncompliance, does not stay any permit condition.
- D. **DUTY TO REAPPLY.** If the Permittee wishes to continue an activity regulated by this Permit after the expiration date of this Permit, the Permittee must apply for and obtain a new permit. The application should be submitted at least 180 calendar days before the expiration date of this Permit.
- E. **DUTY TO PROVIDE INFORMATION.** The Permittee shall furnish to the Executive Secretary, within a reasonable time, any information which the Executive Secretary may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this Permit, or to determine compliance with this Permit. The Permittee shall also furnish to the Executive Secretary, upon request, copies of records required to be kept by this Permit.
- F. **OTHER INFORMATION.** When the Permittee becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or any report to the Executive Secretary, it shall promptly submit such facts or information.
- G. **SIGNATORY REQUIREMENTS.** All applications, reports or information submitted to the Executive Secretary shall be signed and certified.
 1. All permit applications shall be signed as follows:
 - a) For a corporation: by a responsible corporate officer;
 - b) For a partnership or sole proprietorship: by a general partner or the proprietor, respectively.
 - c) For a municipality, State, Federal, or other public agency: by either a principal executive officer or ranking elected official.
 2. All reports required by the Permit and other information requested by the Executive Secretary shall be signed by a person described above or by a duly authorized representative of that person. A person is a duly authorized representative only if:
 - a) The authorization is made in writing by a person described above and submitted to the Executive Secretary, and,

- b) The authorization specified either an individual or a position having responsibility for the overall operation of the regulated facility or activity, such as the position of plant manager, operator of a well or a well field, superintendent, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters for the company. (A duly authorized representative may thus be either a named individual or any individual occupying a named position).
3. Changes to Authorization. If an authorization under Part IV.G.2. is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, a new authorization satisfying the requirements of Part IV.G.2 must be submitted to the Executive Secretary prior to or together with any reports, information, or applications to be signed by an authorized representative.
4. Certification. Any person signing a document under this section shall make the following certification:
- "I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."
- H. PENALTIES FOR FALSIFICATION OF REPORTS. The Act provides that any person who knowingly makes any false statement, representation, or certification in any record or other document submitted or required to be maintained under this Permit, including monitoring reports or reports of compliance or noncompliance shall, upon conviction be punished by a fine of not more than \$10,000 per violation, or by imprisonment for not more than six months per violation, or by both.
- I. AVAILABILITY OF REPORTS. Except for data determined to be confidential by the Permittee, all reports prepared in accordance with the terms of this Permit shall be available for public inspection at the offices of the Executive Secretary. As required by the Act, permit applications, permits, effluent data, and groundwater quality data shall not be considered confidential.
- J. PROPERTY RIGHTS. The issuance of this Permit does not convey any property rights of any sort, or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of federal, state or local laws or regulations.
- K. SEVERABILITY. The provisions of this Permit are severable, and if any provision of this Permit, or the application of any provision of this Permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this Permit, shall not be affected thereby.
- L. TRANSFERS. This Permit may be automatically transferred to a new Permittee if:
1. The current Permittee notifies the Executive Secretary at least 30 calendar days in advance of the proposed transfer date;

2. The notice includes a written agreement between the existing and new Permittee containing a specific date for transfer of permit responsibility, coverage, and liability between them; and,
 3. The Executive Secretary does not notify the existing Permittee and the proposed new Permittee of his or her intent to modify, or revoke and reissue the permit. If this notice is not received, the transfer is effective on the date specified in the agreement mentioned in paragraph 2 above.
- M. STATE LAWS. Nothing in this Permit shall be construed to preclude the institution of any legal action or relieve the Permittee from any responsibilities, liabilities, penalties established pursuant to any applicable state law or regulation under authority preserved by Section 19-5-115 of the Act.
- N. REOPENER PROVISIONS. This Permit may be reopened and modified (following proper administrative procedures) to include the appropriate limitations and compliance schedule, if necessary, if one or more of the following events occurs:
1. If new ground water standards are adopted by the Board, the Permit may be reopened and modified to extend the terms of the Permit or to include pollutants covered by new standards. The Permittee may apply for a variance under the conditions outlined in R317-6-6.4(D).
 2. Changes have been determined in background groundwater quality.
 3. The Executive Secretary determines permit modification is necessary to protect human health or the environment.