

# IM Monthly Report



## Mississippi Public Service Commission Kemper IGCC Project

October, 2016

**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 October, 2016, and review of the project status reported by MPC for the period from August, 2016 to October, 2016 (EPC Status Production Meeting Reports September 22 and October 21, 2016, August and September 2016 PSC Reports, and Kemper County IGCC Weekly Executive Summary, Metrics and Control Meeting Reports through November 1, 2016).

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):

- October, 2016 – Accounting audit of financial records from end of July, 2016 through end of August, 2016 held at MPC offices in Gulfport, MS (Appendix C).
- October, 2016 – Daily monitoring of on-going site construction and startup activities at the jobsite (Appendix E).
- Week of October 10, 2016 – Review of gasifier startup activities held at the jobsite (Section 1.10).
- October 10 and 11, 2016 – Review of project EPC status held at the jobsite (Appendix D).
- October 26, 2016 – Update from MPC on status of open RFI's (Appendix B).

### Project Status through September, 2016 (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.
- Support to construction on heat trace contract.
- E&CS and MPC Management of Change (MOC) process implementation and training.
- Design revisions from PHA physical changes, support requests, updated vendor information, and scope additions.
- Addressing PSSR functional turnover punch list items.
- Supporting operations closeout for punch list items and temp-mod conversions.
- Beginning 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 October, there were two new awards issued for replacement bed plates for one lignite dryer, and new PDAC vessel. There was also one new vendor recommendation approved for Environmental Chemical Remediation Services.

Construction (through October 23, 2016) – Plant construction is complete for the combined cycle unit, nitrogen plant, water plant, water storage pond, ash storage, buildings, lignite delivery facilities, piling and caissons, underground utilities, mass grading, concrete, structural steel, equipment, piping, instrumentation, cable tray, cable, terminations, conduit, tubing, and heat tracing. Plant work in progress includes equipment insulation (99% complete, about 3,000 SF remaining), and pipe insulation (99% complete, about 5,000 LF remaining), plus ongoing punchlist and scope addition activities. Overall base plant construction remained at 99% complete (through September, 2016).

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.

Pipelines – 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 (CO<sub>2</sub> sales), Air Liquide (nitrogen supply from onsite Air Separation Unit), and Martin Product Sales (sulfuric acid and ammonia sales by truck). The CO<sub>2</sub> contract provides for termination by Denbury at its discretion if CO<sub>2</sub> deliveries do not occur by July 1, 2017.

Liberty Mine - Current land control is 100% complete for the initial five year permit area. Construction activities are complete. Mine is operating and stockpiling lignite. Total actual spending for the mine development through September, 2016, 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 September, 2016, contracts totaling \$2.158 billion have been awarded to MS companies, and total MS spending is \$2.142 billion (about 31% of the total, including uncapped costs). MS workforce contributed 297 construction jobs and 373 plant/mine jobs in August. A total of 565 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.*
- System testing has discovered numerous pressure leaks due primarily to inadequate installation, quality control, and quality assurance of flanged and welded connections (bolt torqueing, gaskets, seals, pipe alignment, missing or inadequate welds) – *MPC is repairing the leaks when identified. Key concerns are noted below:*
  - Syngas cooler leaks – *leak repairs and hydrotest completed on both Trains; IM has concerns with future leaks under operating conditions.*
  - Particulate Control Devices – *leakage of low amounts of particulate coal fines was detected in the PCD's on Trains A and B; Train B repairs complete; awaiting clearance to complete repairs on Train A.*
  - Pump seal leaks - *seals on all the pumps in the 140 and 210 areas have been changed out due to the seals leaking; vendor is working with the plant to determine root cause.*
- Train 2 venturi scrubber pumps cavitation issues – *continue to be evaluated during the lignite feed tests.*
- Venturi scrubber solids carryover issues – *new duplex strainers will be installed on all 6 trains; steel platforms and piping in progress; strainers will be installed after other work is complete; approximate duration will be one month per train to complete.*
- Recovered water filters plugging – *testing the new set of filter elements in the 3 Recovered Water Candle Filters is being monitored during the lignite runs; better results but these three filters will not be able to handle the flow from 6 trains; engineering is looking into this.*
- Plugging issues at the roll crushers - *new sealed bearings have been installed in all six gear boxes; new 7 blade feeders will replace the existing 8 blade feeders in the roll crusher rotary inlet air locks; Train 3 blade feeder was replaced with fine coal being put through with no issues; replacement in the remaining trains will follow.*
- Ash moisturizer system – *modifications on all 4 ash moisturizers have improved operation; ash removal through the A and B Ash Moisturizers continues without any mechanical issues noted; dust suppression still an issue at times during ash and coal loading for disposal; these systems continue to be monitored.*
- Lignite dryer solids accumulation – *material testing and evaluation in progress.*
- Bridging in the coal feed lock vessels – *software and nozzle modifications and testing complete; considering additional piping mods.*
- AGR Compressors – *Train B CO2 Recycle Compressor (CO-2066) gear box rebuild is complete; commissioning complete.*
- Gasifier B plugging - *Gasifier B was shut down August 23, 2016 after bed circulation issues arose and hot spots were detected on reactor shell; ash removal and refractory inspection were completed; minor refractory repairs and dry out were completed; 650 psi leak/pressure test was completed. Management decided to start Gasifier A rather than*

*waiting to restart Gasifier B. Gasifier A was restarted in early September. Gasifier B will be restarted in early November.*

- *Gasifier A syngas production - An incident Thursday morning (10/13) allowed hot gas (1750 degrees) to back up into train 3 coal feed system, PDAC (pressure decoupled advanced coal), Dispense Vessel, and into the Lock Vessel. The two 4" isolation ball valves closest to the Gasifier on PDAC 3B were replaced and a blind on the PDAC side of the second isolation valve was installed so the damaged PDAC can be replaced while the Gasifier is running. RCA was completed with a reported mechanical fix to keep the pins from falling out and logic modifications (under IM review).*
- *Gasifier A CCAD and CFAD systems – issues with the CFAD system continue to be investigated while operating the system in manual; CCAD system was designed for smaller particles – coal feed modifications resulted in larger particles; added fluidization inserts; the CCAD system operation continues to be evaluated.*
- *Coal flow meters – 4 of 12 failed due to cracked ceramic inserts; repairs, replacements, improvements, and alternate flow measurement being pursued.*
- *Nitrogen Plant – capacity is insufficient to support simultaneous startup of both gasifiers, requiring availability of recycle syngas on one train before starting the second train; additional flow valves are being installed to monitor the nitrogen usage in the plant.*
- *CO2 Compressor – commissioning is being hampered by low CO2 pressure; larger vaporizer was installed but still having issues under investigation.*
- *Sour Water System – pH imbalance is causing fouling of the ammonia purification columns; steam out was completed while a solution to this issue is being investigated.*

### **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 (October, 2016).

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

### **Project Document Status**

The overall status of the project document reviews are summarized in Appendix B to this monthly report. Most of the RFI's have been posted, reviewed and closed (20 open items remaining). Primary concerns noted by the engineering disciplines are summarized below:

- *Scope Additions – MPC has posted updated list through July, 2016 for approved items (\$127 Million) and through September 14, 2016 for pending items (21 items); October update is pending; weekly updates are being provided to the IM Site Team for all FCR's, OCR's and Resource Pool Listings.*
- *Process and Technology – IM submitted 1 additional RFI relative to the Gasifier A coal feed system syngas backflow incident Root Cause Analysis in October; MPC*

*response posted 11/3/16; IM submitted additional questions (refer to Section 1.10 and Appendix B).*

- Operations and Maintenance – *final RAM Analysis Model was posted and has been reviewed; IM submitted 3 additional RFI's relative to the RAM Analysis in September.*

## Project Cost and Schedule

**In the September 2016 PSC Report, MPC reported no change in forecast completion date of November 30, 2016, and an increase in forecast capped cost of \$29.2 million to \$5.490 billion, including a decrease in base contingency of \$2.4 million to \$23.8 million and a decrease in Schedule Risk of \$4.0 million to \$24.0 million. Forecast capped cost increase was due primarily to increased Post-in-Service costs (\$20.9 million). Forecast uncapped costs decreased in September by \$2.2 million to \$1.423 billion.**

**On November 3, 2016, the Company changed the COD of Kemper IGCC from November 30, 2016, to December 31, 2016, and added \$25 million to its scheduled risk contingency increasing its Capped Plant Cost Current View (forecast) for the Kemper IGCC Project to approximately \$5.515 billion.**

Total capped spending for the plant through September, 2016, with deduction for Department of Energy (DOE) funding, was \$5.358 billion. Overall plant EPC remained at 99% complete. Uncapped spending through September was \$1.363 billion. Refer to Appendix G for the PSC Report Summary.

As of October 23, 2016, the current working schedule indicates TOD of 11/15/16, which is a 370 day slip from the November 2014 rebaseline date, and a 16 day slip from the 9/25/16 report. The critical path to TOD is now through Train 'A' Syngas Operations, Reliable/Clean Syngas Production – Train 'B' then Train 'B' Syngas Operations in parallel with Train 'A' Syngas Operations. The critical path for Reliable/Clean Syngas - Train 'B' remains the restart of Gasifier 'A', followed by syngas to turbine 'A' then Gasifier 'B' restart and return to temperature, followed by Gasifier 'B' Coal Feed Tests and Gas Cleanup 'B'. Reliable/Clean Syngas - Train 'B' is now scheduled to be achieved by November 11.

Key drivers on secondary path include:

Reliable/Clean Syngas Production - Train 'B'

- Gasifier 'B' Readiness driven by completion of 650 psi leak check - completed.
- WGS 'B' N2 Heat Up driven by MOV validation and installation of a gearbox and a valve (4 days off critical path).

TOD

- Ammonia Purification Package Commissioning driven by resolution of pH issue with Sour Water system (1 day off critical path).

- CO2 'A' / 'B' Product Compressors In Service driven by obtaining additional vaporizer to complete 'A' commissioning (4 days off critical path).

Overall project execution status was reviewed on October 11, 2016 at the jobsite. Refer to Appendix D for detailed meeting notes. Primary concern is additional schedule slippage and associated cost increases, and unknown startup and technology risks.

- Additional schedule slippage – MPC has reported a delay in COD to November 30, 2016. MPC will continue to evaluate startup schedule and remaining risks, and has included \$24 million for schedule risk in the September cost forecast; however, recent trends in startup progress (1% per month over the last six months with 5% remaining) will have to improve to meet the forecasted COD. Schedule risks remain for completion of punchlists, scope additions, and on-going issues noted under key Project Execution and Process and Technology concerns herein. Process and mechanical risks remain in the gas cleanup and AGR areas, and completion of performance testing on the combustion turbines will be required to obtain full capacity that is scheduled post COD.
- 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 and technology risks – key concerns include premature equipment failures, coal feed, ash removal, refractory reliability, gas cleanup, overall plant process control integration, chemical product quality and off taker performance. Issues associated with several of these concerns have already been reported and some are still being addressed.

## Accounting

Topp McWhorter Harvey, PLLC (formerly known as Nicholson & Company, PLLC and 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 August 31, 2016, and the examination of special-purpose Forecasted Schedules for the period beginning September 1, 2016, through the completion of the Project.

On October 28, 2016, the Company filed their September 2016, monthly Form 8K with the SEC which increased its Capped Plant Cost Current View (forecast) for the Kemper IGCC Project to approximately \$5.490 billion, net of DOE grants and Cost Cap Exceptions. The Company's Monthly Status Report through September 2016, decreased its Current View (forecast) of Total Exemptions and Exceptions (Non-Capped Cost) to approximately \$1.423 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 September 30, 2016, is \$6.913 billion.

In connection with the filing of the September Monthly Status Report, the Company continues to evaluate the construction, commissioning, and start-up schedule for the Kemper IGCC as the

result of ongoing start-up and commissioning activities for this first-of-a-kind technology. On October 11, 2016, the Kemper IGCC began testing using clean syngas from gasifier “A” and the related gas clean-up systems to produce electricity. The remaining schedule reflects the time expected to complete the integration of all systems necessary for both combustion turbines to simultaneously generate electricity with syngas.

Since the filing of the Form 10-Q (the period ended June 30, 2016), the Company has reported additional estimated costs subject to the cost cap in the aggregate amount of approximately \$33 million. The September Monthly Status Report contains a further increase in the cost estimate subject to the cost cap for the Kemper IGCC of approximately \$29 million, including \$8 million related primarily to modifications and improvements for operational readiness and start-up and \$21 million related to post-in-service costs expected to be subject to the cost cap. The total estimated Kemper IGCC cost subject to the \$2.88 billion cost cap as of September 30, 2016 was approximately \$5.49 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 \$63 million during the third quarter 2016. In addition, during the start-up and commissioning process, the Company is identifying potential improvement projects that ultimately may be completed subsequent to placing the remainder of the Kemper IGCC in service. If completed, such improvement projects would be expected to enhance plant performance, safety and/or operations. The related potential costs have yet to be fully evaluated, have not been included in the current cost estimates and may be subject to the \$2.88 billion cost cap. On November 3, 2016, the Company changed the COD of Kemper IGCC from November 30, 2016, to December 31, 2016, and added \$25 million to its scheduled risk contingency increasing its Capped Plant Cost Current View (forecast) for the Kemper IGCC Project to approximately \$5.515 billion.

The next steps for the facility include the continued testing and production of electricity using clean syngas from gasifier “A”, as well as the generation of electricity using clean syngas from gasifier “B”, which are scheduled to occur by mid-November. If integrated operation of both gasifiers does not occur by mid-November, the expected in-service date and related cost estimate for the Kemper IGCC likely would require further revision. 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, 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). 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.

On June 9, 2016, Treetop Midstream Services, LLC; Greenleaf CO2 Solutions, LLC; Tenrgys, LLC; Tellus Energy, LLC; WCOA, LLC; and Tellus Operating Group, LLC filed a Complaint against the Southern Company, Southern Company Services, Inc., and Mississippi Power Company in the State Court of Gwinnett County, Georgia. The Plaintiffs allege that the Southern Company Defendants concealed and misreported the Start Date of the Kemper Project, and that Treetop relied upon those misrepresentations while building a roughly \$100 million pipeline



and conducting other work necessary to take CO<sub>2</sub> from the Kemper Project. The Plaintiffs assert claims of fraudulent misrepresentation, fraudulent concealment, and civil conspiracy with respect to the Southern Company Defendants, and breach of contract with respect to MPC. The Plaintiffs seek compensatory damages and punitive damages as well as costs and interest. On August 10, MPC, Southern Company, and Southern Company Services filed their Answers as well as their (i) Motion to Dismiss for Lack of Personal Jurisdiction, (ii) Motion to Compel Arbitration, (iii) Motion to Dismiss for Forum Non Conveniens, and (iv) request for oral argument. A hearing is set for January 13, 2017, in Georgia. All of the above motions remain pending and the Southern Company Defendants will vigorously defend the matter, and the final outcome of this matter cannot now be determined.

As reported in the Form 10Q for the first quarter ended March 31, 2016, and again in the Form 10Q for the second quarter ended June 30, 2016, Mississippi Power Company disclosed that the Securities Exchange Commission (SEC) is conducting a formal investigation of Southern Company and Mississippi Power Company concerning the estimated costs and expected in-service date of the Kemper IGCC Project. Southern Company and Mississippi Power Company believe the investigation is focused primarily on periods subsequent to 2010 and on accounting matters, disclosure controls and procedures, and internal controls over financial reporting associated with the Kemper IGCC Project. As of the date of TMH's report, November 3, 2016, Southern Company and Mississippi Power Company are still in the document production stage and continue to cooperate with the SEC. The ultimate outcome of this matter cannot be determined at this time; however, it is not expected to have a material impact on the financial statements of Mississippi Power Company.

## 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. MPC posted 3Q16 effluent monitoring report on November 1 that will be reviewed by the IM (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 8/22/14; MDEQ issued draft permit.

### Process and Technology

Implementing site monitoring plan for gasifier startup by IM gasification technology specialist. Last site visit was conducted week of October 10 (see Section 1.10). Next visit will be conducted week of November 7. IM submitted 1 additional RFI relative to the Gasifier A coal

feed system syngas backflow incident Root Cause Analysis in October; MPC response was posted 11/3/16; IM submitted additional questions (refer to Section 1.10 and Appendix B). The following process and technology concerns are described in Section 1.10:

- The IM Team will continue to monitor the gasifier vibration behavior and the performance of the vibration reduction system.
- The long-term viability of the modified refractory system design in repaired areas and of the original refractory system design in remaining areas of both gasifiers.
- The root cause(s) of the temperature excursion event in Gasifier B and recently in Gasifier A need to be thoroughly investigated and mitigation actions should be developed and implemented to prevent a recurrence of such an event during subsequent startup and commissioning activities and long-term operations.
- It is unclear to the IM Team that the minor reductions in gasifier operating and alarm set point temperatures will significantly reduce the risks of thermal excursions or long-term clinker formation.
- Continuous, stable operation of the Airlocks/Rotary Valves upstream and immediately downstream of the Coal Dryers at full design rates must be achieved before concluding that full functionality of the Coal Preparation System has been successfully demonstrated.
- Trouble-free operation of the Venturi Scrubbers is required to enable the coal feed system for either gasifier train to operate continuously at full design coal feed rate.

#### **Key Technical Milestones Not Yet Achieved**

- Restart Gasifier Train A with syngas composing at some fraction of the gas going to CTA with recycled syngas back to Gasifier A.
- Demonstrate trouble-free operation of CCAD system on both Gasifiers.
- With Gasifier A running, simultaneously restart Gasifier B producing syngas through gas cleanup and AGR for the first time, with syngas going to CTB for the first time.
- Successfully run both CTA and CTB turbines on at least partial syngas for a total of 500 hours (21 days) of operation on each turbine.
- Achieve the target 4 days of continuous simultaneous operation of both Gasifiers with syngas going to both CTA and CTB.
- Successfully operate the WSA unit and the CO<sub>2</sub> compressor.
- Demonstrate the ability to export on-spec CO<sub>2</sub>, ammonia, and wet sulfuric acid product streams as well as overall compliance with regard to environmental emissions.
- Achieve and sustain full design coal feed rate to both Gasifiers while continuing to produce on-spec CO<sub>2</sub>, ammonia and WSA products.
- Achieve full design power production of 580 MW based on 100% syngas flow to CTA and CTB.

#### **Lignite Delivery Facility**

LDF construction is 100% complete. 300 tons of screened coal is being maintained in Crushed Coal Silos 1, 2, and 3 for supplying Gasifier A this month. Approximately 10,000 tons of coal is being maintained in the dome to support lignite testing. Mobile coal screening

equipment continues to screen the coal at the coal storage pile before it is sent to the truck dump. Crews have completed installing the 6" HDPE pipe from the LDF sump to the modular tanks west of the Gasifier Cooling Tower. This will allow the water and coal mixture in the LDF sump to be pumped up to the modular tanks for dewatering instead of using the vacuum trucks. Once this material is dewatered the water will be pumped off the top and the sludge can be removed and hauled off to the Ash Pond (GAMU) for disposal.

## Procurement

IM reviews of Procurement Activities 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 (Plant metrics through October 23, 2016)

The following activities are **behind schedule** with the percentage behind included - Equipment Insulation (1), Pipe Insulation (1), and Startup (5%).

Mechanical work has been proceeding in the following areas - Area 210 - Waste Water & Selexol Storage Area, Area 140 – Tankage Area, Area 150A/250A - Coal Prep Area, Area 120/220 – Gas Cleanup, Area 150/250 - Gasifier Area, Area 160 – Wet Sulfuric Acid Area, Area 230 – Selexol Area (North), Area 130 – Selexol Area (South), Area 105 – Train 1 Gas Clean Up Area, Area 110 – Compressor Area, Area 180 – CO<sub>2</sub> Compression and Dehydration Area, and Area 260 – Sulfuric Acid Recovery Area.

Electrical & Instrumentation work has been proceeding in the following areas - Area 105 – Train 1 Gas Clean Up Area, Area 110 – Compressor Area, Area 120/220 - Gas Cleanup Area, Area 130/ 230 – Selexol Area (South & North), Area 140 – Tankage Area, Area 150/250 - Gasifier 1 & 2, Area 150A/250B – Coal Feed 1 & 2, Area 160 – Wet Sulfuric Acid Area, Area 170 – Pipe rack, Area 180 – CO<sub>2</sub> Compression/Dehydration Area, Area 200 - Main Electrical Building, Area 210 - Waste Water Treatment Area, and Area 260 – Sulfuric Acid Recovery Area.

**Gas Clean - Up (Areas 105, 120, and 220)** – Crews had finalized the air freeing process and the unit's nitrogen pressurized and warmed to initial sulfiding temperatures with sulfiding the catalyst in train A Water Gas Shift Reactors scheduled to begin Tuesday (9/27). This process was delayed because the shaft on isolation valve XV-14507 was found bent and the threads at the top of the shaft galled. Crews removed the valve and replaced it with one from train B on Friday (9/30). Operations once began the nitrogen heat up and were able to begin sulfiding on Tuesday (10/4) and completed the process on Wednesday (10/5). Due to the issue with train 2 multiclone leaks the syngas will continue to pass through the Gas Clean Up to the HP flare until all three dryer trains are available to support Gasifier A. This system was bottled up after the Gasifier was shut down and is scheduled to start the nitrogen heat up and circulation sometime Friday (10/20) or Saturday (10/21) in preparation for syngas production. Crews are installing the metal guards on the heat exchangers for personnel protection in the area. Train A Ammonia Scrubber (CL-1006) drain line was modified to allow lower pressure operation by the addition of a temporary in line chiller to prevent overheating the chemical sump to

which it is being drained into. The permanent bottom drain piping modifications for Train A Ammonia Scrubber (CL-1006) are complete. In train 2 Gas Clean Up a nitrogen cap is being maintained.

**Process Air (Area 110)** – Recycle Gas Compressors CO-1008 was started up Wednesday (10/12) at 4 am on IP nitrogen. Operation ran Recycle Gas Compressors CO-1008 on syngas for the fluidization valves on Gasifier A Thursday (10/13) with no issues. The compressor is expected to continue providing recycled gas as Gasifier A and resumed syngas to turbine operations. Process Air Compressors 1 and 2 were restarted Wednesday morning for establishing circulation in Gasifier A. Crews are installing the metal guards on the heat exchangers in the area.

**Selexol (Areas 130 and 230)** – Commissioning train A Flash Gas Compressor (CO-1065) was completed Saturday (9/24). Train A was returned to service on Monday (9/26) with operations verifying valve alignment and starting circulation in both Semi- Lean and Lean loops in preparation for Sulfiding the Water Gas Shift catalyst and introducing syngas to the AGR. Operations began sending syngas through the unit on Monday (10/10) at 9:30 am. Flow continues at a lower pressure which is producing an off spec syngas containing nitrogen and CO<sub>2</sub>. On Wednesday (10/12) at 4:30 pm syngas was sent from Train A AGR to the Combustion Turbine A for the first time until the unit tripped at midnight. The unit was restarted and run until Thursday morning (10/13) at 10 am the Gasifier was shut down due to an incident on 3B feeder. The unit was down Tuesday (10/18) due to the unit's nitrogen consumption while the nitrogen plant took a small outage. The unit remains off line with circulation on both the Lean and Semi-Lean loops scheduled to begin Friday (10/20) or Saturday (10/21). Crews reinstalled the Syngas Scrubber Bottoms Pump PU-2011 on Thursday (10/23). 230 Area, work continues on train B CO<sub>2</sub> Recycle Compressor (CO-2066) while lube oil flushing continues on train B Flash Gas Compressor (CO-2065). Commissioning dates for both train B compressors has not been scheduled. Crews completed the installation of the heat guards on exchangers in the unit.

**Tankage Area (Area 140)** – The insulators completed the insulation on the piping at the Anhydrous Ammonia Reflux Makeup Pump PU-59 A & B.

**Gasifier (Areas 150 and 250)** – The following activities are in progress or complete:

- **Gasifier A** – The last week of September Gasifier A maintained a temperature of 1750 degrees while operating at low coal feed rates due to issues with the Venturi Scrubber nozzles plugging and issues with dryers 1 and 2. On Tuesday (9/27) pressures and feed rates were increased enough to begin sending syngas downstream until issues in the Gas Clean-Up were discovered. Tuesday night (10/11) at 9 pm another milestone was achieved with 3 successful attempts with getting syngas to the turbine (CTA). During this test the syngas was off spec (syngas, nitrogen, CO, and CO<sub>2</sub>) but burned a clean flame even with the off spec syngas. This was achieved with a feed rate of 250kph and 350 psi. Wednesday (10/12) the Gasifier was supplying syngas to CTA (Combustion Turbine A) when the turbine tripped at 8 pm. The feed rate was increased again at 8:20 pm and continued to run without any issues until Thursday (10/13) when the TE (temperature element) on the diffuser detected a high skin temperature on the piping at the Gasifier.

The Gasifier tripped and was shut down and cooled. Management decided to resolve the issue with the coal feed system and move forward with bringing Gasifier A back online instead of moving efforts to Gasifier B. The RCA (Root Cause Analysis) and MOC (Management of Change) were completed Tuesday (10/18) with a reported mechanical fix to the keepers on the pins and logic modifications. There were no internal issues with the Gasifier during this incident with operations keeping the bed ash fluidized. Circulation was reestablished later in the day on Wednesday (10/19) with the startup burners lit that night at 6 pm. Operations determined that it will take approximately 37 hours from the time they light the startup burners to reaching Gasifier temperature and establishing coal feed into the Gasifier. As of Thursday (10/20) the temperature in the Gasifier was 800 degrees on the way to a hold temperature of 1200 degrees.

- Train A Lock Vessels (Feeders) – An incident Thursday morning (10/13) allowed hot gas (1750 degrees) to back up into train 3 PDAC/coal feed system. It was determined that the slide gate between the Coal Feed Lock Vessel and Coal Feed Dispense Vessel had a key pin between the actuator arm and the valve that fell out during the open cycle, so when the valve received a signal to close it remained open. Because the valve didn't close it allowed the Dispense vessel to depressurize while the Lock Vessel was depressurizing. As the feed cycle continued the pressure was less in the Dispense and Lock Vessels than in the Gasifier which allowed the hot syngas (1750 degrees) to flow back through the PDAC (pressure decoupled advanced coal), Dispense Vessel, and into the Lock Vessel. Monday (10/17) the two 4" isolation ball valves closest to the Gasifier on PDAC 3B were replaced and a blind on the PDAC side of the second isolation valve was installed so repairs could be made while the Gasifier was running.
- 3B PDAC and Feed Piping – Wednesday (10/19) 3B PDAC was removed along with the top access flange cover on the Coal Feed Lock and Dispense Vessels for internal inspections. The feed piping was also removed and is being replaced. Crews performed NDT (Nondestructive Testing) on the shell of both the vessels. The Coal Feed Dispense Vessel actuator arm pin was modified by having a keystack welded on the top of the pin to secure it from falling out again. All actuator arm pins on the Coal Feed Lock and Dispense Vessels have been modified with the keystack material.
- **Gasifier B** – The 650 psi leak/pressure test was completed this month with some minor tubing leaks remaining. These remaining leaks will be addressed as resources become available.
- Train B Lock Vessels (Feeders) – These feeders are being prepped for offline PDAC testing ahead of supplying coal to Gasifier B. Some software and nozzle modifications continue on trains 4, 5, and 6 lock vessels.
- Housekeeping continues to be addressed with operators washing down around the equipment in the structure.
- The new personnel and freight elevator are still not in operation.

**Area 150A/250A - Coal Prep Area:** The following activities are in progress or complete:

- Train A Dryers – The last week of September train 3 ran without any interruptions except for a few multiclone discharge conveyor trips due to a zero speed switch which was resolved. Train 1 was brought back on line after being down for maintenance before train 2 was shut down due to a hole in the expansion joint between the Fluid Bed Dryer and the Multiclone late Tuesday (10/4). The expansion joint was replaced Friday 10/7.
- Train 3 Rotary Inlet Air Lock – Train 3 (7 Blade) Rotary Inlet Air Lock was removed and swap places with train 1 (8 Blade) Rotary Inlet Air Lock. This Roll Crusher Air Lock with the 7 blade internal continues to operate without any issues while processing the finer coal that plagued the air locks earlier in the year. The other trains will be changed out when the new internals arrive.
- Ash Silo A Pneumatic valve was removed and sent out for repair.
- As part of the renewed housekeeping efforts crews are cleaning up coal ash and removing rocks from around the Venturi Scrubbers on Trains 1 & 2. These rocks will be replaced once the cleanup is complete. The Venturi Scrubber sumps plugged with coal fines due to blinds that were inadvertently left in the Multiclone bottom hoppers. The blinds were preventing the hoppers from discharging the coal fines into the Multiclone Collection Conveyor and were being carried over to the Venturi Scrubber sumps.
- Plugging in the 3” discharge line from the north sump to the LDF will be addressed with a scope add which will change the line from a 3” to 6” and upgrade the sump pumps. Material and new upgraded pumps have been ordered.
- Civil crews completed the form work and setting the rebar for the platform modifications for the new Venturi Scrubber duplex strainers. The concrete piers have been placed and crews are erecting steel in all trains. (Steel modifications will take approximately 1 week, piping installation 10 days, and the electrical and I&C around 5 days. From start to finish, once the clearance is received each platform will take approximately 1 month to complete).
- LP Vent Gas Compressor (CO-00040) – The vendor rep is inspecting the compressor for alignment before commissioning activities begins. But due to resource availability commissioning activities are now scheduled for the end of the month.

**Ash Removal System (Area 150A/250A)** – Coal and ash removal through the A and B Ash Moisturizers continues without any mechanical issues noted. Dust suppression still is an issue at times during ash and coal loading for disposal.

**Wet Acid (Area 160)** – A steam leak at the manway of the Steam Drum was repaired Monday (9/26) by repairing the strong backs on the door and replacing the manway gasket. On Tuesday (9/27) the WSA was prepared for operation by pulling the catalyst preservation measures, doing another Condenser acid spray, dropping clearances and executing the valve alignment for operations. The unit is now in pre-warm up in preparation of firing the Combustor to “Hot Stand-by” ahead of Sulfiding the Water-Gas-Shift catalyst and introducing syngas to the AGR. Heat up was completed and the Combustor was lit Monday (10/11) to begin increasing the temperature for sulfiding the

catalyst in the SCR and SO<sub>2</sub>. Issues with the logic on the fans prevented the Combustor from remaining lit. Crews were working to resolve this issue Wednesday (10/12). The WSA unit is down and cooling in preparation for the Condenser acid spray Friday (10/21). Sulfiding the catalyst was delayed due to the Gasifier being shut down Thursday morning (10/13). In order to sulfide the catalyst in the SO<sub>2</sub> Converter and SCR the Combustor will need to be lit and running on acid gas and have a temperature of over 700 degrees. This is scheduled to be completed the next time the Gasifier is running. Both temporary Wabash package boilers continue to operate at 70% and supplying 325# steam to the plant.

**Pipe Rack & BOP (Area 170)** – Construction is complete.

**CO<sub>2</sub> Compression / Dehydration (Areas 180 and 260)** – Parts, hoses, and vaporizer were received and the CO<sub>2</sub> skid set up to begin leak testing on the “A” CO<sub>2</sub> Product Compressor (CO-1080) Friday (9/30). Leak testing and repairs will continue before the functional testing of the compressor begins. Crews completed the leak testing on the “A” CO<sub>2</sub> Product Compressor (CO-1080) Tuesday (10/11) but were not able to run the compressor due to the screens on the lube oil still being dirty. The screens were removed and cleaned with additional lube oil flushing continuing. Attempts to run the CO<sub>2</sub> Compressor Tuesday (10/18) and Wednesday (10/19) were conducted with run times getting better. This is after another (bigger) vaporizer had to be brought in on Monday (10/17) so they could get enough CO<sub>2</sub> to run the compressor. They will continue operational testing, slowly working the machine to running speed and pressurizing the downstream piping again Thursday (10/20). Train “B” CO<sub>2</sub> Product Compressor (CO-2080) leak testing and commissioning will resume after train A is complete. After all testing is complete the compressor will be run for commissioning. (CO<sub>2</sub> will be run through the compressor and discharged into the underground CO<sub>2</sub> line up to the plants boundary limit). 8 of 8 refrigeration compressors have been run in and tuned.

**Flare (Area 190)** – Modifications and pipe fabrication will continue as resources are available to the Ultrasonic Flow Systems for the LP Acid Gas & Ammonia Flares. Trains A and B HP, LP Acid Gas, and the Ammonia Flares are all operational.

**Waste Water Treatment (Area 210)** – This month the Sour Water unit was processing the water while Gasifier A was producing syngas. Steaming out the Wastewater Ammonia Stripper (CL-0044) and Wastewater Ammonia Purifier (CL-0052) due to plugging began with Gasifier A was shut down late in the month in preparation for syngas production. Currently there is a temporary heat exchanger connected downstream of the Wastewater Ammonia Stripper (CL-0044) flow control valve (FV-04702) which routes the water from the Wastewater Ammonia Stripper (CL-0044) back to the Wastewater Storage Tank (TK-0042) for use during startup. A long term solution is needed and engineering is evaluating a heat exchanger for this purpose. A scope change was approved to look into this.

**Acid Storage Tanks and Off Spec Acid Tank (Area 260)** – No activity was observed.

**Nitrogen Plant (Area 260)** – Additional nitrogen flow valves that were received are being installed as part of monitoring the nitrogen usage in the plant. The plant continues to supply nitrogen with no issues. Monday (10/17) the supplier announced that they had

a vent valve that needed to be changed out and would have to take a short outage to replace this valve. During this time it would be critical that nitrogen use be monitored. The valve arrived from Canada on Tuesday morning (10/18), was installed, and the unit was back on line by 3:30 pm Tuesday (10/18).

**Combined Cycle HRSG's and CT's (Areas 510, 520, 530, and 540)** – Syngas was run to Combustion Turbine A Wednesday (10/12) starting at 0% and went up in 5% intervals until at 7:55 pm CTA tripped on 100% syngas after running at that percentage for less than a minute (they did run for over 3 hours on syngas with no issues). The cause of the trip was a logic issue not the syngas. The turbine was run with syngas through Thursday morning (10/13) until the Gasifier tripped. Crews have completed the forms and are installing the rebar for the new Ammonia Containment.

**Steam Turbine & Auxiliary Boiler Area (Area 550)** – Construction is complete.

**Water Treatment (Area 570)** – Construction is complete.

**Cooling Towers (Areas 580 and 590)** – Construction is complete.

**Main Gate Security (Area 700)** – Construction is complete.

**Sewer Plant and Ash Storage Pond (Area 800)** – Dewatering the coal/water mixture using a flocculent has made room in the existing modular tanks for the startup of Gasifier A. The sludge is being removed from Modular tank 4 and hauled off to the Ash Pond (GAMU) for disposal. While crews were cleaning the remaining sludge in the tank they tore a hole in the liner that will have to be repaired. Modular tanks 7 and 8 are maintaining 500,000 gallons/each of demin for the two temporary Wabash package boilers by using the water from the Condensate Tank due to the low water level in the north pond.

**Process Water Reservoir (Area 900)** – Crews completed fuse welding the 6" HDPE pipe together from the LDF up to the modular tanks on the west side of the Gasifier Cooling Tower. The coal/water mixture will be dewatered with the water either being evaporated or sent back to the LDF. The remaining sludge is then hauled to the GAMU for disposal.

### Safety

**Project Safety Summary:** Since the beginning of the project, there has been 86 reportable incidents at the site with 40,554,801 man hours worked. This year, the site has worked 3,513,144 man hours with 4 reportable incidents. The project RIR stands at 0.18 for the year and 0.42 for the Project Total to Date.

### Schedule

The construction schedules for remaining base scope, and the schedule for scope additions, all as of 10/23/16, are included in Appendix E.



Key construction metrics reported through 10/23/16 are summarized below:

- Equipment insulation installation was 1% behind schedule overall. Remaining quantities represent metal guard installation activity. That work will be completed by week ending 10/30. Once the installation is complete, a true-up for the final quantities will be done.
- Pipe insulation installation was 1% behind schedule overall. Remaining quantities are related to insulation of the PCD system in the Gasifier. That work will be completed by week ending 10/30. Once the installation is complete, a true-up for the final quantities will be done.
- Construction to Startup punchlist items for base scope (excluding scope additions) are essentially complete.
- Overall, turnover packages from construction to startup are 100% complete as 968 are received out of a total of 968.

### Startup

- At the end of September, total startup employee staffing was at 212, including 19 SCS startup employees, 187 supplemental, and 6 OPCO's staff; plus 303 startup supplemental craft support and 41 I&C field technicians (grand total of 556 – a decrease of 56 from end of August).
- Through October 23, startup progress was 94.8% complete overall (0.8% increase from September 25) vs. planned 100%.
  - 966 TOP's have been commissioned out of a total of 968 (>99% complete). Of the 2 remaining, 1 is complete for commissioning with the exception of completing all I/O loop checks. 41% (399 of 968) have been turned over from startup to operations (mostly CC and associated BOP).
  - Startup test packages are 85% complete (82 of 96 complete). Of the remaining 14 test packages, 13 are currently in progress.
  - Overall, I/O checks are 1% behind plan (99% complete, 243 of 31,930 remaining). New scope accounts for approximately 242 points of the remaining 243 points that require testing. Scope additions will potentially continue to change the total point count over the coming weeks as loops are added or deleted. These changes will be incorporated into the plan. The majority of the remaining loops are not available to be checked due to needed design, construction, or release from clearance. There is no impact to test package execution or milestone completion.
  - Startup to Operations punchlist summary for base scope (excluding scope additions) shows a decrease in remaining open items from 4,930 on September 25 to 3,975 on October 23 (none of these are high priority).
  - MPC reported the following startup achievements in October:
    - Completed refractory repairs on Gasifier 'B'.
    - Completed WSA Commissioning milestone on 10/09.
    - Syngas was introduced to Train A AGR on 10/10.

- First Syngas to Combustion Turbine 'A' was achieved 10/11.
- Gasifier 'A' ran for 30+ consecutive days prior to shut down.
- AGR 'A' operation on syngas.
- Initial runs on CO2 Product Compressor 'A' completed.
- Gasifier 'A' coal feed and Syngas production resumed.
- AGR 'A' resumed circulation.
- All original instrumentation control points checked (34,000+).
- All priority A punchlist items completed (17,000+).
- Began sulfiding WSA Catalyst.
- Through 10/26, syngas production has totaled 773 hours (32 days) on Train A and 580 hours (24 days) on Train B, resulting in 344 MWH of electrical generation on syngas.

### Operations and Maintenance

Overall 281 of the planned 309 permanent employees are on staff (339 of 309 including contractors). Current supplemental contract staff will be considered for remaining 28 permanent positions.

Process Safety Management (PSM) program development:

- There are 14 PSM elements – 12 of the 14 are complete (ready for chemicals).
  - Executing PSM consultants' recommendations for the remaining 2 elements - Process Hazard Analyses and Pre Startup Safety Review.
1. Process Hazard Analysis - all eight PHA's requiring updates are complete, working through last few remaining recommendations (>99% complete).
  2. Pre-Startup Safety Reviews - Initial Equipment Walkdowns using PSSR checklist are complete for all required systems (346 TOPs walked down out of 346, 100% complete). 13 of 15 PSSR's are complete, last 2 for AGR B and HRSG Ammonia are scheduled for October (0 priority PSSR Action Items remaining).

### Land

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

In the September 2016 report, the IM reported on information received from Mississippi Power Company (MPC) in response to Requests For Information, two new purchases of mining land during the month in Lauderdale County, MS., the redemption from tax sales of land purchased by MPC in Lauderdale County, MS., discussed a review of land documents covering prior land purchases and developments in the Kemper County lawsuit.

In this October 2016 report the IM will discuss that there were no new land purchases in Kemper or Lauderdale Counties, MS. in the last month, there were three new coal leases in Kemper County, the overall list of coal mining land for Liberty Mine/Damascus Coal Reserve maintained by Mississippi Power Company and updates on the Kemper County Lawsuit.

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

- MPC made no new purchases of coal mining land in Kemper County, MS. in the last month.
- There were no new purchases by MPC of coal mining land in Lauderdale County, MS. in the last month.
- MPC purchased three new coal leases in Kemper County, MS. covering 12.67 acres in the Northeast Quarter, Section 33, Township 9 North, Range 15 East.
- The IM is reviewing documents provided by MPC regarding prior purchases of coal mining land and will report on the purchases in the next few months.
- MPC's overall coal mining land purchases list as of June 9, 2016 totals 140 purchases covering 5,382.84 surface acres or 4,798.21 net coal acres for \$43,561,274.
- The parties to the Barham versus Mississippi Power Company lawsuit are still waiting for a decision from the Judge regarding the Summary Judgment Motions filed by both parties and argued at a court hearing held August 27, 2015 in the Chancery Court in Philadelphia, MS. The last filing in the case was August 15, 2015.