

IM Monthly Report



Mississippi Public Service Commission Kemper IGCC Project

May, 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 May, 2017, and review of the project status reported by MPC for the period from March to May, 2017 (Production Meeting Reports April 19 and May 22, 2017, March and April 2017 PSC Reports, and Kemper County IGCC Weekly Executive Summary and Metrics through May 28, 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):

- May, 2017 – Accounting audit of financial records from end of February, 2017 through end of March, 2017 held at MPC offices in Gulfport, MS (Appendix C).
- May, 2017 – Daily monitoring of on-going site construction and startup activities at the jobsite (Appendix E).
- Week of May 8, 2017 – Review of gasifier startup activities held at the jobsite (Section 1.10).
- May 8 and 9, 2017 – Review of project EPC status and held at the jobsite (Appendix D).
- May 18, 2017 – Hand over of remaining land reviews to MPSC consultant (Appendix A).
- May 31, 2017 - Teleconference with MPC and SCS to discuss status of open RFI's (Appendix B).
- June 6, 2017 - Hand over of remaining permit reviews to MPSC consultant (Appendix A).

Project Status through April, 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 May, there were twenty one (21) new awards issued for:

- 1) Sump Pump for Sedimentation Pond for RP #4086;
- 2) CCAD Aeration Flow Control Valves for RP #4114;
- 3) Pressure Letdown Device (PLD) Backpulse Valves for RP #4195;
- 4) Gasifier Sump Pumps for RP #4086;
- 5) Gasifier Submersible Sump Pumps for RP #4086;
- 6) Gasifier Sump Booster Pumps Minimum Flow Valves for RP #4086;
- 7) Ash Dewatering Pad Sump Pump Piping Valves for RP #3634;
- 8) IP Steam Sparger Shutoff Valves for RP #4128;
- 9) CFAD Aeration and Fluidization Valves for RP #4253;
- 10) Ash Dewatering Pad Sump Pump Piping Backpressure Diaphragm CV for RP #3634;
- 11) Electric Heater to Replace HX0075A for RP #4258;
- 12) WSA Quench Column Gas Distribution Plate for RP #4098;
- 13) Lube Oil Filter Skid for RP #4172;
- 14) Manual Valves for CO0041 Recirculation Loop for RP #4112;
- 15) HX2104 Plate Pack for RP #4263;
- 16) Leak Detection System;
- 17) Pressure Regulator for RP #4094;
- 18) Pressure Control Valves for RP #4196;
- 19) Carbon Steel Pressure Relief Valve for RP #4252;
- 20) HX1007/2007 for RP #4040;
- 21) Manual Ball Valves for RP #4094.

In addition, one vendor recommendation was approved for Syngas Scrubber Upper Bed Packing Replacement.

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 5/23/17, 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 and are on going.

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 April, 2017, including mine Allowance for Funds Used during Construction (AFUDC), was unchanged at \$232 million, 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 April, 2017, contracts totaling \$2.176 billion have been awarded to MS companies, and total MS spending is \$2.160 billion (about 29% of the total, including uncapped costs). MS workforce contributed 232 construction jobs and 413 plant/mine jobs in April. A total of 572 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 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 – *the current strainers were not designed to handle the level of solids being carried over; new duplex strainers have been installed on all 6 trains.*
- Recovered water filtering – *generating 1.5 million gpd more water than expected; a trial coal fines removal system has been installed consisting of polymer (flocculent) injection, and a polymer dilution system was added to prevent plugging of the candle filters; system testing in progress (good early results); moving to permanent equipment.*
- Plugging issues at the roll crushers - *new 7 blade internal Rotary Inlet Air Locks have been installed on all 6 trains; will also install auto lube systems (purchased; 1 of 6 installed).*
- Lignite dryer solids accumulation – *backup in feed zone eventually trips inlet feeders; modified fluidization grid plates and grizzly bars have been installed on all six dryers and are being monitored for process optimization (good early results).*
- Lignite dryer weigh belt feeder plugging – *coal fines growth from the walls requires on-going maintenance to clean out; periodically damages the belt feeder; lined feed chutes have been installed on all six dryers; will install air rappers on discharge chutes.*
- Lignite dryer relief valves - *new loop seals are being installed on all 6 dryers to replace the existing PRV's which have been lifting and not reseating.*
- 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; ash is leaking through PLD filters; routed PLD vent piping to ash silos; replacing PLD's with new design when available (40 of 64 replaced); replacing piping in key areas with more wear resistant material; Administrative*

Controls will be implemented to ensure safe operation while repairs are being completed.

- *Syngas cooler tube leaks – In May, additional leaks were found on Train B that have been capped; to date a total of 19 tubes have been capped on Train A and 18 tubes on Train B; Root Cause Analysis and long term solution has been requested (see Appendix B, RFI 2-893); considering acoustic monitoring system; operational changes will be implemented to reduce stresses; syngas cooler superheater sections will be replaced post in service (18 to 24 months).*
- *Train A 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 18 candle filters in one PCD and 5 candle filters in the other PCD was completed; leak source was determined to be a failed gasket that was also replaced.*
- *Ash unloading system – modifications on all 4 ash moisturizers have improved operation; dust suppression still an issue at times during unloading for disposal; ash unloading facilities will be relocated to the ash management unit post in service.*
- *Ash disposal – all material stored in the ash management unit must meet maximum moisture requirements; current process at start and end of run may not meet moisture requirements; installing an ash dewatering pad to dry out noncompliant loads (10 trucks/day, 4 tons/truck).*
- *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 installation of online analyzers; H2S stripper reboiler is plugging and experiencing tube leaks due to ash carryover from the PCD's (see above) and metallurgy; reboiler will be replaced (again) with new metallurgy [REDACTED] will provide spare exchanger and new isolation valves to improve future replacement duration.*
- *Process Water Management – current 5 million gallon storage is insufficient; installed new 1.7 million gallon temporary tank; considering additional permanent tankage (3.5 million gallon) and Zero Liquid Discharge (ZLD) plant (800 gpm).*
- *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 (demurrage costs \$1 million in January); will install additional liquid nitrogen storage tank; considering 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 (May, 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; 15 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 April, 2017 for approved items (\$166 million) and through May 31, 2017 for pending items (4 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; short term plan posted. 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 (response pending).*

Project Cost and Schedule

In the April, 2017 PSC Report, MPC reported a delay in forecast in service date from end of May to end of June, 2017, and an increase in forecast capped cost of \$186 million now at \$5.935 billion, including a decrease in base contingency of \$1.0 million now at \$12.9 million and no change in Schedule Risk at zero. Forecast schedule delay was due to needed repairs of leaks in the syngas coolers on Gasifier B which required an outage. Forecast capped cost increase was due to schedule delay (\$22 million), and potential post-in-service improvement projects required to achieve long term sustained operations (\$164 million), which includes expected replacement of the syngas cooler superheaters (\$125 million), relocation of the ash unloading process (\$35 million), and other minor enhancements (\$4 million). Forecast uncapped costs increased in April by \$23.5 million now at \$1.569 billion, due primarily to increases in AFUDC costs (\$16.4 million).

Total capped spending for the plant through March, 2017, with deduction for Department of Energy (DOE) funding, was \$5.669 billion. Overall plant EPC remained at 99% complete. Uncapped spending through April was \$1.509 billion. Refer to Appendix G for the PSC Report Summary.

As of May 28, 2017, the current working schedule indicates TOD of 6/9/17, which is a 576 day slip from the November 2014 rebaseline date, and a 22 day slip from the 4/23/17 report. TOD is driven by receiving and replacing the ferrules in Train 'A', releasing clearances, conducting the gas-side leak check then restart of Train 'A' followed by sustained two-train integrated operations.

Overall project execution status was reviewed on May 9, 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 June, 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 March 31, 2017, and the examination of special-purpose Forecasted Schedules for the period beginning April 1, 2017, through the completion of the Project.

On June 5, 2017, the Company filed their April 2017, monthly Form 8K with the SEC which increased its Capped Plant Cost Current View (forecast) for the Kemper IGCC Project to approximately \$5.935 billion, net of DOE grants and Cost Cap Exceptions. The Company's Monthly Status Report through April 2017, increased its Current View (forecast) of Total Exemptions and Exceptions (Non-Capped Cost) to approximately \$1.569 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 April 2017, is \$7.505 billion.

Kemper IGCC Schedule and Cost Estimate

The Company's Current Report on Form 8-K dated May 1, 2017 disclosed an expected in-service date by the end of May 2017 for the remainder of the Kemper IGCC. During May, the Company completed work to repair a leak in one of the particulate control devices for gasifier “A,” to make other minor modifications to each gasifier's ash removal systems, and to repair the sour water system. However, the Company also experienced leaks in the syngas coolers on gasifier “B” which required an outage to address the leaks and to make modifications to the syngas coolers on both gasifiers. The Company has completed this outage, is evaluating any potential warranty claims, and is in the process of resuming production of electricity using syngas from the gasifiers. The Company now expects the remainder of the Kemper IGCC, including both gasifiers, will be placed in service by the end of June 2017. The schedule reflects the expected time needed to establish sustained operation of both gasifiers to produce electricity from syngas.

In addition, after gaining experience through startup and operational testing over nearly 200 days of coal operation, the Company has completed its evaluation of certain potential post-in-service improvement projects related to plant performance, safety, and/or operations. Specifically, achievement of long-term sustained operations is expected to require the redesign and eventual replacement of the syngas cooler superheaters sooner than originally expected, primarily as a result of the leaks experienced (estimated to be an 18 to 24 month process). Long-term operations are also expected to require relocation of the ash loading process and other minor enhancements. These additional capital projects are expected to be subject to the \$2.88 billion cost cap established by the Commission as they are undertaken over the next several years and may further negatively impact certain economic aspects of the Kemper IGCC. The Company's evaluation of additional post-in-service improvement projects is expected to continue.

The April Monthly Status Report contains further increases in the cost estimate subject to the cost cap for the Kemper IGCC of approximately \$22 million reflecting the cost of extending the projected schedule through June 30, 2017 and lower-than-expected start-up and fuel costs, and approximately \$164 million related to the expected post-in-service operational improvement projects described above (and exclusive of any potential warranty claim recoveries), for a total increase of \$186 million.

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 or syngas coolers, 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 (in addition to those described above) ultimately may be completed after the remainder of the Kemper IGCC is placed in service. These additional 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 June 30, 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 these matters cannot be determined at this time.

Kemper IGCC Rate Recovery

The In-Service Asset Rate Order provides for retail rate recovery of approximately \$126 million annually, including amortization of certain regulatory assets over periods ranging from two to ten years, with the two-year amortization expiring in July 2017.

The Company and the Mississippi Public Utilities Staff have been discussing the status of the Kemper IGCC project and the nature and timing of a rate filing to address recovery of the approximately \$3.4 billion in Kemper IGCC costs not currently in rates. In light of these discussions and to comply with the In-Service Asset Rate Order, on June 5, 2017, the Company made a rate filing with the Commission solely to address the expiring two-year amortization by accelerating the amortization schedule, beginning August 2017, of the remaining regulatory asset balances, which were previously reviewed and determined prudent, to be recovered through June 2018. If approved by the Commission, the proposal would maintain the current annual revenue requirement of approximately \$126 million with no change in customer rates. The Company expects the Commission to make a decision on this matter during the third quarter of 2017.

As previously disclosed in the December 31, 2016 Form 10-K and the March 31, 2017 Form 10-Q, the Company continues to develop both a traditional rate case and a rate mitigation plan to address the recovery of the remainder of the Kemper IGCC project costs not currently in rates; however, the timing of that filing is uncertain. The Company also continues to expect that timely resolution of such filing will likely require a settlement between the Company and the Mississippi Public Utilities Staff (and other parties) and may include other operational or cost recovery alternatives. Although the ability to achieve a negotiated settlement is uncertain, the Company intends to pursue any available settlement alternatives and will also continue to consider other possible operational and cost recovery options. The ultimate outcome of these matters cannot be determined at this time and could result in further material charges.

Discipline Summaries

Environmental / Permitting

CCE has completed its review of additional environmental/permitting documentation provided by MPC since June 2016.

All documents provided by MP for the Kemper Plant and Linear Facilities are summarized in this monthly report. The documents summarized in this monthly report include two (2) annual monitoring report for wetland mitigation areas as required by the Section 404 (Wetlands) permit, two (2) Discharge Monitoring Reports for permits issued for Plant Ratcliffe permitted outfalls (three), and a quarterly monitoring report as required under the Record of Decision (ROD) and Mitigation Action Plan (MAP) for the Department of Energy.

There were no exceedances of Section 404 (Wetlands) permit conditions, Section 401 (Water Quality) permit conditions or ROD/MAP conditions reported.

A complete listing of documents reviewed as of May 2017 for the Kemper Plant and Linear Facilities are shown in Table 1.3.1 and for the Liberty Mine in Table 1.3.2.

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.

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 May 8 (see Section 1.10). Next visit is scheduled for week of June 12.

Key Technical Milestones Not Yet Achieved as of 01 JUN 2017

- 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 4-5 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 the current maximum capacity limit (80%) imposed by the combustion turbine vendor 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 the turbine vendor prior to the next borescope inspection and complete that inspection with no concerns noted by vendor.
- Demonstrate ability to export on-spec CO₂, ammonia, and wet sulfuric acid products at near full 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, CO₂, 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 of time.

- 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 significant difficulties continuously withdrawing ash from each Gasifier through its associated CCAD system (including CCAD PLDs) and reliably discharging it from the Ash Moisturizers, OR
 - Experiencing significant difficulties continuously withdrawing ash from each PCD through its associated CFAD system (including CFAD PLDs) and reliably discharging it from the Ash Moisturizers, OR
 - Any operational problems in the twin gasifier coal preparation/feed systems, Syngas Coolers, AGR trains, or combustion turbines CTA and CTB, that restrict or curtail syngas production or power generation based on syngas fuel use.
- Demonstrate ability to reliably operate the Venturi Scrubber – Recovered Water Filter System in both Trains A and B along 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 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 May 2017

- MAY 1-6: Gasifier A was down the first week in May to complete ash leak repairs in PCD FL-1106 and thermocouple replacements in PCD FL-1206. In PCD FL-1106 all 18 candle filter bundles were removed and replaced with a leaking gasket found in the last tube bundle removed. In PCD FL-1206 crews replaced 5 candle filter bundles that had failed thermocouples.
- MAY 5: Gasifier B: After maintaining gasifier solids circulation and temperatures at 1200 degrees F using Direct Diesel Injection (DDI) nozzles since APR 12, coal feed to Gasifier

- A was resumed initially at a low rate while working on a stuck DDI injector and then increased to [REDACTED] at 215 psig after DDI injector was successfully withdrawn.
- MAY 6: Gasifier B coal feed rate was reduced to [REDACTED] at 135 psig due to ash leaks in both CFADs.
 - MAY 6: The re-tubed Hydrogen Sulfide Stripper Reboiler was installed along with the new isolation valves. The old leaking Reboiler was sent off to be refurbished while waiting on the new higher-alloy Hydrogen Sulfide Stripper Reboiler to arrive.
 - MAY 7: Gasifier B CFAD leaks were resolved and coal feed rate was increased to [REDACTED] at 295 psig.
 - MAY 7: Pressure testing of Gasifier A was completed.
 - MAY 8: Gasifier A heat up using Startup Burners began.
 - MAY 8: Management made decision to begin controlled shut down Gasifier B due to suspected leaks in section of Syngas Cooler (Superheater HX-2113).
 - MAY 10: Gasifier B – using acoustic monitoring technique, plant operations determined that four outer tubes of Superheater HX-2113 were leaking.
 - MAY 10: Gasifier A at 1200 degrees F operating on Direct Diesel Injection (DDI) nozzles
 - MAY 11: Coal feed started to Gasifier A at with a feed rate of [REDACTED] at 175 psig as small CCAD and CFAD leaks were repaired while flaring syngas after the Syngas Scrubber
 - MAY 11: Four leaking tubes in Gasifier B Syngas Cooler Superheater HX-2113 were capped and NDE testing completed.
 - MAY 12: After draining water accumulation in multiple sections of Gasifier B Syngas Cooler, it was determined that many of the ceramic ferrules in Steam Generator A (HX-2110) and Steam Generator B (HX-2210) were broken or cracked and must be replaced.
 - MAY 13: Gasifier A coal feed rate was increased from [REDACTED] while sending syngas to CTA.
 - MAY 14: After increasing coal feed rate to Gasifier A to [REDACTED] the level in the Gasifier Standpipe increased to 88' due problems discharging coarse ash from the gasifier through the CCAD system; so, coal feed rate was reduced to [REDACTED].
 - MAY 14: Gasifier A tripped due to PRVs in the downstream Acid Gas Removal (AGR) unit lifting; Gasifier A was brought back on-line within 13 minutes, but PRVs continued leaking.
 - MAY 14: Syngas feed to CTA was suspended when Gasifier A tripped and it was switched to natural gas fuel.
 - MAY 15: Management decided to suspend coal feed to Gasifier and place it on DDIs while repairs to AGR PRVs were completed.
 - MAY 15: Wet Sulfuric Acid (WSA) unit was placed in hot standby mode.
 - MAY 16: Management decided to start controlled shutdown of Gasifier A due to a required combined cycle outage to repair a leaking condenser tube. During this shutdown, all ceramic ferrules in Syngas Cooler Steam Generators will be removed and replaced and the tubes inspected for leaks. Crews will also inspect the tubes and replace the ceramic ferrules in Economizers I (HX-2213) and II (HX-2214) while Gasifier A is down.
 - MAY 17: Both Combustion turbines CTA and CTB, which had been running on natural gas feed, were shut down after a leak in the Steam Turbine Condenser required both HRSHs and the Steam Turbine to shut down. One leaking tube in the Steam Turbine Condenser was repaired.

- MAY 18: One leaking tube due to erosion in Gasifier A Syngas Cooler Steam Generator B (HX-2210) was plugged and several eroded tubes were repaired by buttering the eroded metal tube surface.
- MAY 18: After discovering and draining a significant amount of water from Gasifier B PCD Fines Receiver (HX-2218), inspection of 2200 CFAD PLDs began.
- MAY 18: New loop seal on Train 3 Coal Dryer was installed.
- MAY 18: CTA and CTB were restarted on natural gas.
- MAY 18: Permanent mechanical plug was installed in the bottom of the leaking tube on Gasifier Train B Syngas Cooler Steam Generator B (HX-2210).
- MAY 18: Crews inspected the A and B legs of Gasifier Train B CFAD FL-2220 and found all 6 PLDs on A leg filled with wet ash and PLD 1 on B leg wet and PLD 3 with a collapsed screen.
- MAY 20: Five new design PLDs were installed on each leg of Gasifier Train B CFAD FL-2220 with PLD 4 being deleted/by-passed on both legs.
- MAY 22: Gasifier B pressure tested to 600 psi.
- MAY 22: New loop seal on Gasifier A train 3 Coal Dryer was installed.
- MAY 24: Hydrotesting the piping for the permanent acid injection system from the new Acid Tank to the Hydrogen Sulfide Stripper Column was completed.
- MAY 25: Plant Operations in consultation with the Syngas Cooler vendor decided to plug all tubes on coil 5 (outermost tube coil) in all 4 Superheater II sections in Train B.
- MAY 25: New Venturi Scrubber duplex strainers were installed on trains 1 and 2 during the past week while Gasifier A Train was down. New Duplex Strainers have now been installed on all 6 trains.
- MAY 25: In Gasifier Train B CFAD System five new design PLDs have now been installed on the A leg of FL-2120 with PLD 4 being deleted/by-passed. Crews completed the delete/by-pass piping on the 4th PLD on FL-1120A. The total number of new design PLDs that have been installed in Gasifier Trains A and B CCAD and CFAD systems is now 40 out of 64.
- MAY 27: Gasifier B reached 1700 degrees on DDIs and coal feed was reestablished; at 10:13 pm a high-high PCD temperature rate of change alarm due to a faulty thermocouple on the PCD Candle Filters tripped the Gasifier. Coal feed was reestablished at 11:43 pm at [REDACTED] at 416 psi.
- MAY 30: Gasifier B tripped due to a blown wrong size fuse in Process Air Compressor 3. All fuses were changed out and the compressor and Gasifier B were brought back online later that day.
- MAY 30: After coal feed was re-established in Gasifier B, operations noticed there was an inconsistent flow through the Gasifier Seal Leg. At 4:34 pm Gasifier B again tripped due to high temperatures in the Riser at the Lower Mixing Zone from a lack of flow through the Seal Leg through which ash circulates from the Gasifier Primary Cyclone to the Gasifier Standpipe.
- MAY 30: At 6:32 pm coal feed to Gasifier B was resumed but at low feed rates of [REDACTED] and a low pressure in the gasifier at 209 psig this time due to restricted flow through the Secondary CCAD Cooler.
- MAY 31: Low flow issue through Gasifier B Secondary CCAD Cooler was resolved and coal feed rate to Gasifier was increased at 5:03pm.
- MAY 31: Around 10 pm the PRV (PRV-24181) off of the Gasifier B PLD Vent Gas Drum (DR-2043) developed a leak. Coal feed to Gasifier B was suspended and the gasifier is

operating on DDIs and one Startup Burner while operations isolates and replaces the PRV, which has a hole in the body on the HP Flare discharge side due to ash erosion.

- MAY 31: Gasifier A – Inspection and ferrule replacement was completed in in all four Economizers and in Steam Generator HX-1110 which have been resealed.
- JUN 1: Gasifier A pressure testing at 300 psi and leak fixing is in progress.
- JUN 1: Gasifier B is running on DDIs and one Startup Burner at 1305 degrees and 25 psig while maintenance replaces the packing on the other Startup Burner (AH-2303) before placing it back in service.

Startup

- At the end of April, total startup employee staffing was at 64, including 7 SCS startup employees, 54 supplemental, and 3 OPCO's staff; plus 291 contractor craft support (grand total of 355 – a decrease of 23 from end of March).
- Startup Issues / Focus Areas (as of May 14, 2017)
 - Gas turbines on syngas – demonstrated transitions between natural gas and syngas without turbine trips; working toward full load on syngas.
 - Particulate Control Devices – replaced all 18 modules on PCD 1106 and 5 modules on PCD 1206; all element mounted thermocouples replaced; one module to tubesheet gasket replaced.
 - 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; focusing on at least one complete line; working spare line while unit is operating; repairing ash leaks caused by erosion.
 - Compressors – both Extraction Air Compressors integrated into process air header.
 - Sour Water – replaced damaged H2S stripper reboiler with old metallurgy and returned to service; upgrading bottoms pumps drives and seals.
- Through May 28, 2017, startup progress was 96.2% complete overall (0.1% increase from April 23) 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 98 on April 23 to 36 on May 28 (none of these are high priority).

- MPC reported the following startup achievements in May:
 - Sour water stripper reboiler replacement work completed (old design).
 - Sold first shipments of on-spec sulfuric acid.
 - Completion of Train B outage repairs and resumption of Train B operation.

Operations and Maintenance

Overall 292 of the planned 309 permanent employees are on staff (340 of 309 including contractors). Current supplemental contract staff will be considered for remaining 17 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 1.43% through May 28, 2017.
- Through June 8, 2017, CTA has operated 673 hours on syngas producing 53,365 MWHs while CTB has operated 1,092 hours on syngas producing 81,275 MWHs.

Gasifier Operation:

- Through May 28, 2017, syngas production has totaled 1,855 hours (77 days) on Train A and 2,938 hours (122 days) on Train B.

Integrated Operation:

- Through the end of May, 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 For the Kemper IGCC Power Plant, Liberty Mine Coal Leases, Liberty Mine Coal Land Purchases, and Kemper Power Plant Linear Facilities, Lauderdale and Kemper Counties, Mississippi (the Kemper Project)

The URS IM Team (IM) is pleased to present the following summary report on land acquisition activities for the Kemper Project through May 31, 2017. This is a supplemental report to the summary on land purchased for the Kemper Project through March 31, 2013. The following exhibits are attached to provide further information relating to the topics covered in this report;

Exhibit "A" - Copy of the Land Section Prudency Review Summary Report,
Exhibit "B"- Summary of Requests for Information For Kemper Project Land, and
Exhibit "C"- Highlight Summary of Monthly URS Land Reports.

In this May 2017 Final Land Report the IM will discuss and provide an overview of purchases for the plant site and buffer lands in Kemper County, MS., an update regarding the Kemper County lawsuit regarding severed mineral owners under the Plant site, Coal Leases for the Liberty Mine and the purchases of Coal Mining Land for the Liberty Mine which supplies coal for the Plant and the Linear Facilities for the Kemper IGCC Power Plant.

Highlights of this report are the following:

- Mississippi Power Company (MPC) has purchased 3,297 acres of land in Kemper County, MS. for the plant site, buffer lands, mining facilities and wetlands mitigation for a total cost of \$16,054,089 which equals an average cost \$4,870 per acre.
- The Barham versus MPC lawsuit continues with an appeal to the Mississippi Supreme Court. At present the court reporter has until June 10, 2017 to transcribe and file the court transcript.
- The Liberty Mine Area of Interest consists of over 31,000 acres divided into four (4) mine blocks for the forty (40) year mining plan. Through April 30, 2017 MPC has mined 106 acres of land for coal which produced 1,485,464 tons of coal and paid \$744,253 in coal royalties.
- MPC has leased 9,772 net coal acres as of March 31, 2017. MPC has spent \$4,167,293 on these leases. This figure includes advance royalty payments, non-recoupable payments and production royalties.
- MPC did not purchase any new coal leases in the last month in Kemper or Lauderdale Counties, MS.
- MPC has purchased 5,029.04 net acres of coal mining land through April 2017 in 157 purchases for [REDACTED] which equals an average cost [REDACTED] per acre.
- MPC purchased another interest in the Crogman Wooten, Sr. Estate in Kemper County, MS in the last month. MPC purchased a 1/14th interest from Shelia F. Williamson in 15.8

acres, more or less, in Section 27, Township 9 North, Range 15 East. This purchase brings the interest acquired in the Crogman Wooten, Sr. Estate up to 44.42 net acres or 53.26% of the 83.4 acres covered in the Estate.

- MPC purchased one new tract of land in Lauderdale County in the last month from Mary Annie Jones who conveyed 12.7 acres, more or less, in Section 2, Township 8 North, Range 15 East.
- The Kemper IGCC Power Plant required the acquisition of 820 easements for four power transmission lines and three pipelines covering a total of 156.74 miles or 837,936 linear feet or 1479.12 acres of land. The IM reviewed 453 or 55% of these easements. The easements reviewed by the IM cost a total of \$6,905,375 or \$9,253 per acre or \$16.25 per linear foot.