COLSTRIP POWER PLANT

Prepared for

TALEN MONTANA, LLC
303 N 28th St., Suite 400
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LINER CONSTRUCTION DOCUMENTATION REPORT

Per Requirements of 40 CFR §257.71(a)(1)

COLSTRIP STEAM ELECTRIC STATION
COLSTRIP, MONTANA

Prepared by

Geosyntec consultants

10211 Wincopin Circle, 4th Floor
Columbia, Maryland 21044

Project Number ME1272

October 2016

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1. INTRODUCTION

1.1 Purpose

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 Part 257 of Title 40 of the Code of Federal Regulations (40 CFR 257 Subpart D), referred to herein as the CCR Rule. Section 257.71(a)(1) requires owners or operators to document if existing CCR surface impoundments were constructed with a liner that meets the requirements of Section §257.71(a)(1)(i), (ii), or (iii).

1.2 Site Description

Colstrip Steam Electric Station (CSES or the Site) is a coal-fired steam electric generating facility partially owned and operated by Talen Montana, LLC (Talen). The facility is located in Colstrip, Rosebud County, Montana, approximately 90 miles east of Billings, Montana. CSES is located at 580 Willow Avenue, Colstrip, Montana 59323. An aerial location map for CSES is shown in Figure 1.

CSES has four coal-fired generating units capable of producing up to 2,094 megawatts (MW) of electricity. Units 1 and 2 began commercial operation in 1975 and 1976, respectively, and Units 3 and 4 started in 1984 and 1986, respectively. Units 1 and 2 have about 307 MW of generating capacity each and Units 3 and 4 have about 740 MW of generating capacity each.

CCR generated at CSES are managed at the Site's three primary areas: the Plant area, the Units 1 & 2 Stage-Two Evaporation Pond (STEP) area, and the Units 3 & 4 Effluent Holding Pond (EHP) area. Figures 2, 3, and 4 present the locations of the Plant area, the Units 1 & 2 STEP area, and the Units 3 & 4 EHP area on United States Geologic Survey (USGS) 7 ½ minute topographic quadrangle maps. Individual cells within each of these areas are identified in their respective figure.

Two types of CCR waste are produced due to electricity generation at the Site: (i) *scrubber slurry*, which includes fly ash and flue gas desulfurization (FGD) solids from the air pollution control system; and (ii) *bottom ash*, which is collected at the bottom of the boilers. The scrubber slurry is transferred as a slurry through pipes to either the Units 1 & 2 STEP (for CCR generated at Units 1 & 2) or to the Units 3 & 4 EHP (for CCR generated at Units 3 & 4), where it is treated and dewatered and then disposed as paste. Bottom ash is dewatered in bottom ash ponds at the plant area, and then transported via truck to the Units 3 & 4 EHP.

Surface impoundments covered by the CCR Rule are shown below with their primary location area.

Plant Area – Figure 2
Units 1 & 2 B Pond
Units 1 & 2 Bottom Ash Pond with Clearwell
Units 3 & 4 Bottom Ash Pond
Units 1 & 2 Stage-Two Evaporation Pond (STEP) Area – Figure 3
Old Clearwell
D Cell
E Cell
Units 3 & 4 Effluent Holding Pond (EHP) Area – Figure 4
A Cell
B Cell (Clearwater Cell)
C Cell
D/E Cell
G Cell
J Cell

2. LINER CONSTRUCTION

2.1 Liner Design Criteria for Existing Surface Impoundments

Section 257.71(a)(1) of the CCR Rule states that a surface impoundment is considered lined if it was constructed with:

(i) a liner consisting of a minimum of two feet of compacted soil with a hydraulic conductivity of no more than 1 x 10^{-7} cm/sec;
(ii) a composite liner that meets the requirements of §257.70(b); or
(iii) an alternative composite liner that meets the requirements of §257.70(c).

2.2 Document Review

In order to evaluate the liner construction for existing CCR surface impoundments at CSES, Geosyntec reviewed the *History of Construction for Colstrip Steam Electric Station* (Geosyntec, 2016). This document contains information regarding original impoundment construction and existing Site infrastructure.

2.3 Summary of Liner Design

Based on the document review, the liner designs for CSES CCR units under the CCR Rule are listed in Table 1. Based on this information, Geosyntec has determined that none of the impoundments listed in the table was constructed with a liner that meets the requirements of §257.71(a)(1)(i), (ii), or (iii) and, therefore, these impoundments shall be considered existing unlined surface impoundments.

TABLE 1

SUMMARY OF CCR SURFACE IMPOUNDMENTS AND LINER SYSTEMS

CCR UNIT	LINER SYSTEM (TOP TO BOTTOM)
PLANT AREA UNITS	
Units 1&2 B Pond	GM (45-mil RPP)/GC/GM/GT/Compacted Bottom Ash on floor with underdrain system
Units 1 & 2 Bottom Ash Pond	3' compacted clay
Units 1 & 2 Bottom Ash Clearwell	GM (45-mil RPP)/GC/GM/GT or GC/Compacted Subgrade (bottom ash) with underdrain system;
Units 3 & 4 Bottom Ash Pond	3' compacted clay
UNITS 1 & 2 STAGE II EVAPORATION PONDS	
Old Clearwell	80-mil HDPE (Floor) & 100-mil HDPE (Slopes)
D Cell	GM (45-mil RPP)/GC/GM/GT/12" compacted subgrade with underdrain system
E Cell	80-mil HDPE (Floor) & 100-mil HDPE (Slopes)
UNITS 3 & 4 EFFLUENT HOLDING PONDS	
A Cell	Seepage control system - concrete cut-off wall around the perimeter of the pond down to bedrock with 3 feet of compacted clay on the exposed bedrock areas in the bottom of the pond; 2.5 ft thick with a hydraulic conductivity no greater than 1.0×10-6 cm/s or 2 ft thick with a hydraulic conductivity no greater than 1.0×10-7 cm/s
B Cell	Seepage control system and GM (45-mil RPP)/GT/Underdrain System
C Cell D/E Cell G Cell J Cell	Seepage control system - concrete cut-off wall around the perimeter of the pond down to bedrock with 3 feet of compacted clay on the exposed bedrock areas in the bottom of the pond; 2.5 ft thick with a hydraulic conductivity no greater than 1.0×10-6 cm/s or 2 ft thick with a hydraulic conductivity no greater than 1.0×10-7 cm/s

Note: GM = Geomembrane, GC = Geocomposite, GT = Geotextile, RPP = Reinforced Poly Propylene, HDPE = High Density Poly Ethylene geomembrane

3. CERTIFICATION

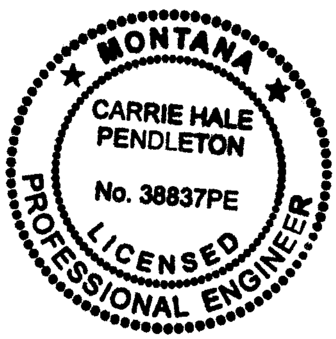
I, Carrie H. Pendleton, a registered Professional Engineer in the State of Montana (License No. 38837PE), certify that the ***Liner Construction Documentation Report*** for the Colstrip Steam Electric Station fulfills the minimum requirements of ***40 CFR 257.71(a)(1) Liner design criteria for existing CCR surface impoundments.***

This certification is made in compliance with the specific requirements of §257.71(b) in compliance with the deadline specified in §257.71(a)(1).

Geosyntec Consultants

C.H. Pendleton

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

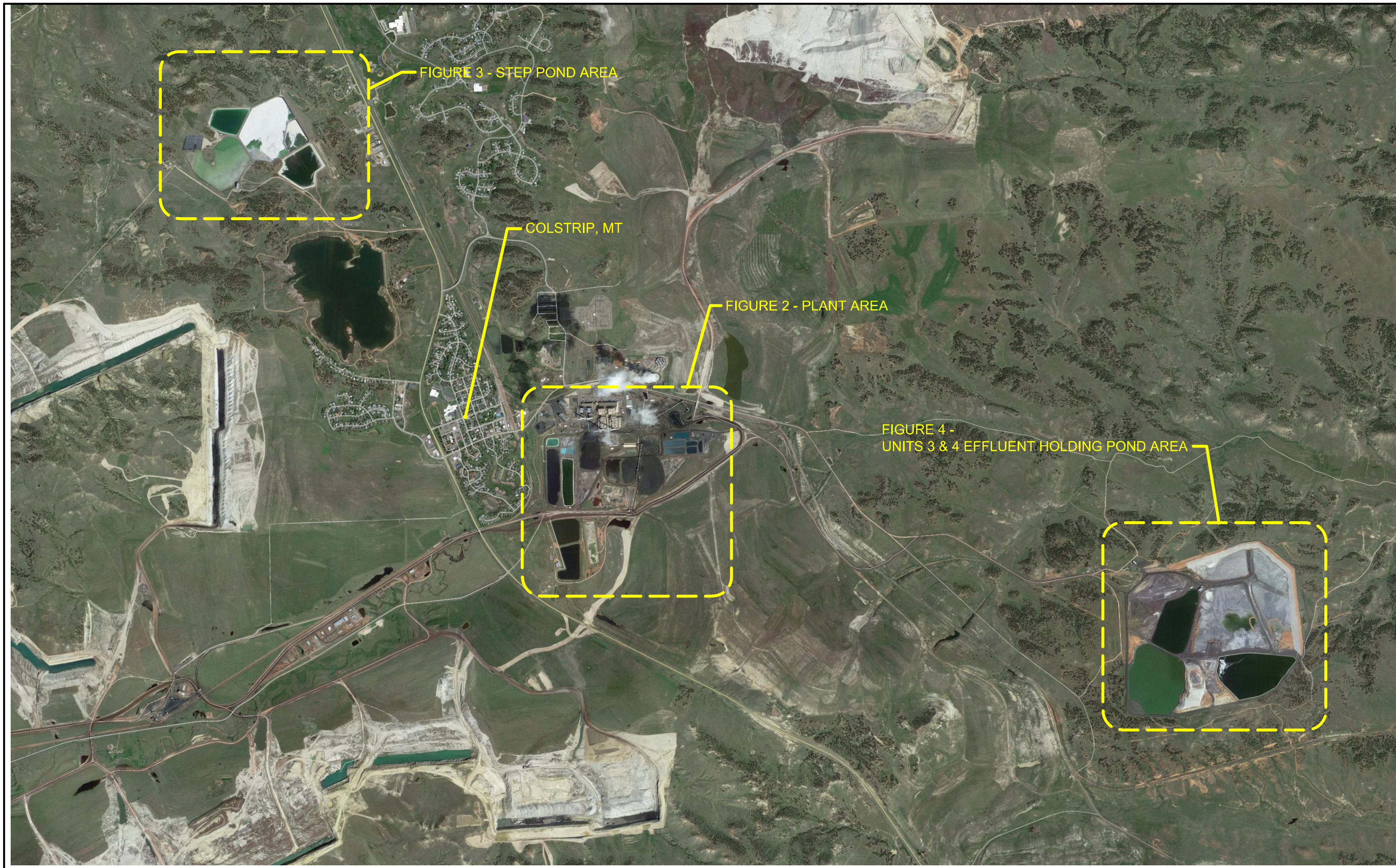


Geosyntec consultants

4. REFERENCES

Geosyntec (2016a). "History of Construction Per Requirements of 40 CFR §257.73 Colstrip Steam Electric Station Colstrip, Montana" Geosyntec Consultants. September 2016.

FIGURES



BACKGROUND © GOOGLEMAPS (2015)

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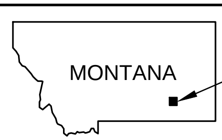

SITE LOCATION
NO SCALE

PROJECT LOCATION MAP

COLSTRIP STEAM ELECTRIC STATION
COLSTRIP, MONTANA

Geosyntec consultants

COLUMBIA, MARYLAND

DATE:	OCTOBER , 2016
PROJECT NO.	ME1272
DOCUMENT NO.	MD16217
FILE NO.	1199f154
FIGURE NO.	1

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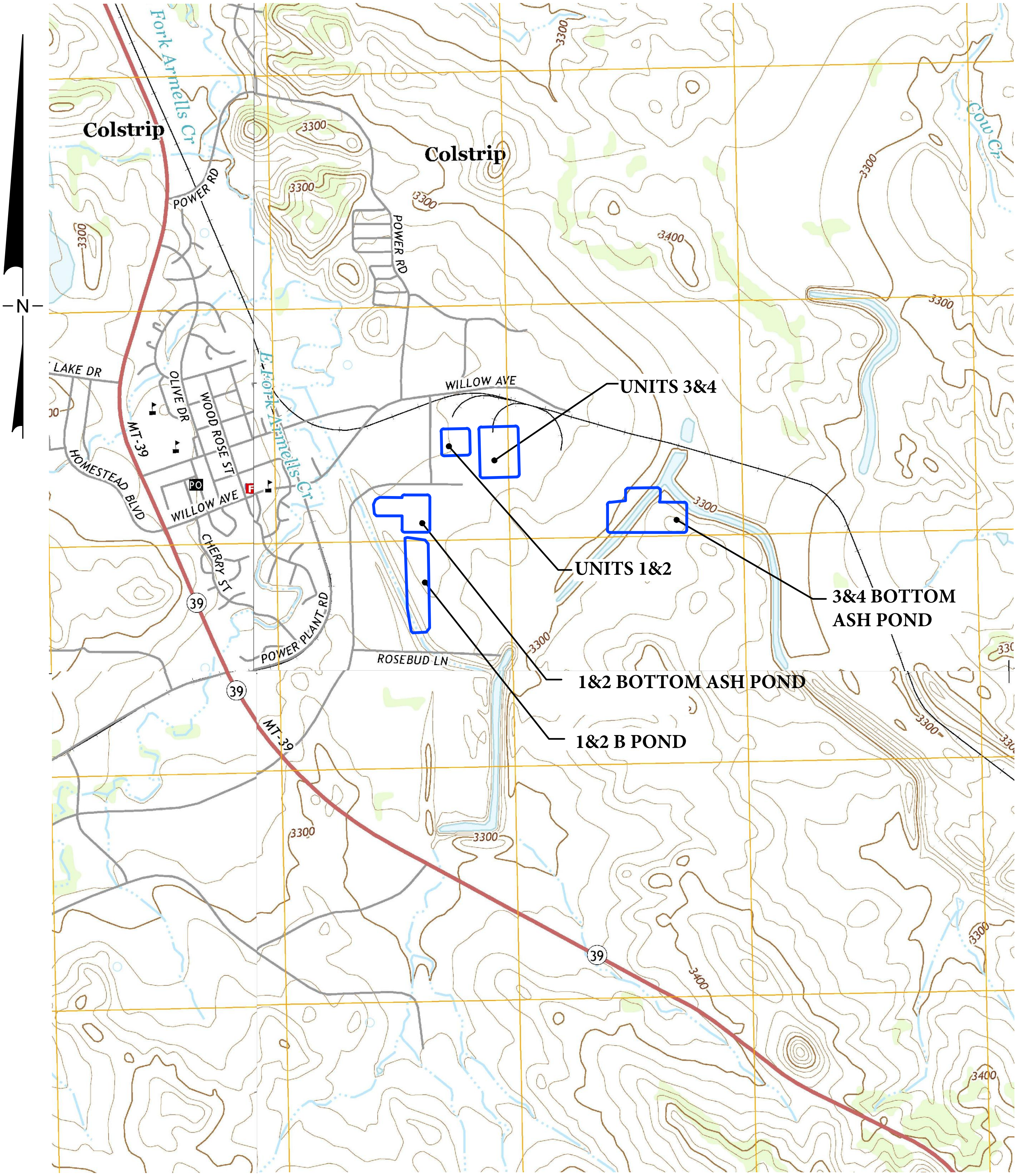

SOURCE: USGS MAP (7.5, MINUTE SERIES, ROSEBUD COUNTY, 2014)

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UNIT LOCATIONS PLANT AREA

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DATE:	OCTOBER, 2016
PROJECT NO.	ME1272
DOCUMENT NO.	MD16217
FILE NO.	F001-003
FIGURE NO.	2

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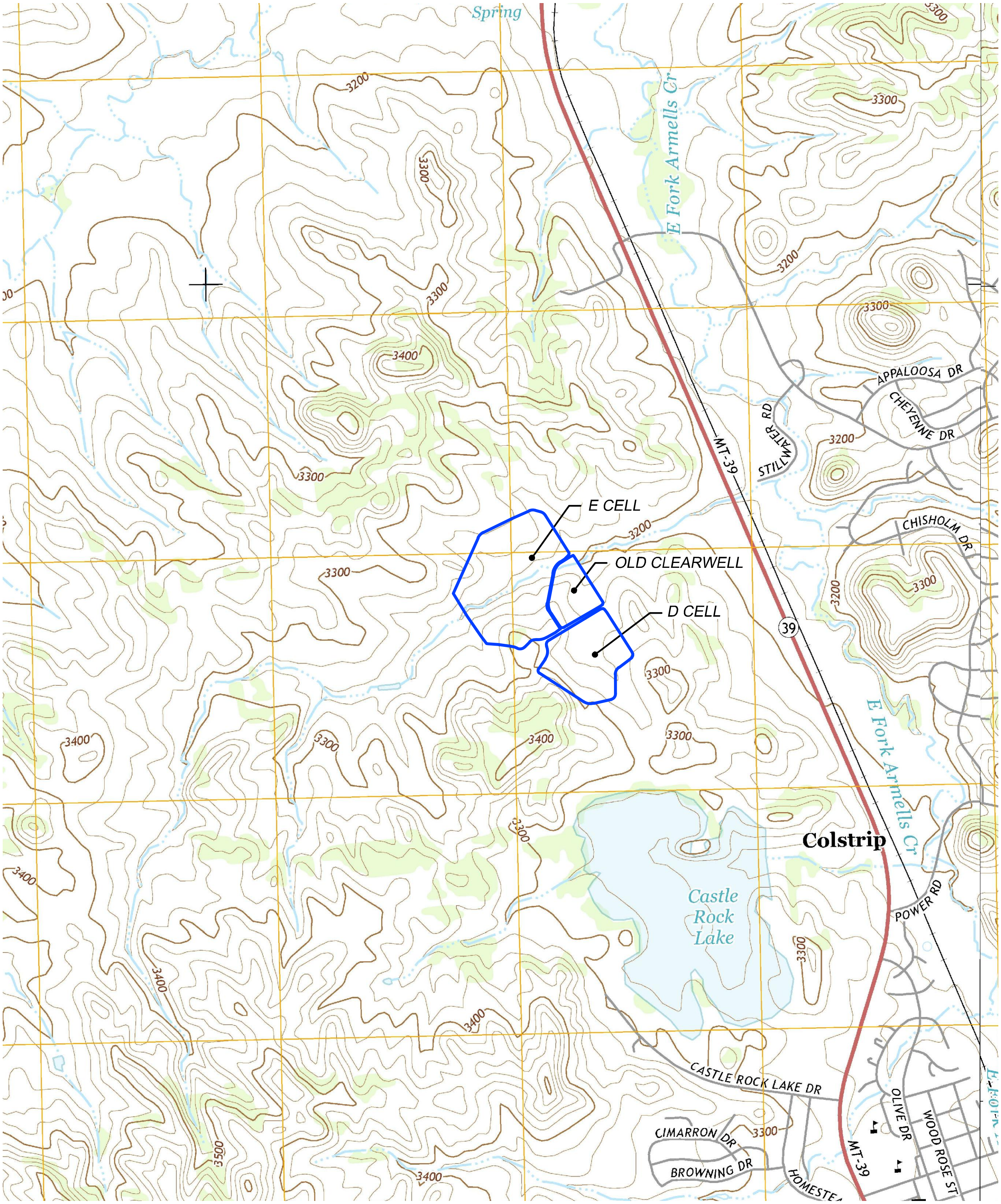

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SOURCE: USGS MAP (7.5, MINUTE SERIES, ROSEBUD COUNTY, 2014)

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UNIT LOCATIONS
UNITS 1 & 2 STEP AREA

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DATE:	OCTOBER, 2016
PROJECT NO.	ME1272
DOCUMENT NO.	MD16 217
FILE NO.	F001-003
FIGURE NO.	3

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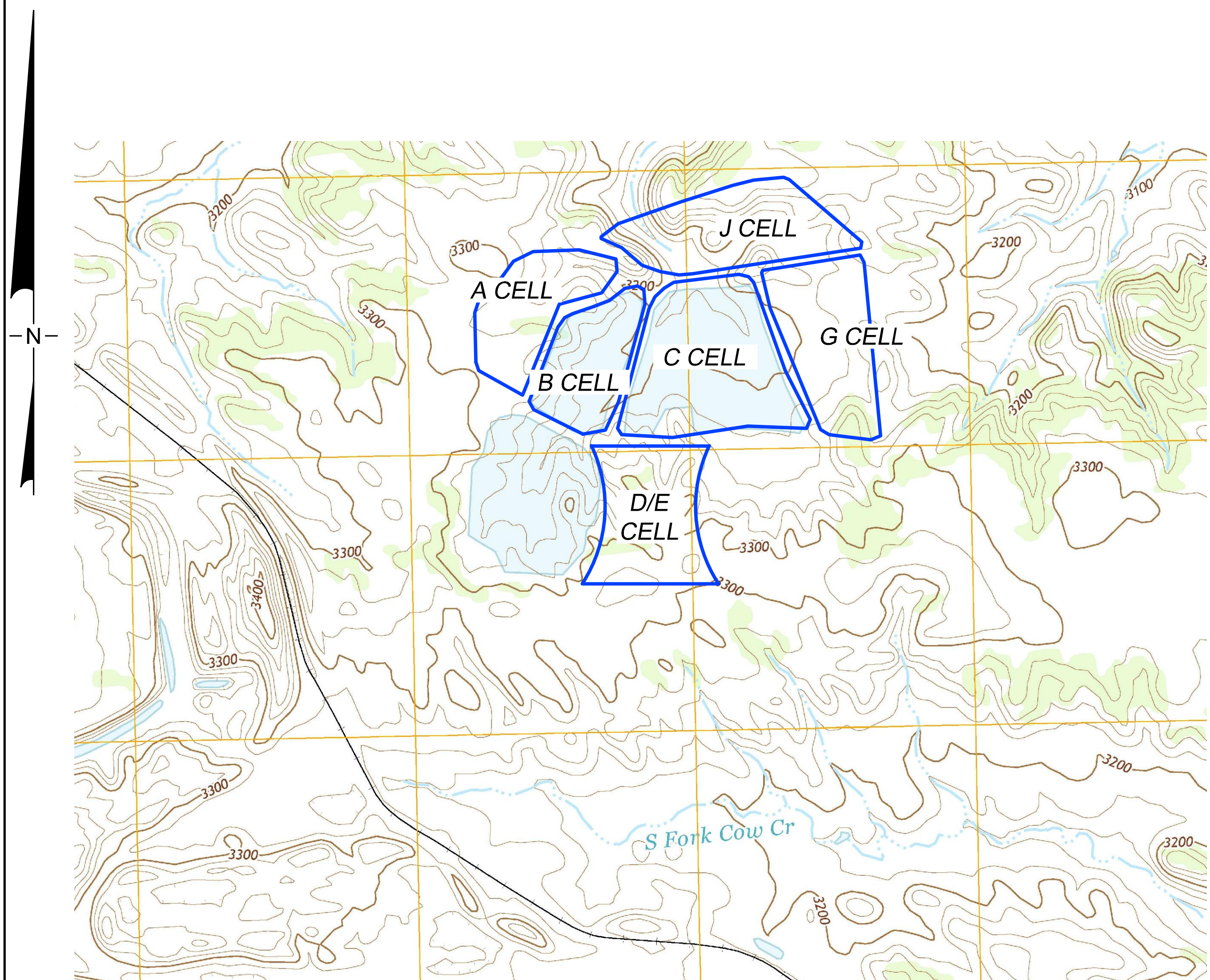

SOURCE: USGS MAP (7.5, MINUTE SERIES, ROSEBUD COUNTY, 2014)

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SCALE IN FEET

UNIT LOCATIONS
UNITS 3 & 4 EHP AREA

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DATE:	OCTOBER, 2016
PROJECT NO.	ME1272
DOCUMENT NO.	MD16217
FILE NO.	F001-003
FIGURE NO.	4

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