

# IM Monthly Report



## Mississippi Public Service Commission Kemper IGCC Project

April, 2017

**URS**

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## Executive Summary

URS Corporation (URS), later acquired by AECOM, was requested by the Mississippi Public Service Commission (MPSC) to provide Independent Monitoring services for the Kemper Integrated Gasification Combined Cycle (IGCC) Project located in Kemper County, MS. The scope of services includes monthly reporting by URS (AECOM) and its subcontractors, the Independent Monitor (IM), of the status and prudence of the on-going engineering, procurement, construction and startup activities performed by Mississippi Power Company (MPC or the Company), its parent Southern Company and subsidiary Southern Company Services (SCS), and its subcontractors on the project. This IM Monthly Report provides the results of this assessment for the reporting period of April, 2017, and review of the project status reported by MPC for the period from February to April, 2017 (Production Meeting Reports March 23 and April 19, 2017, February and March 2017 PSC Reports, and Kemper County IGCC Weekly Executive Summary and Metrics through April 23, 2017).

During this reporting period, the IM has conducted weekly status review meetings with MPSC staff. Several meetings, teleconferences and reviews were also conducted with MPC and SCS staff, as described below (refer to other Report Sections where referenced for more details):

- April, 2017 – Accounting audit of financial records from end of January, 2017 through end of February, 2017 held at MPC offices in Gulfport, MS (Appendix C).
- April, 2017 – Daily monitoring of on-going site construction and startup activities at the jobsite (Appendix E).
- April 10 and 11, 2017 – Review of project EPC status and COD Criteria held at the jobsite (Appendix D).
- April 26, 2017 - Teleconference with MPC and SCS to discuss status of open RFI's (Appendix B).

### Project Status through March, 2017 (Unless Noted Otherwise)

Engineering - The gasification island design performed by KBR, and the SCS design of the combined cycle island and the balance of plant (BOP) work, is 100% complete for base scope. All major Revision 0 design packages have been issued for construction. Remaining effort will be focused on resource pool and scope addition activities, including:

- Resource pool support activities.
- E&CS and MPC Management of Change (MOC) process implementation and training.
- Design revisions from support requests, updated vendor information, and scope additions/OCR's.
- Supporting closeout of punch list items.
- Activities to support Project Close-Out.

Procurement - All major equipment and commodity orders have been placed. Major equipment deliveries are complete. Remaining effort will be focused on final construction and startup needs including procurement of miscellaneous items as identified (scope additions). During April,

there were eight (8) new awards issued for 1) DVC Positioner for PV-30850 for RP #4036, 2) Specialty Flanges for RP #4097, 3) AGR 60 & 66 Pumps Seal Retrofit Parts and Labor, 4) Rebuild HX0042 [REDACTED] 5) Ammonia Scrubber Bottoms Pumps for RP #4002, 6) Six (6) 4" Ball Valves for RP #4097 & RP #3945, 7) Flex Hoses for RP #3634, and 8) Pressure Relief Valve for RP #3728.

Construction – Overall base plant construction is 100% complete (as of November 13, 2016). Remaining work includes ongoing punchlist and scope addition activities. The schedule for scope additions, as of 4/18/17, is included in Appendix E.

Transmission – Right of way acquisition and construction is complete for all 11 line segments and all 8 substations. MPC will continue to monitor transmission right of ways for any needed restoration and maintenance.

Supply Chain – Right of way acquisition and construction is complete for all 3 pipelines. Long term sales or supply contracts have been signed with the City of Meridian (water supply), Tennessee Gas Pipeline (NG supply), Denbury Resources (CO2 sales), Air Liquide (nitrogen supply from onsite Air Separation Unit), and Martin Product Sales (sulfuric acid and ammonia sales by truck). The CO2 contract provides for termination by Denbury at its discretion if CO2 deliveries do not occur by July 1, 2017. Initial CO2 sales to Denbury and sulfuric acid sales to Martin Products were achieved in February.

Liberty Mine - Current land control is 100% complete for the initial five year permit area. Construction activities are complete. Mine is operating and stockpiling/delivering lignite. Total actual spending for the mine development through March, 2017, including mine Allowance for Funds Used during Construction (AFUDC), was unchanged at \$232.0M, which is the forecast final cost.

### Mississippi Economic Impact

IM has reported for each contract and purchase order whether MS bidders were involved, and if so, status and basis of the award decision (refer to Appendix F). Through March, 2017, contracts totaling \$2.175 billion have been awarded to MS companies, and total MS spending is \$2.159 billion (about 30% of the total, including uncapped costs). MS workforce contributed 239 construction jobs and 410 plant/mine jobs in March. A total of 571 MS Companies have provided construction, equipment, material or professional services for the Project.

### Key Concerns

The following Project Execution related concerns have been reported with associated resolution status:

- Differential settlement and/or slope movement during initial loading of lignite stockpile in the storage dome - *Survey benchmarks will be monitored for settlement and slope stability during initial stockpile placement. IM suggests MPC consider development of mitigation plans in the event excessive settlements and/or slope movements are discovered, and staging of the initial placement of the lignite stockpile. Initial stockpile of 10,000 tons was increased to 32,000 tons in January (32% capacity).*

- Venturi scrubber solids carryover issues – *new duplex strainers are being installed on all 6 trains while coal feed is suspended on both gasifiers; the Recovered Water Candle Filters are not able to handle the full flow, so bypass flow is being routed to gasifier sumps and temporary tanks for solids collection and disposal; a trial coal fines removal system has been installed consisting of polymer (flocculent) injection, polymer dilution system was added, system testing in progress.*
- Plugging issues at the roll crushers - *new 7 blade feeders will replace the existing 8 blade feeders in the roll crusher rotary inlet air locks (5 of 6 complete); will also install auto lube systems and shaft modifications.*
- Lignite dryer solids accumulation – *revised grid plates and lined feed chutes are being installed on all six dryers and are being monitored for process optimization.*
- Lignite dryer weigh belt feeder plugging – *coal fines growth from the walls requires on-going maintenance to clean out; periodically damages the belt feeder; will install air rappers on discharge chutes.*
- Pulverizer wind box erosion – *leaks are being repaired as identified; long term solution needed.*
- Continuous Coarse and Fine Ash Depressurization systems (CCAD and CFAD) - *both the CFAD and CCAD systems are experiencing leaks due to internal erosion of the pipe and or fittings from high velocity solids; leaks on April 5 and 13 resulting in significant ash releases were isolated and repaired; long term Action Plan posted (see Appendix B, RFI 2-894); replacing PLD's with new design when available (22 of 64 replaced); IM suggests Administrative Controls be considered while Action Plan is being implemented..*
- Syngas cooler tube leaks – *Gasifier A was shutdown on 3/9 due to hot spots detected in the superheater section caused by leaking tubes; a total of seven (7) tubes were capped and three (3) refractory repairs were completed; Root Cause Analysis and long term solution has been requested (see Appendix B, RFI 2-893).*
- Particulate Control Devices (PCD's) – *Gasifier A was shutdown on 4/21 due to ash leaks detected in one of the PCD's; replacement of the candle filters in both PCD's in progress will take about 3 weeks and will result in COD delay.*
- Ash moisturizer system – *modifications on all 4 ash moisturizers have improved operation; dust suppression still an issue at times during unloading for disposal; these systems continue to be monitored.*
- Syngas Scrubber water bypass – *operational improvements are being evaluated to reduce load on sour water system; may require chimney tray redesign.*
- Sour Water System – *inconsistent inlet composition causing control issues; considering addition of online analyzers; H2S stripper reboiler is plugging and experiencing tube leaks due to ash carryover from the PCD's; reboiler will be replaced (again) with new metallurgy [REDACTED]*
- Process Water System – *current 5 million gallon storage is insufficient; installed new 1.7 million gallon temporary tank; considering additional permanent tankage.*
- Nitrogen Plant – *capacity is insufficient to support simultaneous startup of both gasifiers; existing plant can only make 1% of output as liquid; supplemental nitrogen is being brought in by truck to support startup; will install additional liquid nitrogen storage tank; considering adding liquefier or increasing plant capacity.*

## Contractor Hotline



MPC has established a toll free telephone number for contractors or others to provide observations of any concerns with improper activities associated with the project. Comments are collected by a third party and reported to MPC for follow up investigation and action. The IM is copied on all correspondence and will report status of all cases. There were no new concerns filed this reporting period (April, 2017).

A summary of the twenty six (26) claims received to date and their status, including corrective actions taken, is included in Appendix I.

### Requests for Information (RFI) Status

The overall status of the project data requests are summarized in Appendix B to this monthly report. Most of the RFI's have been posted, reviewed and closed (over 1000 items total; 16 open items remaining). Primary concerns noted by the engineering disciplines are summarized below:

- Accounting – *MPC posted response to new RFI requesting MPC post In Service Date process for 1) categorization of on-going costs (capped or uncapped); and 2) accounting records showing how these costs are being booked, under IM review.*
- Scope Additions – *MPC has posted updated list through March, 2017 for approved items (\$162 million) and through April 26, 2017 for pending items (11 items); weekly updates are being provided to the IM Site Team for all FCR's, OCR's and Resource Pool Listings.*
- Process and Technology – *new RFI was submitted in March requesting Root Cause Analysis for recent syngas cooler tube leaks along with long term action plan, schedule and cost. New RFI's were submitted in April concerning ash conveyance and PLD vent piping erosion, PLD failures and replacement, and PCD ash leakage and repairs.*
- Operations and Maintenance – *MPC posted the response to new RFI requesting Action Plan to address recurring piping and equipment leaks resulting from internal erosion from high velocity solids (ash and coal) to ensure long term safe and reliable operation of these systems; additional Administrative Controls are recommended.*

### Project Cost and Schedule

In the March, 2017 PSC Report, MPC reported a delay in forecast in service date from end of April to end of May, 2017, and an increase in forecast capped cost of \$37.7 million now at \$5.750 billion, including a decrease in base contingency of \$1.3 million now at \$13.9 million and no change in Schedule Risk at zero. Forecast schedule delay was due to needed repairs in one of the PCD's for Gasifier A, modifications to the ash removal systems, and repairs to the sour water system. Forecast capped cost increase was due to schedule delay (\$22 million), startup fuel (\$8 million), and outage repair costs (\$8 million). Forecast uncapped costs increased in March by \$20.3 million now at \$1.546 billion, due primarily to increases in AFUDC costs (\$15.7 million).

Total capped spending for the plant through February, 2017, with deduction for Department of Energy (DOE) funding, was \$5.630 billion. Overall plant EPC remained at 99% complete. Uncapped spending through March was \$1.489 billion. Refer to Appendix G for the PSC Report Summary.

As of April 23, 2017, the current working schedule indicates TOD of 5/18/17, which is a 554 day slip from the November 2014 rebaseline date, and a 36 day slip from the 4/4/17 report. TOD is driven by replacement of the PCD Candle Filters, then the addition of solids and resumption of coal feed on Train 'A', followed by sustained two-train integrated operations.

Overall project execution status was reviewed on April 11, 2017 at the jobsite. Refer to Appendix D for meeting attendance. Primary concerns are additional schedule slippage and associated cost increases, and unknown startup and technology risks.

- Additional schedule slippage – MPC has reported a delay in COD to end of May, 2017. MPC will continue to evaluate startup schedule and remaining risks associated with ongoing issues noted under key Project Execution and Process and Technology concerns herein, and as reported by MPC (see Appendix H).
- Associated cost increases – While increases in the indirect project costs due to schedule delays are capped and therefore being absorbed by the MPC shareholders, the rate payers are also at risk for alternative power generation and AFUDC costs, to the extent these are allowed by the MPSC.
- Unknown startup, operation and technology risks – emergent issues, primarily equipment reliability, associated with sustained integrated operation of both gasifiers at design capacity, sustained electrical production on both combustion turbines at rated capacity, sustained production of by products at design rates and quality, and overall plant process control integration.

## Accounting

Topp McWhorter Harvey, PLLC (hereinafter referred to as "TMH") has completed the accounting audit of the special-purpose Historical Schedules of Capped and Uncapped Plant Costs of the Project for the historical project-to-date and month-to-date periods ended February 28, 2017, and the examination of special-purpose Forecasted Schedules for the period beginning March 1, 2017, through the completion of the Project.

On May 1, 2017, the Company filed their March 2017, monthly Form 8K with the SEC which increased its Capped Plant Cost Current View (forecast) for the Kemper IGCC Project to approximately \$5.750 billion, net of DOE grants and Cost Cap Exceptions. The Company's Monthly Status Report through March 2017, increased its Current View (forecast) of Total Exemptions and Exceptions (Non-Capped Cost) to approximately \$1.546 billion. The total Current View (forecast) for Capped Plant Cost and Total Exemptions and Exceptions (Non-Capped Cost) in the Company's Monthly Status Report through March 2017, is \$7.295 billion.

The Company's current Monthly Status Report on Form 8-K dated April 3, 2017 disclosed an expected in-service date by the end of April 2017 for the remainder of the Kemper IGCC. The

Company achieved integrated operation of both gasifiers on January 29, 2017, including the production of electricity from syngas in both combustion turbines. The Company continues to work toward achieving sustained operation sufficient to place the plant in service. The plant has, however, produced and captured CO<sub>2</sub> and has produced sulfuric acid and ammonia, all of acceptable quality under the related off-take agreements. As a result of ongoing challenges associated with the ash removal and gas cleanup sour water systems, efforts to improve reliability and reach sustained operation of both gasifiers and production of electricity from syngas in both combustion turbines remain in process. The Company now expects the remainder of the Kemper IGCC, including both gasifiers, will be placed in service by the end of May 2017. The schedule reflects the expected time needed to repair a leak in one of the particulate control devices for gasifier "A", make other minor modifications to each gasifier's ash removal systems, repair the sour water system, and establish sustained operation of both gasifiers for the production of electricity from syngas

The Company has revised its previous cost estimate, which included projected costs through April 30, 2017, to include projected additional schedule costs through May 2017 and to include additional costs associated with the current repair outage. Since the filing of the Form 10-K, the Company has previously reported additional estimated costs subject to the cost cap in the aggregate amount of approximately \$70 million. The March Monthly Status Report contains a further increase in the cost estimate subject to the cost cap for the Kemper IGCC of approximately \$38 million, including approximately \$22 million related to extending the projected schedule through May 2017, \$8 million related to start-up fuel, and \$8 million primarily related to the current repair outage. The total estimated Kemper IGCC cost subject to the \$2.88 billion cost cap as of March 31, 2017 was approximately \$5.75 billion, net of the Initial DOE Grants and excluding the Cost Cap Exceptions. The Company does not intend to seek rate recovery for any costs related to the construction of the Kemper IGCC that exceed the \$2.88 billion cost cap, net of the Initial DOE Grants and excluding the Cost Cap Exceptions. As a result of this revised cost estimate, the Company recorded total pre-tax charges to income for the estimated probable losses on the Kemper IGCC of approximately \$108 million during the first quarter 2017.

Further cost increases and/or extensions of the expected in-service date may result from factors including, but not limited to, difficulties integrating the systems required for sustained operations, sustaining nitrogen supply, continued issues with ash removal systems, major equipment failure, unforeseen engineering or design problems including any repairs and/or modifications to systems, and/or operational performance (including additional costs to satisfy any operational parameters ultimately adopted by the Commission). Furthermore, additional improvement projects to enhance plant performance, safety, and/or operations ultimately may be completed after the remainder of the Kemper IGCC is placed in service. These projects have yet to be fully evaluated, have not been included in the current cost estimate, and may be subject to the \$2.88 billion cost cap. Any further changes in the estimated costs of the Kemper IGCC subject to the \$2.88 billion cost cap, net of the Initial DOE Grants and excluding the Cost Cap Exceptions, will be reflected in the Company's statements of income and these changes could be material.

Any extension of the in-service date beyond May 31, 2017 is currently estimated to result in additional base costs of approximately \$25 million to \$35 million per month, which includes maintaining necessary levels of start-up labor, materials, and fuel, as well as operational resources required to execute start-up activities. However, additional costs may be required for remediation of any further equipment and/or design issues identified. Any extension of the in-service date would also increase costs for the Cost Cap Exceptions, which are not subject to the

\$2.88 billion cost cap established by the Commission. These costs include AFUDC, which is currently estimated to total approximately \$16 million per month, as well as carrying costs and operating expenses on Kemper IGCC assets placed in service and consulting and legal fees of approximately \$3 million per month.

The ultimate outcome of this matter cannot be determined at this time.

Pursuant to the Company's 10-Q filed with the SEC on May 2, 2017, for the first quarter ended March 31, 2017, the Company recorded pre-tax charges to income for revisions to the cost estimate subject to the construction cost cap totaling \$108 million in the first quarter 2017. Since 2012, in the aggregate, the Company has incurred charges of \$2.87 billion as a result of changes in the cost estimate above the cost cap for the Kemper IGCC through March 31, 2017. The current cost estimate includes costs through May 31, 2017, as well as identified costs to be incurred beyond May 31, 2017, expected to be subject to the \$2.88 billion cost cap.

As reported in the Company's 10-Q for the quarter ended March 31, 2017, the Company is required to file a rate case to address Kemper IGCC cost recovery by June 3, 2017 (2017 Rate Case). Costs incurred through March 31, 2017 totaled \$6.93 billion, net of the Initial and Additional DOE Grants. Of this total, \$2.87 billion of costs has been recognized through income as a result of the \$2.88 billion cost cap, \$0.83 billion is included in retail and wholesale rates for the assets in service, and the remainder will be the subject of the 2017 Rate Case to be filed with the Commission and expected subsequent wholesale MRA rate filing with the FERC. The Company continues to believe that all costs related to the Kemper IGCC that remain subject to recovery have been prudently incurred in accordance with the requirements of the 2012 MPSC CPCN Order. The Company recognizes significant areas of potential challenge during future regulatory proceedings (and any subsequent, related legal challenges) will exist. These challenges include, but are not limited to, prudence issues associated with capital costs, financing costs (AFUDC), and future operating costs, net of chemical revenues; potential operating parameters; income tax issues; costs deferred as regulatory assets; and the 15% portion of the project previously contracted to SMEPA.

Given the variety of potential scenarios and the uncertainty of the outcome of future regulatory proceedings with the Commission (and any subsequent related legal challenges), the ultimate outcome of these matters cannot now be determined, but could result in further charges that could have a material impact on the Company's results of operations, financial condition and liquidity.

## **Discipline Summaries**

### **Environmental / Permitting**

CCE has completed its review of additional environmental/permitting documentation provided by MPC. The IM's review of these documents has not identified any major concerns or issues. However, there will be additional monitoring reports (Mitigation Action Plan, Wetlands Mitigation and Water Quality and Macroinvertebrate Monitoring Reports) prepared by MPC and LF for the MDEQ and the Corps of Engineers. These documents and reports should be provided to and reviewed by the IM to insure that the permit requirements for the IGCC Plant Site and Linear Facilities and for the Liberty Mine continue to be met (see Appendix B, RFI 2-698).



IM is monitoring status of approvals for the one (1) remaining plant permit:

- Title V Operating Air Permit Modification – Application was submitted on 8/18/14; MDEQ issued construction permit. The plant will operate under the current construction permit until the Title V Operating Permit is issued.

### Process and Technology

Implementing site monitoring plan for gasifier startup by IM gasification technology specialist. Last site visit was conducted week of March 13 (see Section 1.10). Next visit is scheduled for week of May 8.

### Key Technical Milestones Not Yet Achieved as of 01 MAY 2017

- Complete repairs to Train A PCDs to address the ash leaks that have been occurring for the past several months and postulated to be the cause of the fouling and damage that has occurred to the downstream H<sub>2</sub>S Stripper Reboiler.
- Resume simultaneous operation of Gasifier Trains A and B with clean syngas from AGR Trains A and B composing at least some fraction of the gas going to combustion turbines CTA and CTB in co-fire mode with recycled syngas going back to Gasifiers A and B.
- Demonstrate ability to reliably and continuously withdraw coarse ash from both Gasifiers through their respective CCAD systems and fine ash from the PCDs in both trains through their respective CFAD systems after replacing all the original failure-prone PLDs in the CCAD and CFAD systems with new PLDs of an improved, more robust design.
- Achieve the scheduled/targeted 4 days of continuous, simultaneous operation of both Gasifiers with 100% of the on-spec syngas produced by both Gasifiers going to CTA and CTB operating on 100% syngas (no co-firing) near, but not above, the current maximum capacity limit (80%) imposed by combustion turbine vendor (Siemens) in co-fire mode.
- Successfully run both CTA and CTB turbines on syngas (co-firing with natural gas is acceptable) for the minimum testing time required by turbine vendor (Siemens) prior to next borescope inspection and complete that inspection with no concerns noted by Siemens.
- Demonstrate ability to export on-spec CO<sub>2</sub>, ammonia, and wet sulfuric acid products at near design rates for some to-be-determined minimum period of time while remaining in compliance with regard to plant environmental emissions limits.
- Achieve and reliably sustain full design coal feed rate (~400 kpph) to each Gasifier for a to-be-determined minimum period of time while continuing to produce on-spec syngas, CO<sub>2</sub>, ammonia and WSA products.
- Achieve full design power production of 524 MW based on 100% syngas flow to both CTA and CTB (no co-firing with natural gas) plus design steam turbine operation for a to-be-determined minimum continuous period.
- Demonstrate ability to operate both Gasifiers reliably over an extended period without:

- Forming ash clinkers or fused ash on walls of the Gasifier or experiencing refractory damage requiring a shutdown to repair, OR
- Experiencing difficulties continuously withdrawing ash from each Gasifier through its associated CCAD system and reliably discharging it from the Ash Moisturizers
- Demonstrate ability to reliably operate the Venturi Scrubber - Recovered Water Filter System in both Trains A and B with any equipment modifications/additions as may be required, such as the new Venturi Scrubber Duplex Strainers and the new Recovered Water Polymer Addition System, while continuously removing coal fines at the target efficiency level and recovering design quantities of clean water needed for downstream operations.

### Lignite Delivery Facility

LDF construction is 100% complete. The levels in all 6 Crushed Coal Silos are being monitored during coal feed and while waiting for coal feed to resume on the Gasifiers. Approximately 32,000 tons of coal is being maintained in the dome to support coal feed. Mobile coal screening equipment continues to screen the coal at the coal storage pile this week. The filter presses at the LDF are processing the dewatered sludge before being hauled to the GAMU (Gasification Ash Management Unit) for disposal.

### Contract Awards Review

IM reviews of Contract Awards are complete. Most known key Contracts and Purchase Orders, including construction and Liberty Mine facilities, have been included, totaling about 700 items (excluding O&M Service Contracts, MS Tier II contractors, and Transmission). Refer to the IM July 2016 Monthly Report (Appendix F), for the final update of completed reviews.

### Site Activities

#### Significant Technical Events which Occurred in April 2017

- APR 1: Gasifier A pressure testing to 600 psig completed.
- APR 2: Gasifier A solids circulation initiated.
- APR 3: Gasifier A heating at a rate of [REDACTED] achieved to properly dry out the repaired refractory on the Syngas Coolers.
- APR 3: Gasifier B coal feed rate reduced temporarily due to ash leaks on CCAD and CFAD ash handling systems while leaks were repaired by replacing leaking piping.
- APR 3: Repairs to Windbox on Coal Pulverizer #4 completed.
- APR 4: Recovered Water Polymer Addition System – new larger polymer injection pumps were installed over the previous weekend and successfully commissioned today.
- APR 5: Gasifier B coal feed rate reduced temporarily due to ash leaks on CCAD and CFAD ash handling systems while leaks were repaired by replacing leaking piping.
- APR 5: Repairs to Windbox on Coal Pulverizer #6 were completed.

- APR 6: Gasifier A and its Syngas Cooler achieved [REDACTED]
- APR 7: Gasifier A and its Syngas Cooler achieved [REDACTED]
- APR 7: Gasifier B coal feed rate increased to [REDACTED]
- APR 7: Train 2 AGR was restarted after an earlier shutdown due to a simultaneous trip of all the plant ammonia refrigeration compressors with quality MP CO<sub>2</sub> being supplied to the CO<sub>2</sub> pipeline.
- APR 8: Coal feed established to Gasifier A at [REDACTED]
- APR 8: CTB resumed co-firing with syngas at 46%.
- APR 9: Gasifier A coal feed rate was increased to [REDACTED]
- APR 9: CTA started co-firing with syngas at 60%.
- APR 10: Train 1 AGR started processing syngas with quality CO<sub>2</sub> being supplied to the pipeline from the LP CO<sub>2</sub> Flash Drum.
- APR 10: The Wastewater Ammonia Purifier Reflux Pump was swapped out with the Wastewater Ammonia Purifier Bottoms Pump (PU-0057B) until a replacement Reflux Pump is received.
- APR 11: Additional leaks on Windbox of Pulverizer #6 were repaired.
- APR 11: Gasifier B experienced difficulties conveying ash out CCAD system.
- APR 12: Train A Extraction Air Compressor (CO-1004) was brought online.
- APR 12: Gasifier B coal feed rate was reduced and syngas was pulled from CTB while CCAD system was placed under a clearance to investigate cause of ash plugging. [REDACTED]
- APR 12: After Gasifier B 1<sup>st</sup> PLD (primary) on CCAD FL-2230 was pulled and the screen was found collapsed blocking the ash flow, this PLD was replaced with a spool piece.
- APR 12: After processing [REDACTED] the Venturi Scrubbers with no issues earlier in the week, issues with the system were detected with the polymer not attaching to the coal fines due to a possible mix issue.
- APR 12: After CTA tripped due to a NO<sub>x</sub> steam limit switch fault when backing down from 100% syngas because of low coal feed rates, CTA was brought back on line on natural gas.
- APR 12: Syngas was pulled from CTB due to high ash levels in Gasifier B.
- APR 13: Gasifier A coal feed rate was holding at [REDACTED]
- APR 13: CTA resumed co-firing with syngas at 59% while CTB operated on natural gas.
- APR 14: Gasifier B coal feed rate at [REDACTED] with ash level in the Standpipe at 104' while flaring before the gas turbine.
- APR 14: After Gasifier B CFAD system leak was detected Operations isolated leaking piping and issued a clearance to make repairs.
- APR 14: With Dryer train 5 down, crews patched leaks on the Windbox of Pulverizer #5.
- APR 15: Gasifier A coal feed rate was reduced to [REDACTED] and discovered CCAD FL-1130 and FL-1230

were not pulling ash out of Gasifier A due to restrictions in the PLDs on both legs of the CCAD system.

- APR 16: Gasifier A coal feed was suspended and gasifier was placed on direct diesel injection (DDIs) to maintain temperature at 1700F.
- APR 16: After inspecting the Hydrogen Sulfide Stripper Reboiler (HX-0042), crews found tube leaks and around 60% of the tubes plugged. This is the new reboiler that was fabricated out of the same material as the original (carbon steel) in early February 2017.
- APR 16: After tripping twice over the weekend, CTA was brought back on line burning natural gas.
- APR 18: After hydro blasting the plugged H<sub>2</sub>S Stripper Reboiler tubes and plugging the known tube leaks, a pressure test revealed additional tube leaks.
- APR 18: CTB was brought back on line burning natural gas.
- APR 19: Additional identified leaking tubes in the H<sub>2</sub>S Stripper Reboiler were plugged.
- APR 19: To date CTA has achieved 620.3 total operating hours on syngas while producing 48,827 MWH on syngas and CTB has achieved 1,057.3 total operating hours on syngas while producing 78,196 MWH on syngas.
- APR 20: Soon after Operations resumed pulling ash from Gasifier B, they discovered some CCAD fluidization lines were plugging due to the process pressure in the CCAD system being higher than the nitrogen pressure being used for fluidization.
- APR 20: Both Train A and B CCAD systems experienced operational failures the past week due to screens collapsing in the CCAD PLDs. On Gasifier Train A, crews replaced PLDs on both FL-1130 and FL-1230 legs this week with a combination of new CFAD and CCAD PLDs: a total of 5 new PLDs were replaced, 1 old PLD was reused, and 2 PLDs were removed and replaced with straight pipe spools. On the Gasifier Train B CCAD system, a total of 4 new PLDs were replaced, 1 old PLD was reused, and 3 PLDs were removed and replaced with straight spools.
- APR 20: Train A Dryers – All three Dryer trains were down for the past week for cleaning and while modified grizzlies/diffuser plates were installed in Dryers 1 and 2. Train B Dryers – All three Dryers were cleaned and inspected and modified grizzlies/diffuser plates were installed in Dryer 4.
- APR 20: MPC management determined that the Hydrogen Sulfide Stripper Reboiler HX-0042 was beyond repair – out of a total of 460 tubes over 200 tubes were being plugged with an additional pressure test pending to check if any more would need to be plugged.
- APR 20: PCD FL-1106 was determined to be leaking ash as particulates were detected in the upper section of FL-1106. It is possible that this leaking ash could be the cause of the plugging and erosion of the H<sub>2</sub>S Stripper Reboiler tubes.
- APR 20: Both CTA and CTB were online each producing 120 MW burning natural gas.
- APR 21: Gasifier A was shut down to repair the ash leak in PCD FL-1106. Gasifier B continues to operate on DDIs while flaring before the Syngas Scrubber.
- APR 24: The 6<sup>th</sup> 7-blade internal Rotary Inlet Air Lock was installed on Train 3.
- APR 26: Crews have removed the back pulse piping and blow back pots on PCD FL-1106 and started removing the old modular PCD filter canisters (tubesheets) and replacing them with new modular tubesheets.



- APR 27: Operations started removing the old modular PCD filter canisters (tubesheets) from PCD FL-1206, which will be replaced with new modular tubesheets.
- APR 27: To date, of 48 total CFAD PLDs (Pressure Letdown Devices) in both Gasifier trains (8 groups of 6 PLDs, 24 CFAD PLDs per Gasifier train), six (6) have been replaced with new design PLDs (FL-1120A 1, 2, 3, 4, 5 & 6). Of 16 total CCAD PLDs in both Gasifier trains (4 groups of 4 PLDs, 8 CCAD PLDs per Gasifier train), 15 have been replaced with new design PLDs and one has been replaced with an old design PLD.
- APR 27: Modified grizzlies/diffuser plates were installed this past week in Dryer 3.
- APR 27: New inlet chutes lined with a plastic to prevent coal sticking have been installed between the Roll Crusher and the Rotary Inlet Air Lock on Coal Dryer Train 4 and old chutes have been removed from trains 2, 3, 5 and 6. Chutes in all six trains will be replaced with the new design, which will hopefully minimize/eliminate chute fouling.
- APR 27: Spare H<sub>2</sub>S Stripper Reboiler was received; crews will install isolation valves, which will facilitate installation of new reboiler with Incoloy 825 tubes in 10-12 weeks.
- APR 27: To date, CTA has operated 620.3 total hours on syngas producing 48,827 MWH on syngas; CTB has operated 1,057.3 total hours on syngas producing 78,196 MWH on syngas.
- APR 28: Installation of all 12 Venturi Scrubber duplex strainers on Gasifier trains A and B is in progress with priority on completing Train B this week and Train A next week.
- APR 28: The Wet Sulfuric Acid (WSA) system and CO<sub>2</sub> Product Compressors A and B have been offline the past week.
- APR 28: Piping for the new acid injection system for the Hydrogen Sulfide Stripper Column is being installed.

## Startup

- At the end of March, total startup employee staffing was at 65, including 7 SCS startup employees, 55 supplemental, and 3 OPCO's staff; plus 313 contractor craft support (grand total of 378 – a decrease of 17 from end of February).
- Startup Issues / Focus Areas (as of April 16, 2017)
  - Gas turbines on syngas – demonstrated transitions between natural gas and syngas without turbine trips; working toward full load on syngas.
  - Syngas coolers – capped total of 7 superheater tubes on Train A (4 on south exchanger and 3 on north exchanger); repaired refractory damage on both exchangers.
  - Lignite preparation equipment commissioning – modifying dryer feed zones to improve material distribution and prevent plugging; managing treatment of venturi scrubber recovered water for reinjection in syngas scrubbers; demonstrate adequate throughput to support sustained gasifier operation.
  - Wet Sulfuric Acid – produced and delivered on spec sulfuric acid.
  - Ash Removal – replacing damaged PLD's when available; repairing ash leaks caused by erosion.
  - Compressors – Train A and B CO<sub>2</sub> product compressors final testing complete; started charging CO<sub>2</sub> to pipeline on 1/12, Denbury accepted product 2/27; both Extraction Air Compressors integrated into process air header.

- Sour Water – acid injection system installed; producing and recycling ammonia; replacing H<sub>2</sub>S stripper reboiler with improved metallurgy.
- Through April 23, 2017, startup progress was 96.1% complete overall (0.1% increase from March 26) vs. planned 100%.
  - 968 TOP's have been commissioned out of a total of 968 (100% complete). 41% (398 of 968) have been turned over from startup to operations (mostly CC and associated BOP).
  - Startup test packages are 99% complete (95 of 96 complete). The only remaining test package is currently in progress and is not required prior to TOD.
  - Overall, I/O checks are 100% complete for base scope. New scope accounts for all of the remaining points that require testing.
  - Startup to Operations punchlist summary for base scope (excluding scope additions) shows a decrease in remaining open items from 785 on March 26 to 98 on April 23 (none of these are high priority).
  - MPC reported the following startup achievements in April:
    - Gasifier 'A' outage completed.
    - Exceeded five days continuous power generation from syngas on CT-B with byproduct generation.
    - Resumed Train 'A' coal feed.
    - Co-firing syngas on both CT-A and CT-B.
    - Completed Ammonia Purification Package Commissioning Milestone.
    - Completed Train 'A' Relative Accuracy Test Audit (RATA) testing.
    - Siemens has agreed to a logic change allowing for up to 80% co-firing.

## Operations and Maintenance

Overall 286 of the planned 309 permanent employees are on staff (335 of 309 including contractors). Current supplemental contract staff will be considered for remaining 23 permanent positions.

Process Safety Management (PSM) program development:

- All 14 PSM elements are complete (ready for chemicals).
- IM has requested final PSM Audit Report showing completion of all open actions noted in the March 2016 Draft Report.

CC Operation:

- 2017 year to date EFOR on natural gas is 0.51% through April 26, 2017.
- Through April 26, 2017, CTA has operated 620 hours on syngas producing 48,827 MWHs while CTB has operated 1,057 hours on syngas producing 78,196 MWHs.

#### Gasifier Operation:

- Through April 26, 2017, syngas production has totaled 1,756 hours (73 days) on Train A and 2,797 hours (117 days) on Train B.

#### Integrated Operation:

- Through the end of April, both trains have operated simultaneously while producing electricity from syngas on both turbines for a total of 138 hours (maximum continuous integrated run time of 54 hours from January 29 - 31).

#### Land

#### **IM Review of Documents and Purchases from the Kemper County Courthouse, Lauderdale County Courthouse, Review of Land Purchases For 2016 and Update on the Lawsuit Concerning the Kemper IGCC Power Plant Site and Liberty Mine, Kemper County, Mississippi**

In the March 2017 report, the IM reported that there were two new purchases of coal mining land in Kemper County, MS., three new coal leases in Kemper County, MS., three new purchases of mining land in Lauderdale County, MS., no new coal leases in Lauderdale County and the status of the Kemper County lawsuit.

In this April 2017 report the IM will discuss one new purchase of coal mining land in Kemper County, MS., a Quitclaim Deed relating to the purchase, one new coal lease in Kemper County, no new purchases or Coal Leases in Lauderdale County, MS., Mississippi Power Company's (MPC) coal mining land purchases for the year 2016, and developments in the appeal of the Kemper County lawsuit to the Supreme Court of Mississippi.

The IM has reviewed the above described information and determined the following:

- MPC purchased one new tract of land in Kemper County, MS. in the last month totaling 40.0 acres, more or less, located in Section 28, Township 9 North, Range 15 East from the Camon Wooten Trust No. 1, et al.
- MPC filed one Memorandum of Coal Lease in Kemper County, MS. covering 1.0 acre, more or less, in Section 34, T 9 N, R 15 E, from Sheila Wooten.
- MPC did not purchases any new coal mining land or coal leases in Lauderdale County, MS. in the last month.

- For the year 2016 MPC has purchased 1,072.59 acres, more or less, of coal mining land for a total consideration of [REDACTED] or [REDACTED] per acre.
- MPC has purchased a total of 5,491.94 acres, more or less, of coal mining land for a total purchase price of [REDACTED] or [REDACTED] per acres since the first purchase of coal mining land.
- The Kemper County Lawsuit proceeds with an extension until May 10, 2017 for the court reporter to complete the case transcript.
- There have been no other lawsuits filed in Kemper County, MS. in the last month.