ENVIRONMENTAL MANAGEMENT SERVICES, INC.

December 21, 2016

Mr. Brian Hocutt
Cooperative Energy
P.O. Box 15849
Hattiesburg, MS 39402

Re: Annual CCR Landfill Inspection Report for 2016
R.D. Morrow, Sr. Power Generating Station
Purvis, Lamar County, Mississippi

Dear Mr. Hocutt :

Cooperative Energy (formerly South Mississippi Electric Power Association) retained Environmental Management Services, Inc. (EMS) to conduct the annual inspection for the coal combustion residuals (CCR) landfill at the R.D. Morrow, Sr. Generating Station in Purvis, Mississippi. The purpose of this report is to comply with the air criteria in the federal Coal Combustion Residual Rule (CCR Rule) 40 CFR 257.84(b)(1) and (b)(2) requiring an annual inspection of the CCR landfill at the subject property.

1.0 Introduction

EMS performed the CCR landfill inspection on August 22, 2016, and a land elevation survey was performed on November 22, 2016. The review of available existing information, inspection summary, and conclusions regarding changes in landfill geometry, CCR volume, and the structure, operation, stability, and safety of the landfill are summarized herein.

The CCR Rule requirements for the annual landfill inspection include:

- A review of available information regarding the status and condition of the CCR unit [257.84 (b)(1)(i)]
- A visual inspection of the CCR unit to identify signs of distress or malfunction [257.84(B)(1)(ii)]
- An inspection report that includes the following:
  - Changes in geometry since the last inspection [257.84 (b)(2)(i)]
  - Approximate volume of CCR in unit at time of inspection [257.84 (b)(2)(ii)]
  - Appearance of actual or potential structural weakness of the CCR unit, in addition to any existing conditions that are disrupting or have the potential to disrupt the operation and safety of the CCR unit [257.84 (b)(2)(iii)]
  - Any other changes which may have affected the stability or operation of the CCR unit since the last inspection [257.84 (b)(2)(iv)]

Cooperative Energy must notify the Mississippi Department of Environmental Quality (MDEQ) Director within 30 days of placing the CCR Landfill Annual Inspection Report in the operating record and posting to the CCR web site (40 CFR 257.106 and 257.107).

The landfill site is located in the N1/2 of the NE1/4 of Sec.21, T3N, R14W, in Lamar County, Mississippi, as shown on the Site Location Map presented as **Figure 1**. The site is located at latitude 31° 12' 40" and longitude -89° 23' 53". The approximately 72 acre permitted landfill site is located within the 1,200 acre R.D. Morrow, Sr. Generating Station property. The permitted landfill area is shown on the

Existing Site Plan presented as Figure 2. The 72 acre permitted landfill area includes approximately 46 acres of existing landfill permit and a proposed 26 acre expansion area located to the west of the existing landfill. None of the expansion area has been constructed at this time.

The CCR landfill consists of various cells and partially capped areas as shown in **Figure 2**. An aerial photograph showing the landfill area is shown in **Figure 3**. The entire existing operating footprint of the landfill is regulated as an "existing CCR landfill" in accordance with the definitions in the CCR Rule. The proposed expansion will be classified as a new or lateral expansion of the CCR landfill. However, the landfill also operates under a solid waste permit issued by the Mississippi Department of Environmental Quality.

2.0 Review of Available Information

EMS has worked for Cooperative Energy providing services for over 10 years related to the design, construction, operation, and monitoring of the CCR landfill, so we have a great degree of familiarity with the landfill and relevant records. EMS has also performed professional land surveys of the landfill to calculate filled and available volumes on an approximately annual basis for the past several years, so in preparing this year's volume estimate EMS had direct access to prior volume survey records. Other information was available for review as needed for this annual inspection and report.

3.0 Inspection Summary

The EMS Mississippi licensed professional engineer, Christopher T. Johnson, P.E., P.S. performed the annual landfill inspection on August 22, 2016. Mr. Johnson was accompanied by Mr. Kenneth Ruckstuhl of EMS, and Mr. Wes Long of Cooperative Energy. A supplemental inspection by Mr. Johnson was performed during the elevation surveying on November 22, 2016. The inspection findings are summarized in the following sections.

An index map showing the various portions of the active landfill with alphanumeric sector labels is provided in **Attachment A**. At the time of the inspection, CCR materials were being placed in Sector F as shown on the index map.

3.1 Vegetation

Healthy grassy vegetation is present on all sectors of the landfill except the active working face area, Sector F, and the top surface of the western cell designated as Sector A. The grass is mowed with a bush hog several times per year. No trees or woody vegetation are present on the landfill surfaces or capped areas.

Cattails and other wet condition vegetation were present in drainage ditches primarily along the south side of the landfill in areas that drain eastward to the serpentine runoff treatment area located just beyond the southeast end of the landfill. The cattails in the southern ditch are due to be cleaned out using excavating equipment.

An unexpected growth of cattails was found in Sector A2 at a portion of its junction with Sector F. Upon visual inspection it was discovered that leachate from Sector A2 was seeping out in the area, and an erosion feature has occurred in the seepage area, perhaps due to the saturated soil conditions (and consequent vegetative stress) and surface drainage flow.

3.2 Erosion

Generally, very little significant erosion was noted on the landfill. Some early stage rill erosion was beginning to form on some of the long slopes in areas such as Sectors A1, C, and E. At this time the rills tend to be less than about 3 to 4 inches deep. These areas should be checked again in the next annual inspection. Corrective measures are not required at this time, but may be needed within the next 12 to 24 months. Ideally any re-grading of topsoil should be scheduled to occur in the spring so that wet weather could facilitate the regrowth of grass before dry and hot summer conditions adversely affect new vegetation growth.

3.3 Storm Water Management

Storm water management around the landfill consists primarily of a system of perimeter ditches that route contact leachate eastward into the serpentine treatment system. A limited amount of non-contact storm water runoff from closed areas including the northern half of Sector A1 and all of Sector A4 drain westward, then south into Black Creek. Despite cattail growth in the southern storm ditch system, storm water runoff appears to be adequate at this time.

3.4 Leachate Collection System

The leachate collection system is served by six individual sumps with siphon pumps that are regularly maintained during the weekly inspections performed by the Cooperative Energy inspector during his weekly inspection rounds. At the time of the EMS inspection only one of the six siphons was flowing, despite indications that that leachate levels were high enough to cause gravity overflow at five of the six stations.

3.5 Record Keeping

Cooperative Energy's inspection records are kept in paper files. EMS reviewed the records and found that the records indicate that routine landfill inspections are being performed on a weekly basis as required by the CCR regulations.

3.0 Changes in Geometry

Given that most of the landfill is covered by lush grassy vegetation, it is readily apparent from visual inspection where CCR has been placed recently. The inspection indicated that CCR had recently been filled only in Sector F.

The EMS licensed professional land surveyor performs elevation surveys of the landfill on an approximately annual basis. EMS performed the 2016 survey on Tuesday, November 22, 2016. Then EMS used the survey data to create a digital elevation terrain model. Inspection of the model surface confirmed that CCR placement had been limited to Sector F.

4.0 CCR Volume

As described in the previous section, an AutoCAD® surface model was prepared based on an elevation survey of the landfill. The model surface was compared to the prior year model surface using the AutoCAD® Civil 3D package to calculate the change in volume from 2015 to 2016. The map representing the results of this effort is included as **Attachment B**.

The CCR volume in the Landfill as of November 22, 2016, is estimated to be approximately 1,999,000 cubic yards (CY). Approximately 16,000 CY of material was added to the landfill since the last survey conducted October 8, 2015. Based on the design volume and the latest topographic survey, approximately 1,076,000 CY of airspace remains available in the developed portion of the landfill.

5.0 Structural Weakness and Disrupting Conditions

Based on a review of available information and the August 22, 2016 and November 22, 2016 observations, EMS found no significant indications of structural weakness of the landfill. However, saturated conditions, seepage, and small soil creep along a portion of the boundary between Sectors A2 and F were noted.

6.0 Changes Affecting Stability or Operations

Based on the inspections, survey, and review of records performed in association with this annual inspection, to our knowledge, there have been no changes in condition or operation that have affected stability or operation of the CCR landfill.

7.0 Recommendations

The CCR Rule requires deficiencies or releases to be remedied as soon as feasible in accordance with 257.84(b)(5) which states

> *"If a deficiency or release is identified during an inspection, the owner or operator must remedy the deficiency or release as soon as feasible and prepare documentation detailing the corrective measures taken."*

Based on the findings of this annual inspection of the CCR landfill, EMS has identified one item that in our opinion constitutes a deficiency under the CCR Rule and thus should be remedied as soon as feasible:

- Repair the seepage and soil erosion area along the boundary between Sectors A2 and F.

EMS offers the following recommendations for items that in our opinion do not constitute a deficiency or release under the CCR Rules, but which would improve the operation and maintenance of the landfill:

- Clean out ditches along the southern side of landfill to remove cattail vegetation.
- Improve the maintenance of the landfill leachate siphon system to keep the leachate levels pumped down before the level rises to the point that it reaches the gravity overflow.
- Perform re-grading of topsoil on capped areas of the landfill where erosion rills are beginning to form.

8.0 Closing

EMS provided observations and reporting in general accordance with the scope of work defined in our revised proposal dated March 17, 2016 proposal authorized by Cooperative Energy Purchase Order No. 55006,0. The inspection of the CCR landfill at the R. D. Morrow, Sr. Generating Station was conducted to satisfy the requirements of the federal CCR rule. Based on the field observations and a review of available information, EMS concludes that the design, construction, operation, and maintenance of the landfill with implementation of corrective measures for the identified deficiency will be consistent with recognized and generally accepted good engineering standards.

Please contact us at your convenience with any questions you may have. I can be reached at (601) 544-3674.

Sincerely,
Environmental Management Services, Inc.

CHRISTOPHER T. JOHNSON
LICENSED PROFESSIONAL
ENGINEER
AND
SURVEYOR
PE-15761
PS-3129
STATE OF MISSISSIPPI

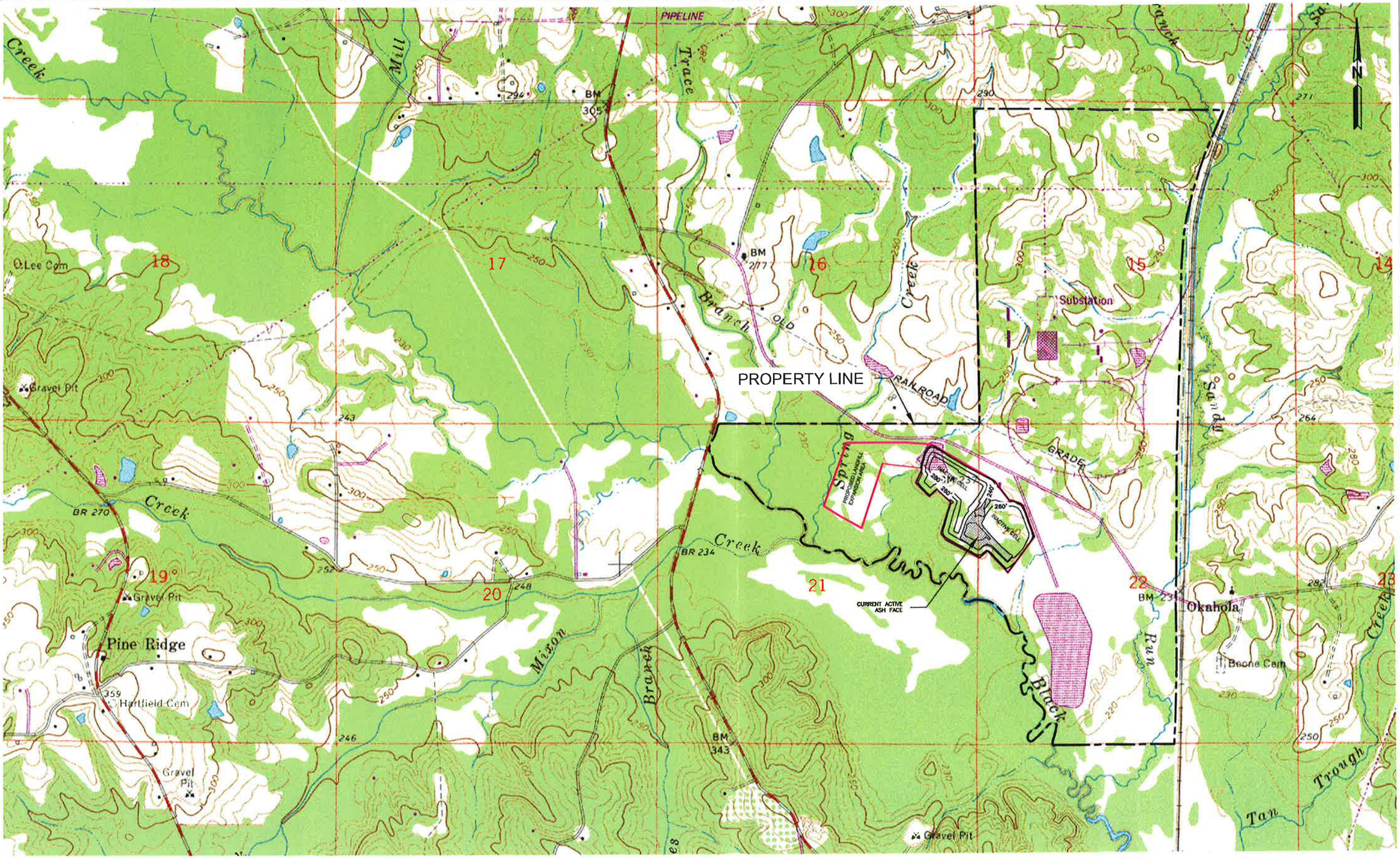
Christopher T. Johnson, P.E., P.S.
Engineering Manager/Vice President
Mississippi Professional Engineer No. #15761

Date: DEC. 21, 2016

Figures

Attachment A – CCR Landfill Sector Index Map
Attachment B –Depth of Fill Grid

FIGURES



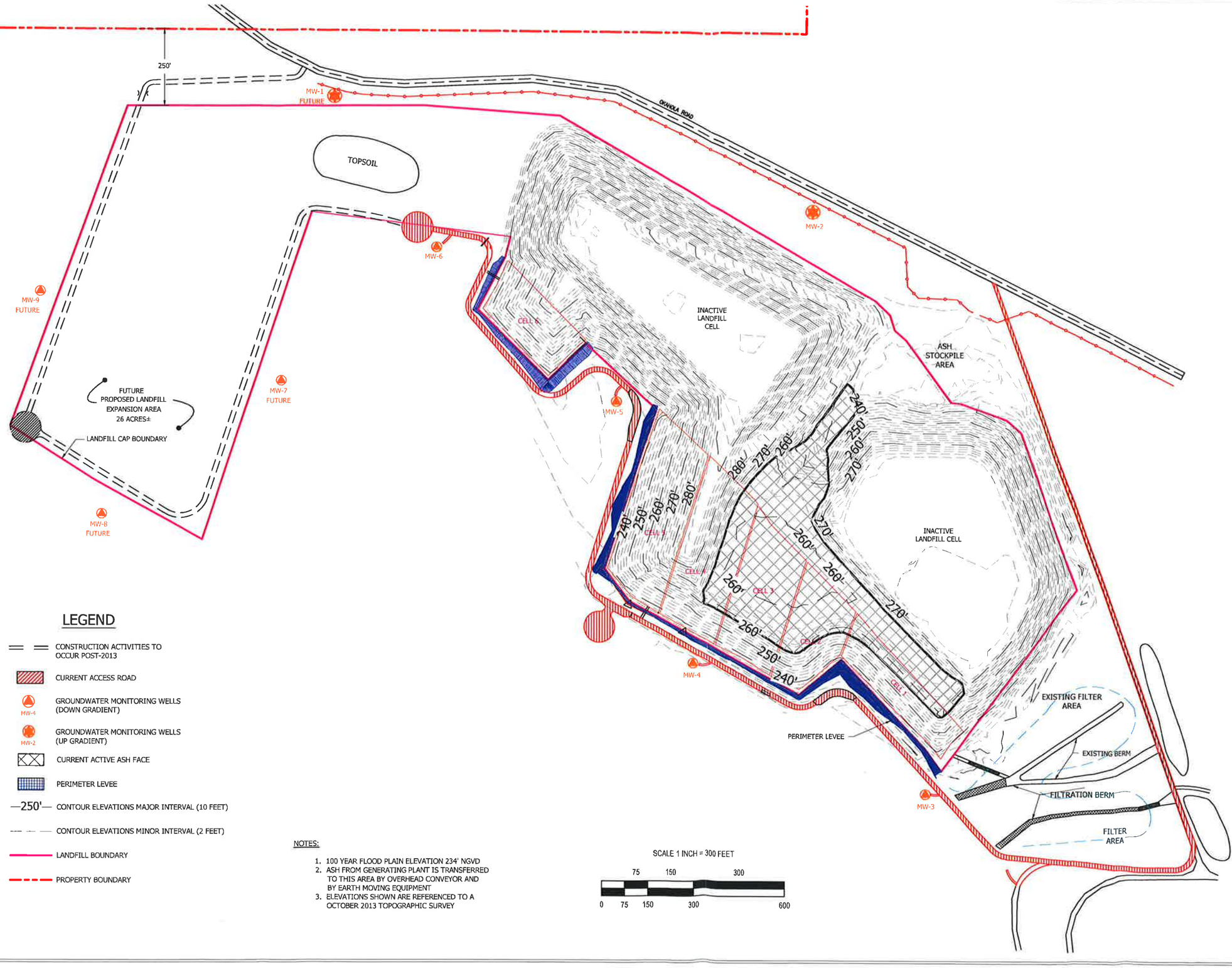
REFERENCE: 7.5 MIN. SERIES TOPOGRAPHIC MAP
PURVIS, MISSISSIPPI 1982

ENVIRONMENTAL MANAGEMENT SERVICES, INC.
P.O. BOX 15389
HATTIESBURG, MS 39404

PREPARED FOR
Cooperative ENERGY
P.O. BOX 15849
HATTIESBURG, MS 39404-5849

SHEET TITLE
SITE LOCATION
R.D. MORROW, SR. GENERATING PLANT
PURVIS, MISSISSIPPI

DATE	12/20/2016
SCALE	AS SHOWN
SHEET NO.	1
PROJECT NO.	SOU2-16-002



LEGEND

- CONSTRUCTION ACTIVITIES TO OCCUR POST-2013
- CURRENT ACCESS ROAD
- MW-4 GROUNDWATER MONITORING WELLS (DOWN GRADIENT)
- MW-2 GROUNDWATER MONITORING WELLS (UP GRADIENT)
- CURRENT ACTIVE ASH FACE
- PERIMETER LEVEE
- 250' CONTOUR ELEVATIONS MAJOR INTERVAL (10 FEET)
- CONTOUR ELEVATIONS MINOR INTERVAL (2 FEET)
- LANDFILL BOUNDARY
- PROPERTY BOUNDARY

NOTES:

1. 100 YEAR FLOOD PLAIN ELEVATION 234' NGVD
2. ASH FROM GENERATING PLANT IS TRANSFERRED TO THIS AREA BY OVERHEAD CONVEYOR AND BY EARTH MOVING EQUIPMENT
3. ELEVATIONS SHOWN ARE REFERENCED TO A OCTOBER 2013 TOPOGRAPHIC SURVEY

SCALE 1 INCH = 300 FEET

75 150 300

0 75 150 300 600

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SHEET TITLE

SITE PLAN

R.D. MORROW, SR. GENERATING PLANT
PURVIS, MISSISSIPPI

DATE	12/20/2016
SCALE	AS SHOWN
SHEET NO.	2
PROJECT NO.	SOU2-16-002

REFERENCE: AERIAL IMAGE
2012 GOOGLE EARTH
PURVIS, MISSISSIPPI

LEGEND

LANDFILL BOUNDARY

CHAIN LINK FENCE

SCALE 1 INCH = 400 FEET

100 200 400

0 100 200 400 800

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SHEET TITLE

AERIAL PHOTOGRAPH

R.D. MORROW, SR. GENERATING PLANT
PURVIS, MISSISSIPPI

DATE 12/20/2016

SCALE AS SHOWN

SHEET NO. 3

PROJECT NO. SOU2-16-002

ATTACHMENTS

MW-1
FUTURE

OKAHOLA ROAD

TOPSOIL

MW-6

MW-2

MW-7
FUTURE

MW-5

MW-4

MW-3

A4

A1

A

INACTIVE
LANDFILL
CELL

C

CELL 6

A3

A2

D

ASH
STOCKPILE
AREA

B1

B2

B3

B4

B

INACTIVE
LANDFILL CELL

E

CELL 5

CELL 4

F

CELL 3

G

CELL 2

H

CELL 1

240'
250'
260'
270'
280'

PERIMETER LEVEE

EXISTING FILTER
AREA

EXISTING BERM

FILTRATION BERM

FILTER
AREA

N

SCALE 1 INCH = 250 FEET

62.5 125 250

0 62.5 125 250 500

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PREPARED FOR

SHEET TITLE

LANDFILL SECTOR INDEX MAP

R.D. MORROW, SR. GENERATING PLANT
PURVIS, MISSISSIPPI

DATE
12/20/2016

SCALE
AS SHOWN

SHEET NO.
1

PROJECT NO.
SOU2-16-002