Prepared for:

TALEN MONTANA, LLC

303 N 28th St., Suite 400

Billings, Montana 59101

WRITTEN POST-CLOSURE PLAN

Per Requirements of 40 CFR §257.104

J Cell

Colstrip Steam Electric Station

Colstrip, Montana

Prepared by:

Geosyntec consultants

10211 Wincopin Circle, Fourth Floor
Columbia, Maryland 21044

Project Number ME1210

September 2016

CERTIFICATION STATEMENT

I, Carrie H. Pendleton, a registered Professional Engineer in the State of Montana (License No. 38837PE), certify that the *Written Post-Closure Plan* prepared for the ***Colstrip Steam Electric Station's J Cell*** fulfills the minimum requirements of ***40 CFR 257.102(d) Written Post-Closure Plan***.

This certification is made in compliance with the specific requirement of §257.104(d)(4) in compliance with the deadline specified in §257.104(d)(2)(i).

This certification is based in part on review of reference documentation and data provided to Geosyntec Consultants (Geosyntec) by Talen Montana, LLC (Talen). These references, which are listed below, contain information regarding existing site infrastructure and past operations, which Geosyntec has relied upon (without independent verification of accuracy) for preparation of this certification.

- Bechtel (1982). "Effluent Holding Pond Design Report." Bechtel Power Corporation. October 1982.
- Hydrometrics (2016). "DRAFT Coal Combustion Residual Hydrogeologic Monitoring Plan for the Colstrip Steam Electric Station." Hydrometrics. June 2016.
- SCG (2014). "J Cell Phase 1 Earthworks Project, PPL-Montana – Colstrip Power Plant, Units 3 & 4 EHP Construction Drawings." Summit Consulting Group, March 2014.
- United States Environmental Protection Agency (USEPA) (2015). "Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals from Electric Utilities; Final Rule." Title 40 Code of Federal Regulations, Parts 257 and 261.
- Womack (2009). "C Cell-Old Clearwell (C/CW) Piezometers and Slope Stability." Womack & Associates, Inc. May 2009.

Geosyntec Consultants

C.H. Pendleton

Carrie H. Pendleton, P.E.
Montana P.E. License No. 38837PE

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1. INTRODUCTION

1.1 Organization and Terms of Reference

On 17 April 2015, the United States Environmental Protection Agency (USEPA) published the final rule for disposal of coal combustion residuals (CCR) from electric power utilities under Subtitle D of the Resource Conservation and Recovery Act (RCRA), contained in Section 257 of Title 40 of the Code of Federal Regulations (40 CFR 257 Subpart D), referred to herein as the CCR Rule. Geosyntec Consultants (Geosyntec) has prepared this Written Post-Closure Plan (Plan) for Talen Montana, LLC (Talen) to describe the manner in which post-closure care (PCC) will be provided in compliance with the CCR Rule following closure of J Cell, an existing CCR impoundment at the Colstrip Steam Electric Station (CSES). PCC requirements for CCR units are specified under §257.104.

This Plan was prepared by Mr. Mike Nolden, E.I.T., and reviewed in accordance with Geosyntec's internal review policy by Mr. Jeremy Morris, Ph.D., P.E., Mr. David Espinoza, Ph.D., P.E., and Ms. Carrie Pendleton, P.E., all of Geosyntec. Ms. Pendleton is a registered Professional Engineer in the State of Montana.

1.2 Site Location

J Cell is part of the Units 3 and 4 Effluent Holding Pond (EHP) area at the CSES, which is located in Colstrip, Rosebud County, Montana. The location of J Cell is shown on a United States Geological Survey (USGS) 7.5-minute topographic map for the Colstrip Southeast Quadrangle (Figure 1). J Cell is located southeast of the CSES generating facilities.

1.3 Site Description

J Cell is an active unlined CCR surface impoundment within the CSES EHP, which was constructed between 1983 and 1984 to accept CCR such as scrubber effluent and bottom ash from the CSES (Bechtel 1982). The EHP was constructed in the basin between Cow Creek and South Fork Cow Creek, the uppermost rim of which consists of baked and semi-baked shale underlain by sedimentary rock and coal beds (Bechtel 1982). A thin deposit of alluvium and colluvium cover most of the basin floor.

J Cell is bounded by the EHP Main Dam to the north, the EHP Saddle Dam to the northeast and east, and divider dikes to the south and west. The Main and Saddle Dams are zoned earth-fill dams with vertical cores extending to bedrock and sand and gravel drainage zones (Bechtel 1982). The divider dikes are constructed variously of baked shale fill, fly ash, and bottom ash (Womack 2009, SCG 2014).

A description of the J Cell closure activities and final cover system is presented in the J Cell *Written Closure Plan* (Geosyntec 2016).

2. CCR RULE REQUIREMENTS FOR WRITTEN POST-CLOSURE PLAN

2.1 Written Post-Closure Plan Requirements per §257.104(d)

As specified in §257.104(d)(1), the Plan prepared for J Cell must describe the PCC activities to be performed following closure of the CCR unit. The Plan must include, at a minimum:

(i) A description of the monitoring and maintenance activities required in §257.104(b) for the CCR unit, and the frequency at which these activities will be performed;

(ii) The name, address, telephone number, and email address of the person or office to contact about the facility during the post-closure care period; and

(iii) A description of the planned uses of the property during the post-closure period. Post-closure uses of the property shall not disturb the integrity of the final cover, liner(s), or any other component of the containment system, or the function of the monitoring systems unless necessary to comply with the requirements in this subpart. Any other disturbance is allowed if the owner or operator of the CCR unit demonstrates that the disturbance of the final cover, liner, or other component of the containment system, including any removal of CCR, will not increase the potential threat to human health or the environment. The demonstration must be certified by a qualified professional engineer, and notification shall be provided to the State Director that the demonstration has bene placed in the operating record and on the owners or operator's publicly accessible Internet site.

The owner or operator of the CCR unit must comply with the additional requirements of §257.104(d)(2) through (4), which pertain to the deadline for Plan preparation/amendment and certification, as well as §257.104(e) and (f), which pertain to notification of the conclusion of the post-closure period and recordkeeping requirements, respectively.

2.2 Compliance with Post-Closure Care Requirements

The table below summarizes where the CCR Rule requirements are addressed in this document.

RULE SECTION	RULE REQUIREMENT	LOCATION WHERE ADDRESSED IN DOCUMENT
§257.104(d)(1)(i)	Description and frequency of monitoring and maintenance activities required by §257.104(b)	Section 3.1
§257.104(d)(1)(ii)	Post-closure period contact information	Section 3.2
§257.104(d)(1)(iii)	Property uses during post-closure period	Section 3.3
§257.104(d)(2)	Deadline to prepare the initial written post-closure plan	CERTIFICATION STATEMENT
§257.104(d)(3)	Amendment of a written post-closure plan	Not Applicable
§257.104(d)(4)	Written certification from a qualified professional engineer that the initial/amended written post-closure plan meets the requirements of §257.104(d)	CERTIFICATION STATEMENT
§257.104(e)	Notification of completion of post-closure care period	Section 3.4
§257.104(f)	Recordkeeping and notification requirements	Section 3.4

3. POST-CLOSURE PLAN

3.1 Description and Frequency of Monitoring and Maintenance Activities

Per §257.104(d)(1)(i), this section provides a description of the monitoring and maintenance activities required in §257.104(b) and the frequency at which these activities are performed. Details of the J Cell closure design are presented in Figure 2.

3.1.1 Final Cover System Maintenance

Section 257.104(b)(1) requires the owner or operator to maintain the integrity and effectiveness of the final cover system, including making repairs to the final cover as necessary to correct the effects of settlement, subsidence, erosion, or other events, and preventing run-on and run-off from eroding or otherwise damaging the final cover.

As described in Geosyntec (2016), the J Cell final cover will be an alternative cover system designed according to the requirements of §257.102(d)(3)(ii). The composite cover system design includes (from top to bottom):

- 18-inch bottom ash protective drainage layer;
- 8-oz non-woven geotextile cushion;
- 60-mil textured high density polyethylene (HDPE) geomembrane; and
- geosynthetic clay liner (GCL).

The GCL will be installed above a prepared subgrade of CCR paste and bottom ash. Following completion of J Cell closure, Talen proposes to construct a new CCR Rule-compliant surface impoundment, designated as J-1 Cell, as a surface impoundment overfill directly above J Cell. The proposed overfill design offers significant construction and operational efficiencies for Talen in that the cover system for J Cell will be protected from erosion damage by the placement of CCR in J-1 Cell, thus negating the need for installation of an erosion layer as part of the cover system and eliminating the need for future maintenance and repair of erosion layer soils and vegetation.

The protective drainage layer installed for the J Cell cover system will simultaneously serve to collect and remove leachate from the base of the J-1 Cell overfill. The protective drainage layer will be graded at a 2% slope to flow to a drainage system, which comprises perforated HDPE liquid collection pipes embedded in protective gravel mounds at 375 feet spacings on the final cover as well as in toe drains at the low-point boundary between the J Cell sideslopes and the final cover. Liquids collected in the pipes and toe drains will be conveyed to a sump fitted with riser pipes in which a pump will be operated to remove liquids.

The drainage system will be operated and monitored as needed to remove liquids from above the J Cell cover system, including by managing leachate produced by the waste placed in J-1 Cell. The operability of the drainage system will also be inspected as part of the weekly inspections performed in accordance with the requirements of the §257.83. If routine inspections and/or

monitoring or performance of the drainage system indicate that the drainage system is not operating as designed, maintenance will be performed to correct the deficiency.

3.1.2 Leachate Collection and Removal System Maintenance

Section 257.104(b)(2) requires the owner or operator to maintain the integrity and effectiveness of the leachate collection and removal system (LCRS) and operate the LCRS in accordance with the requirements of §257.70.

J Cell is an unlined surface impoundment and was not constructed with a LCRS. As such, the requirements of §257.104(b)(2) are not applicable.

3.1.3 Groundwater Monitoring System Maintenance and Groundwater Monitoring

Section 257.104(b)(3) requires the owner or operator to maintain the groundwater monitoring system and monitor the groundwater in accordance with the requirements of §§257.90 through 257.98.

Following J Cell closure, the groundwater will be monitored by a monitoring well network that was designed to meet the requirements of §§257.90 through 257.98. The groundwater monitoring system will be maintained as part of the continued operation of J-1 Cell and the EHP area, which are all monitored together as part of a multiunit groundwater monitoring system as described in §257.91(d). The locations, procedures, and frequency of groundwater monitoring for the 3&4 EHP multiunit groundwater monitoring system are described separately from this document in the DRAFT Coal Combustion Residual Hydrogeologic Monitoring Plan for the Colstrip Steam Electric Station (Hydrometrics 2016).

The groundwater monitoring system will be operated and maintained so that it performs to the design specifications throughout the life of the monitoring program. Routine inspections will be performed at least once per year to evaluate the integrity of each monitoring point such that it provides representative samples of groundwater from the upper aquifer. Inspection items include an overall visual examination of surface components to evaluating the integrity of the locking protective surface casing and surface seal for potential damage, periodically painting the surface casing and any associated traffic bollards with high-visibility paint, checking that grading promotes storm water runoff away from the surface seal, removal of vegetation and insect nests (if any), and checking the total depth to evaluate whether redevelopment to remove accumulated sediment is necessary. Periodic repair maintenance items are anticipated to include repainting of the surface casing and traffic bollards, redevelopment, and potentially replacement of sampling pump components and repairs to cracks in the surface seal.

3.2 Post-Closure Period Contact Information

Per §257.104(d)(1)(ii), this section provides the name, address, telephone number, and email address of the person or office to contact about the facility during the post-closure care period.

Day-to-day access to the EHP area and J Cell is controlled by Colstrip SES facility personnel. Facility personnel can be reached using the contact information below.

Gordon Criswell
Director, Environmental & Compliance
580 Willow Avenue
Colstrip, Montana 59323-0038
(406) 748-5002
Gordon.Criswell@TalenEnergy.com

3.3 Property Uses during Post-Closure Period

Per §257.104(d)(1)(iii), this section describes the planned uses of the property during the post-closure period.

Following completion of J Cell closure, Talen proposes to construct a new CCR Rule-compliant surface impoundment, designated as J-1 Cell, as a surface impoundment overfill directly above J Cell. The new CCR surface impoundment J-1 Cell and the other CCR units within the EHP area will continue to be operated for the dewatering and storage of CCR. J-1 Cell will be designed, constructed, operated, and maintained in accordance with the requirements of the CCR Rule.

Operation of J-1 Cell will include placement of additional CCR above the final cover system for J Cell. CCR placement will be performed so as to not disturb the integrity of the final cover or other portions of the containment system for J Cell, or the functionality of the monitoring system for J Cell.

3.4 Notifications and Recordkeeping

The owner or operator of a closed CCR surface impoundment must comply with the requirements of §257.104(e) and (f), which pertain to notification of completion of post-closure care period and recordkeeping requirements, respectively. Key dates and milestones that will be observed in order to comply with these requirements include the following

1. Notification of Completion of Post-Closure Care Period: This notification is required no later than 60 days following completion of the PCC period. The notification must include a certification by a qualified professional engineer verifying that PCC has been completed in accordance with the Written Closure Plan and Written Post-Closure Plan.

2. Recordkeeping Requirements: The owner or operator of the CCR unit must comply with the recordkeeping requirements specified in §257.105(i), the notification requirements specified in §257.106(i), and the Internet requirements specified in §257.107(i). The

timing for compliance with §257.105(i) is specified only in terms of placing required information in the facility's operating record as it becomes available. The timing for compliance with §257.106(i) and §257.107(i) is triggered by fulfilment of §257.105(i).

4. REFERENCES

Bechtel (1982). "Effluent Holding Pond Design Report." Bechtel Power Corporation. October 1982.

Geosyntec (2016). "Closure Plan per Requirements of 40 CFR §257.102; J Cell Colstrip Steam Electric Station." Geosyntec Consultants. May 2016.

Hydrometrics (2016). "DRAFT Coal Combustion Residual Hydrogeologic Monitoring Plan for the Colstrip Steam Electric Station." Hydrometrics. June 2016.

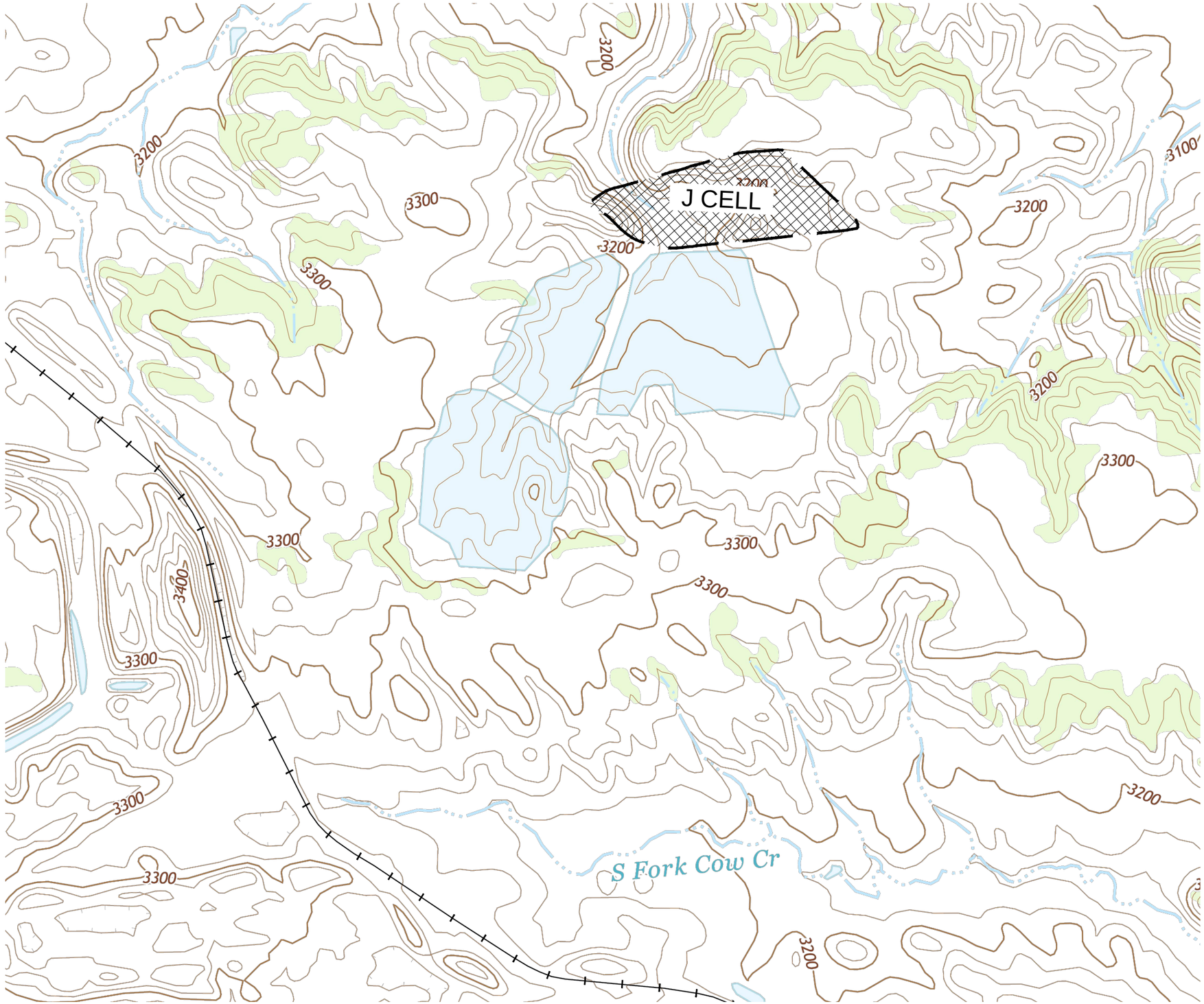
SCG (2014). "J Cell Phase 1 Earthworks Project, PPL-Montana – Colstrip Power Plant, Units 3 & 4 EHP Construction Drawings." Summit Consulting Group, March 2014.

United States Environmental Protection Agency (USEPA) (2015). "Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals from Electric Utilities; Final Rule." Title 40 Code of Federal Regulations, Parts 257 and 261.

United States Geological Survey (USGS) (2014). "Colstrip SE Quadrangle Montana-Rosebud Co. 7.5-Minute Series." Accessed 17 March 2016. http://store.usgs.gov/b2c_usgs/usgs/maplocator/(ctype=areadetails&xcm=r3standardpitrex_prd&carea=%24root&layout=6_1_61_48&uiarea=2)/.do

Womack (2009). "C Cell-Old Clearwell (C/CW) Piezometers and Slope Stability." Womack & Associates, Inc. May 2009.

FIGURES



N

LEGEND

- 3200 EXISTING GRADE CONTOUR (FEET-MSL)
- EXISTING RAILROAD TRACKS
- EXISTING WATERLINE
- SITE BOUNDARY

REFERENCE:
BACKGROUND IMAGE IS A USGS
7.5 MINUTE SERIES QUAD MAP FOR ROSEBUD, MONTANA

0 1,000'
SCALE IN FEET

J CELL LOCATION MAP

UNITS 3 & 4 EFFLUENT HOLDING POND AREA
COLSTRIP STEAM ELECTRIC STATION
COLSTRIP, MONTANA

Geosyntec consultants
COLUMBIA, MARYLAND

DATE:	JUNE 2016
PROJECT NO.	ME1210
DOCUMENT NO.	MD16039
FILE NO.	1199f054
FIGURE NO.	1

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LEGEND

- EXISTING GRADE CONTOUR (FEET-MSL)
- EXISTING ROAD / DRIVE
- EXISTING BURIED ELECTRIC LINE
- EXISTING OVERHEAD ELECTRIC LINE
- EXISTING STRUCTURE
- CAP DRAINAGE SYSTEM COLLECTION PIPE
- TOE DRAIN PIPE
- RISER CLEANOUT PIPE

N

ACCESS RAMP

CAP DRAINAGE SYSTEM COLLECTION PIPE (TYP)

ACCESS RAMP

TOE DRAIN (TYP)

CAP DRAINAGE SYSTEM CLEANOUT PIPE (TYP)

CAP DRAINAGE SYSTEM COLLECTION PIPE AND TOE DRAIN CONNECTION (TYP)

CAP DRAINAGE SYSTEM COLLECTION SUMP AND RISERS

CAP DRAINAGE SYSTEM RISER BUILDING

VALVE VAULT

EXISTING PASTE PLANT

A CELL

B CELL INLET

B CELL

C CELL

G CELL

OHE

GRADING KEY

250 125 0 250 250

SCALE IN FEET

CONCEPTUAL CLOSURE DESIGN

Geosyntec consultants

COLUMBIA, MARYLAND

DATE:	JUNE 2016
PROJECT NO.	ME1343
DOCUMENT NO.	MD16039
FILE NO.	1210f216
FIGURE NO.	2