EXHIBIT G
MILL CREEK ENVIRONMENTAL AIR COMPLIANCE PROJECT
GUARANTEES
AND
PERFORMANCE GUARANTEE TEST PROTOCOL
Definitions

"CEMS" means the continuous emissions monitoring system of the applicable Unit as such Unit is improved by the Work.

"Commercial Operation Test" means a single test for each Subproject consisting of Full Load Test Run and a Low Load Test Run. Commercial Operation Tests will be performed and evaluated on each Subproject separately.

"Correction Curves" means the correction curves attached as part of Exhibit A.

"Extra Test" has the meaning set forth in Section 1.

"Full Load" means the full load heat input in mmBtu/hr for each applicable Unit as identified in Exhibit S and measured as indicated in the DCS of the Existing Facility.

"Full Load Test Run" means for each Subproject all Performance Guarantee Tests for that Subproject will be performed simultaneously with simultaneous sampling at all required locations in accordance with this Exhibit G, three (3) separate times at Full Load, eight (8) hours each time, and the arithmetic average of the results of each such Performance Guarantee Test will constitute the result of each such Performance Guarantee Test at Full Load.

"Guaranteed Air Emissions" means the Guaranteed PJFF Mercury Emissions, the Guaranteed PJFF PM Emissions, the Guaranteed PJFF Sulfuric Acid Emissions, the Guaranteed WFGD HCl Removal, the Guaranteed WFGD Liquid Carryover, the Guaranteed WFGD Mercury Removal, the Guaranteed WFGD Particulate Matter Removal, the Guaranteed WFGD SO2 Removal, and the Guaranteed WFGD Sulfuric Acid Removal.

"Guaranteed Availability" means (i) with respect to the Subprojects 1, 2, 3, and 4, each Subproject shall have fewer than one hundred and ninety two (192) hours of Subproject Unavailability in the twelve (12) month period ending on the first anniversary of Commercial Operation for that Subproject, of which one hundred and ninety two (192) hours of Subproject Unavailability, there will be (a) fewer than ninety six (96) hours of Subproject Unavailability attributable to the PJFF and (b) fewer than ninety six (96) hours of Subproject Unavailability attributable to the WFGD and (ii) with respect to the Subproject 5, the Subproject shall have fewer than ninety six (96) hours of Subproject Unavailability attributable to the PJFF in the twelve (12) month period ending on the first anniversary of Commercial Operation for that Subproject.

"Guaranteed Consumption Limits" means the Guaranteed PAC Consumption Limit, the Guaranteed PJFF Auxiliary Power Consumption Limit, the Guaranteed Sorbent Consumption Limit, the Guaranteed Subproject 5 Auxiliary Power Consumption Limit, the Guaranteed Subproject BOP Auxiliary Power Consumption Limit, the Guaranteed WFGD Auxiliary Power Consumption Limit, the Guaranteed WFGD Limestone Consumption Limit, the Guaranteed WFGD Limestone Reagent Utilization, and the Guaranteed WFGD Water Consumption Limit.
"Guaranteed Fan Performance" means the Guaranteed Flow Excursion Margin, the Guaranteed Pressure Excursion Margin, and the Guaranteed Temperature Excursion Margin.

"Guaranteed Flow Excursion Margin" means each fan that is part of the Subproject shall have a flow excursion margin of at least ten percent times the flow to that fan in actual cubic feet per minute.

"Guaranteed PAC Consumption Limit" means the maximum quantity of PAC consumed by Full Load operation of the Subproject is guaranteed to not exceed: two hundred and sixty four (264) lb per hour for the Unit 1 Subproject; two hundred and seventy two (272) lb per hour for the Unit 2 Subproject; three hundred and thirty six (336) lb per hour for the Unit 3 Subproject; and four hundred and ten (410) lb per hour for the Unit 4 Subproject.

"Guaranteed PJFF Auxiliary Power Consumption Limit" means the maximum quantity of power consumed by Full Load operation of each PJFF (excluding the power consumed by the Temporary PAC and Sorbent Systems) is guaranteed to not exceed: four hundred and eighteen (418) kilowatts per hour for the Unit 1 Subproject; four hundred and eighteen (418) kilowatts per hour for the Unit 2 Subproject; four hundred and ninety six (496) kilowatts per hour for the Unit 3 Subproject; and six hundred and ten (610) kilowatts per hour for the Unit 4 Subproject.

"Guaranteed PJFF Mercury Emissions" means the maximum emissions of Mercury (HG) is guaranteed to not exceed 1.0 lb/TBtu at the PJFF outlet testing ports.

"Guaranteed PJFF PM Emissions" means the maximum emissions of Particulate Matter (PM) is guaranteed to not exceed 0.010 lb/mmBtu at the PJFF outlet testing ports.

"Guaranteed PJFF Pressure Drop" means the pressure drop for each PJFF, as measured from the inlet of the PJFF to the outlet of the PJFF, under all operating conditions specified will not exceed:

<table>
<thead>
<tr>
<th>Mill Creek</th>
<th>Mill Creek</th>
<th>Mill Creek</th>
<th>Mill Creek</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pressure Drop: Normal (in.wg)</td>
<td>5.5</td>
<td>5.6</td>
<td>5.3</td>
</tr>
<tr>
<td>Pressure Drop: One Compartment Off (in.wg)</td>
<td>6.2</td>
<td>6.3</td>
<td>6.3</td>
</tr>
</tbody>
</table>

"Guaranteed PJFF Sulfuric Acid Emissions" means the maximum emissions of Sulfuric Acid (SAM) is guaranteed to not exceed 0.015 lb/mmBtu at the PJFF outlet testing ports.

"Guaranteed PJFF Temperature Loss" means the flue gas temperature loss, as measured with permanently installed thermocouples or third party testing measurements, from the inlet of the PJFF to the outlet of the PJFF, under all operating conditions specified will not exceed 15 deg F.
"Guaranteed Pressure Drops" means the Guaranteed WFGD Pressure Drop, the Maximum WFGD Pressure Drop, the Guaranteed PJFF Pressure Drop and the Maximum PJFF Pressure Drop, and the Guaranteed Subproject BOP Pressure Drop.

"Guaranteed Pressure Excursion Margin" means each fan in each Subproject will have a pressure excursion margin of at least 21 percent times the static pressure rise across that fan in inches water column (IWC).

"Guaranteed Sorbent Consumption Limit" means the maximum quantity of sorbent consumed by Full Load operation of the Subproject is guaranteed to not exceed the amounts in the following table (measured in lbs. per hour; note, sorbent used in Performance Tests may be either Trona or hydrated lime at Owner's discretion):

<table>
<thead>
<tr>
<th>Subproject Unit</th>
<th>Guaranteed Maximum (Trona)</th>
<th>Guaranteed Maximum (Hydrated Lime)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>975</td>
<td>954</td>
</tr>
<tr>
<td>2</td>
<td>1,000</td>
<td>979</td>
</tr>
<tr>
<td>3</td>
<td>3,100</td>
<td>3,034</td>
</tr>
<tr>
<td>4</td>
<td>3,700</td>
<td>3,621</td>
</tr>
</tbody>
</table>

"Guaranteed Sound Emissions" means that, for Equipment other than that in the WFGD scope of supply, the maximum A-weighted sound level free field measured 3.0 feet horizontally from the base of each item of Equipment and 5.0 feet above floor level or any personnel platform is guaranteed to not exceed 85 dBA at all times during operation of the Equipment; provided, however, with respect to PJFF mills, blowers, and compressors contained in enclosures, the sound will instead be measured 3.0 feet horizontally from the base of each such enclosure and 5.0 feet above floor level or any personnel platform outside of the enclosure. For Equipment in the WFGD scope of supply, other than the Oxidation Air Blowers, the Recycle Slurry Pumps, the Recycle Slurry Pump Gear Boxes, and the Recycle Slurry Pump Motors; the maximum A-weighted sound level free field measured 1.0 meter from the base of each item of Equipment and 1.5 meters above floor level or any personnel platform is guaranteed not exceed 85 dBA at all times during operation of the Equipment. For the Recycle Slurry Pump, Recycle Slurry Pump Gear Box, and Recycle Slurry Pump Motor assemblies, the maximum A-weighted sound level free field measured 1.0 meter from the base of each item of Equipment and 1.5 meters above floor level or any personnel platform is guaranteed not to exceed 89 dBA. For the Oxidation Air Blowers, the maximum A-weighted sound level free field measured 3.0 feet horizontally from the exterior of its enclosure and 5.0 feet above floor level or any personnel platform outside of the enclosure is guaranteed to not exceed 85 dBA at all times during operation of the Equipment. For the purposes of Guaranteed Sound Emissions, sound levels shall be tested for at the location...
of the installed equipment and in accordance with applicable industry standards, accounting for
the effects of background and reflected sound.

"Guaranteed Subproject 5 Accuracy" means the actual amount of Sorbent or PAC, as applicable, that each of the three Systems installed in Subproject 5 (i.e., the PAC System for Unit 3 and the Sorbent Systems for Units 3 and 4) is guaranteed to be within five percent (5%) of the flow rate indicated by the permanent control and instrumentation components of Subproject 5, across the entire range of flow from the Required Extrapolated Flow for that System down to ten percent (10%) of the Required Extrapolated Flow for that System.

"Guaranteed Subproject 5 Auxiliary Power Consumption Limit" means the maximum quantity of power consumed by Full Load operation of Subproject 5 is guaranteed to not exceed three hundred and seventy five (375) kilowatts per hour.

"Guaranteed Subproject 5 Flow" means each of the three Systems installed in Subproject 5 (i.e., the PAC System for Unit 3 and the Sorbent Systems for Units 3 and 4) is guaranteed to be capable of metering and transporting sorbent or PAC, as applicable, to the appropriate injection points at flow rates across the entire range from the Required Extrapolated Flow for that System down to ten percent (10%) of the Required Extrapolated Flow for that System.

"Guaranteed Subproject 5 Performance" means the Guaranteed Subproject 5 Flow and Guaranteed Subproject 5 Accuracy.

"Guaranteed Subproject BOP Auxiliary Power Consumption Limit" means the maximum quantity of power consumed by Full Load operation of each Subproject (excluding the quantity of power consumed by the PJFF and the WFGD, for that Subproject) is guaranteed to not exceed: twenty nine thousand two hundred and fifty (29,250) kilowatts per hour for Unit 1 Subproject, twenty five thousand two hundred ninety (25,290) kilowatts per hour for Unit 2 Subproject, thirty thousand five hundred and eighty (30,580) kilowatts per hour for Unit 3 Subproject, and thirty nine thousand one hundred and forty (39,140) kilowatts per hour for Unit 4 Subproject.

"Guaranteed Subproject BOP Pressure Drop" means the pressure drop (excluding the pressure gain across all fans after the boiler and excluding the pressure drop from the inlet of the PJFF to the outlet of the PJFF and the pressure drop from the inlet of WFGD to the outlet of the WFGD, if applicable) for each Subproject ("Subproject Pressure Drop") under all operating conditions specified will not exceed 5.0 inches of water column for the Unit 1 Subproject, 5.0 inches of water column for the Unit 2 Subproject, 6.0 inches of water column for the Unit 3 Subproject, and 5.0 inches of water column for the Unit 4 Subproject. These values are subject to verification and adjustment as required based upon the results of the CFD and physical flow modeling.

"Guaranteed Temperature Excursion Margin" means each fan in each Subproject shall have a temperature excursion margin of no more than 25°F added to the MCR fan inlet temperature.
"Guaranteed WFGD Absorber Gypsum Slurry" means that for each WFGD (i.) a minimum of ninety-eight percent (98%) of the SO2 removed is oxidized to gypsum; (ii.) the gypsum slurry shall have a minimum of ninety-two percent (92%) gypsum solids purity; (iii.) the gypsum slurry pH shall not be less than 5.5 or greater than 8.0; (iv.) the gypsum slurry shall have a maximum of 15,000 parts per million of Chlorides; (v) the particle sizes contained in the gypsum slurry shall not be less than 40 microns or greater than 70 microns as measured, and (vi) the slurry shall not contain constituents in quantities that would be considered toxic or hazardous or would restrict its end use in the manufacture of gypsum wallboard, with the exception of chlorides which are to be reduced in the Owner's dewatering plant. These qualities of the gypsum slurry will be met as measured from the hydrocyclone underflow.

"Guaranteed WFGD Auxiliary Power Consumption Limit" means the maximum quantity of power consumed by Full Load operation of each WFGD is guaranteed to not exceed: seven thousand three hundred and seventy six (7,376) kilowatts per hour for Units 1 & 2 and five thousand five hundred and twenty nine (5,529) kilowatts per hour for each Units 3 & 4 as measured with the highest level in each WFGD as a spare and with "n+1" agitators in service.

"Guaranteed WFGD HCl Removal" means the removal of hydrochloric acid (HCl) caused by the operation of the WFGD is guaranteed to be sufficient such that the HCl as measured at the outlet of the WFGD is equal to or less than the greater of (i) one percent (1%) of the HCl as measured at the inlet of the WFGD or (ii) 1 ppm (corrected to 6% O2.) This removal performance shall be accomplished with any one of the spray levels (Owner's discretion) and its associated recirculation pump out of service and without the use of additives.

"Guaranteed WFGD Limestone Consumption Limit" means the maximum quantity of limestone consumed by each WFGD during the Full Load operation of the WFGD is guaranteed to not exceed: seventy seven thousand six hundred and eighty five (77,685) pounds per hour on a dry basis for Units 1 & 2 and sixty one thousand two hundred and ten (61,210) pounds per hour for Unit 4 and fifty one thousand three hundred and thirty two (51,332) pounds per hour for Unit 3 based on limestone having the properties set forth in Section 3.3.3 of this Exhibit G.

"Guaranteed WFGD Limestone Reagent Utilization" means the minimum utilization of limestone for each WFGD shall be ninety-six and one half percent (96.5%) (based on limestone having the properties set forth in Section 3.3.3 of this Exhibit G) as calculated by the following equation:

\[
\text{Utilization} = \frac{\text{moles (CaSO}_4 + 2\text{H}_2\text{O)} + \text{moles (CaSO}_3 + \frac{1}{2}\text{H}_2\text{O)}}{\text{moles (CaSO}_4 + 2\text{H}_2\text{O)} + \text{soluble moles CaCO}_3 + \text{moles (CaSO}_3 + \frac{1}{2}\text{H}_2\text{O)}}
\]

"Guaranteed WFGD Liquid Carryover" means the maximum liquid carry over rate for the WFGD measured at least one foot after the mist eliminator but before the inlet of the stack is less than 0.01 grains per actual cubic foot of gas.
the outlet of the WFGD is guaranteed not to be less than eighty percent (80%); provided, that the 
WFGD will be deemed to meet the Guaranteed WFGD Mercury Removal if the Hg outlet is less 
than 1.0 lbs/TBtu. The Guaranteed Mercury Removal percentage is to be calculated as 
(Hg inlet - Hg outlet)/ Hg inlet * 100%.

The sole remedy for failure to meet Guaranteed WFGD Mercury Removal shall be for 
Contractor, at Owner’s option, to either (a) supply and deliver a Nalco re-emission control 
chemical feed system and optimization of re-emission control system at its expense or (b) pay 
Owner $250,000.

"Guaranteed WFGD Particulate Matter Removal" means (i) the removal of total particulate 
matter (TPM) caused by the operation of the WFGD is guaranteed to be sufficient such that the 
TPM as measured at the outlet of the WFGD is equal to or less than the greater of (A) thirty 
percent (30% of the TPM as measured at the inlet of the WFGD or (B) 0.03 lb/mmBtu and (ii) 
the removal of filterable particulate matter (FPM) caused by the operation of the WFGD is 
guaranteed to be sufficient such that the FPM as measured at the outlet of the WFGD is equal to 
or less than the greater of (A) twenty percent (20%) of the FPM as measured at the inlet of the 
WFGD or (B) 0.015 lbs/mmBtu.

"Guaranteed WFGD Pressure Drop" means the pressure drop for each WFGD, as measured 
from the inlet of the WFGD to the outlet of the WFGD, under all operating conditions specified 
will not exceed 8.75 inches of water column for Units 1 & 2 and 8.85 inches of water column for 
Unit 4 and 8.95 inches of water column for Unit 3.

"Guaranteed WFGD SO2 Removal" means the minimum percentage of total SO2 reduction 
caused by the operation of the WFGD, as measured from the inlet of the WFGD to the outlet of 
the WFGD, is guaranteed not to be less than ninety-eight point five percent (98.5%). The 
Guaranteed SO2 Removal is to be calculated using the guidelines presented in EPA Method 19, 
that is (SO2 inlet - SO2 outlet)/ SO2 inlet * 100%. This removal performance shall be 
accomplished with any one of the spray levels (Owner’s discretion) and its associated 
recirculation pump out of service and without the use of additives.

"Guaranteed WFGD Sulfuric Acid Removal" means the minimum percentage of total Sulfuric 
Acid (SAM) reduction caused by the operation of the WFGD and as measured from the inlet of 
the WFGD to the outlet of the WFGD is guaranteed not to be less than fifty percent (50%) for 
inlet SO3 concentrations greater than 0.07 lbs/mmBtu. For inlet SO3 concentrations between 
0.035 and 0.07 lbs/mmBtu, a constant emission of 0.035 lbs/mmBtu is guaranteed. For inlet SO3 
concentrations of less than 0.035 lbs/mmBtu, no net reduction is guaranteed. The Guaranteed 
Sulfuric Acid Removal is to be calculated as (SAM inlet - SAM outlet)/ SAM inlet * 100%. This 
removal performance shall be accomplished with any one of the spray levels (Owner’s 
discretion) and its associated recirculation pump out of service and without the use of additives.
"Guaranteed WFGD Water Balance" means (i) each WFGD will be controlled such that there will be no fugitive or uncontrollable discharges of water or slurry from the system; (ii) the only water leaving the system will be in the flue gas via the chimney as vapor or exiting the WFGD system for use in gypsum slurry dewatering; and (iii) when the WFGD equilibrium chloride content is less than 15,000 ppm, each WFGD will accept back the quantity of liquid that exits the WFGD from its hydrocyclone underflow and overflow.

"Guaranteed WFGD Water Consumption" means the maximum quantity of water required to be supplied by the Owner for consumption under the following conditions: (i) Full Load operation of the WFGD, (ii) with a maximum reclaim water chloride content of 15,000 ppm, (iii) mist eliminator wash system in service, (iv) dewatering system wash in service, and (v) reagent preparation in service, is guaranteed to not exceed seven hundred and twenty (720) gallons per minute for Units 1 & 2 and five hundred and sixty (560) gallons per minute for Units 4 and five hundred (500) gallons per minute for Unit 3.

"Hopper Heater Guarantee" means that the hopper heating systems shall perform as specified.

"Low Load" means the low load heat input in mmBtu/hr for each applicable Unit as identified in Exhibit S and measured as indicated in the DCS of the Existing Facility (for the Units 1 & 2 WFGD, Low Load means such low load heat input on one of the two Units with the other Unit not in operation); provided, at Owner's sole option, the Low Load Test Run may be performed at a higher heat input.

"Low Load Test Run" means for each Subproject the Performance Guarantee Tests for the Guaranteed Air Emissions, the Guaranteed Sound Emissions, Turndown Guarantee, Guaranteed WFGD Absorber Gypsum Slurry, and the Guaranteed Pressure Drops for that Subproject will be performed simultaneously with simultaneous sampling at all required locations in accordance with this Exhibit G, three (3) separate times at Low Load, eight (8) hours each time, and the arithmetic average of the results of each such Performance Guarantee Test will constitute the result of each such Performance Guarantee Test at Low Load.

"Maximum PJFF Pressure Drop" means the pressure drop for each PJFF, as measured from the inlet of the PJFF to the outlet of the PJFF, under all operating conditions specified will not exceed:

<table>
<thead>
<tr>
<th>Subproject</th>
<th>Maximum PJFF Pressure Drop: One Compartment Off (inches wg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mill Creek 1</td>
<td>7.6</td>
</tr>
<tr>
<td>Mill Creek 2</td>
<td>7.6</td>
</tr>
<tr>
<td>Mill Creek 3</td>
<td>7.9</td>
</tr>
<tr>
<td>Mill Creek 4</td>
<td>7.8</td>
</tr>
</tbody>
</table>

"Maximum WFGD Pressure Drop" means the pressure drop for each WFGD, as measured from the inlet of the WFGD to the outlet of the WFGD, under all operating conditions specified will not exceed:
will not exceed 9.8 inches of water column for Units 1 & 2 and 9.8 inches of water column for Unit 4 and 9.8 inches of water column for Unit 3.

"PAC" means powdered activated carbon.

"Performance Fuel" means Eastern bituminous coals meeting the specifications set forth in Exhibit S.

"Performance Guarantees" means (i) for each Subproject (other than Subproject 5), the Guaranteed Air Emissions, Guaranteed Fan Performance, the Guaranteed Sound Emissions, the Guaranteed Consumption Limits, the Guaranteed Pressure Drops, the Guaranteed WFGD Water Balance, the Guaranteed PJFF Temperature Loss, the Turndown Guarantee, the Guaranteed Availability, and the Guaranteed WFGD Absorber Gypsum Slurry and (ii) for Subproject 5, the Guaranteed Sound Emissions, the Guaranteed Subproject 5 Auxiliary Power Consumption Limit, the Guaranteed Availability, and the Guaranteed Subproject 5 Performance.

"Performance Guarantee Test Procedures" means the final detailed procedures for conducting the Performance Guarantee Tests (i.e., Commercial Operation Test and any Extra Test) prepared by Contractor and approved, in writing, by Owner in accordance with this Exhibit G.

"Performance Guarantee Tests" means the tests to determine whether the Performance Guarantees (other than Guaranteed Availability) have been achieved.

"Required Extrapolated Flow" means for each of the three Systems installed in Subproject 5 (i.e., the PAC System for Unit 3 and the Sorbent Systems for Units 3 and 4), the flow rate determined by (i) taking the flow rate for PAC or Sorbent, as applicable, transported by the analogous temporary System during successful Performance Testing for Subproject 3 or 4, as applicable, at Full Load and (ii) extrapolating that rate upward to reflect the flow that would be required to meet the Performance Guarantees if the flue gas composition and condition was at the worst condition for removal specified in Exhibit S (e.g., SO\textsubscript{3} at the highest concentration, etc.) instead of the composition and condition that existed during the successful Performance Test.

"SAM" means SO\textsubscript{3} and sulfuric acid mist.

"Subproject Unavailability" means for a Subproject, the aggregate number of clock hours (i.e., 60 minute periods starting at the top of each hour) for that Subproject in which, one of the following has occurred for all or a fraction of the clock hour: (i) the applicable Unit(s) are not in service or derated as a result of Work supplied by the Contractor or (ii) the applicable Unit(s) are operating and the Subproject fails to achieve any of the Performance Guarantees or Guaranteed Air Emissions and Maximum PJFF Pressure Drop or (iii) the Subproject is incapable of operating in compliance with clause (ii) above across the entire range of loads (and the entire
range of load changes) of the applicable Unit(s) (from minimum stable load to Full Load) while in automatic control with normal operating staff levels and without unusual operator intervention and without the use of redundant equipment operated simultaneously with primary equipment (e.g., the Subproject must be capable of meeting this standard with one PJFF compartment and/or one spray level of the WFGD designated by Owner taken out of service). If (i), (ii), or (iii) occur (other than because of a malfunction occurring prior to the Subproject 5 Guaranteed Commercial Operation Date of the temporary Sorbent system supplied by Owner that is not caused by a Defect in Contractor's Work) then one (1) hour of Subproject Unavailability is recorded for the given clock hour.

"Temporary PAC and Sorbent Systems" means, the temporary Systems for PAC and Sorbent for Subprojects 3 and 4 that are to be replaced by permanent Systems in Subproject 5. "Turndown Guarantee" means that each Subproject is capable of following and responding to flue gas conditions from Full Load to Low Load of the applicable Unit(s) without placing restrictions on the operation of the balance of plant. The Subproject will demonstrate stable operation at any load between and including Full Load and Low Load.

Any other terms that are capitalized, but not defined in this Exhibit G, shall have the meanings assigned them in the Body of the Agreement.

1. Introduction of Performance Guarantee Test.

Passage of the Commercial Operation Test for a Subproject requires that the results of the Full Load Test Run and the Low Load Test Run each demonstrate simultaneously (i) the achievement of all Performance Guarantees other than the Buydown Performance Guarantees and the Guaranteed Availability and (ii) that neither the Maximum PJFF Pressure Drop nor, if applicable, the Maximum WFGD Pressure Drop shall have been exceeded. During the Full Load Test Run and the Low Load Test Run, each of the Performance Guarantee Tests required to be performed will be performed simultaneously in three (3) separate consecutive test sets.

If Contractor passes the Commercial Operation Test, but during the Full Load Test Run or any Extra Test any of the Buydown Performance Guarantees are not achieved, Contractor may request that the applicable Performance Guarantee Test be performed again (each, an "Extra Test"). Extra Tests are to be performed only while the Unit(s) are at Full Load. The Extra Test shall include sampling at all required locations in accordance with this Exhibit G, three (3) separate times at Full Load, eight (8) hours each time, and the arithmetic average of the results of each such Performance Guarantee Test will constitute the result of the Extra Test. The results of the last Extra Test performed, if any, will determine whether the applicable Performance Guarantee has been achieved or whether Contractor will be responsible for applicable Liquidated Damages.

1.1 Testing Commencement.

With respect to Performance Guarantee Tests, the following will apply: (i) the Commercial Operation Test will commence on a date selected by Owner within thirty (30) Days after completion of hot commissioning of the Subproject.
and receipt by Owner of the notice required pursuant to Section 3.2.1 of this Exhibit G; (ii) Performance Guarantee Tests will be performed when all systems of the Subproject are operating as designed (without any temporary equipment); (iii) Performance Guarantee Tests will be performed when the Subproject is operating in full automatic mode with temporary logic or controls; (iv) Performance Guarantee Tests will commence when consistent with Prudent Utility Practices; (v) Performance Guarantee Tests must be in strict accordance with the Performance Guarantee Test Procedures, Article 11 of the EPC Agreement, and with Applicable Law, including 401 KAR Chapter 59; and (vi) the Subproject will be operated and maintained by Owner (with the technical advice from Contractor) in accordance with Section 5.9 of the EPC Agreement and the written requirements of the Subproject Operating, Maintenance, Parts and Service Manual as approved by Owner. Contractor’s directions issued to Owner pursuant to Section 5.9 must be consistent with Prudent Utility Practices and Applicable Law, including operation of all Systems and Equipment of a Subproject within the manufacturers’ specifications, recommendations, and warranty requirements, without over-stressing or over-pressurizing any such systems. Test technicians collecting data and providing other testing-related services may not operate any Equipment during any Performance Guarantee Test. Owner shall provide Contractor at least five (5) Business Days’ advance written notice of the commencement of the Commercial Operation Test and each Extra Test. If, within two (2) Business Days of the receipt of such notice, Contractor objects in writing on reasonable grounds to the commencement of the Commercial Operation Test or Extra Tests, Owner shall reschedule the Commercial Operation Test or Extra Tests. Owner shall provide Contractor at least two (2) Days’ advance written notice of the re-performance of any Commercial Operation Test or Extra Test after the initiation of the Commercial Operation Test, unless such subsequent test is performed within seventy-two (72) hours following the preceding test, in which case no additional notice will be required; provided, that such test may be subject to reasonable delays and postponement following Owner’s written notice.

1.2 Testing. The Commercial Operation Test and Extra Tests, if any, will be scheduled with due regard for minimizing the operating expenses of, and maximizing revenues to be derived from Unit operations during such tests. The Commercial Operation Test and Extra Tests must be conducted by a qualified third party contractor acceptable to Owner. Performance Guarantees must be achieved and passed while the Unit(s), as improved by the Subproject(s), are in compliance with Applicable Law. The Commercial Operation Test and Extra Tests must be conducted in the presence of Owner and in accordance with the requirements of this Exhibit G and the Performance Guarantee Test Procedures. Contractor will be required to have representatives present at the Job Site to observe any Performance Guarantee Tests and monitor the taking of measurements. During the Commercial Operations Test, the Owner reserves the right to add sulfur to the boiler fuel and to add SO₂ and/or SO₃ to the flue gas to increase the SO₂ and/or SO₃ concentration entering the WFGD system to a level equivalent to that which would be obtained while firing a design sulfur coal. The Owner also reserves the right to add CaCl₂ to the system to achieve the design chloride level. The Owner reserves the right to artificially create...
conditions to verify validity of any correction factor or curve or to run tests at performance design conditions, including the simulation of air in-leakage. In the event that either of these constituents is added, or air in-leakage simulated, then Owner will make corrections for the actual test conditions using Correction Curves to adjust for the conditions.

1.3 Defects During Performance Guarantee Tests.

After completion of any Performance Guarantee Test or any retest, including Extra Tests, Owner and Contractor shall consult concerning the results of such test and Owner shall advise Contractor in writing of any Defects, deficiencies, or needed adjustments in the Work that it has discovered or observed during the performance thereof. If Contractor is notified, or otherwise has knowledge, of such Defects, deficiencies, or adjustments, or a failure to achieve the Performance Guarantees, Contractor shall, at its sole expense, immediately commence and promptly: (i) complete corrective measures to rectify such Defects, deficiencies, or the cause of such failure, including correcting defects or deficiencies in the Work (including redesign and replacement of any defective parts) and (ii) make any necessary adjustments, in each case, as soon as practicable. Owner will make the Subproject reasonably available for this purpose; provided that such availability is required to be consistent with Owner's operating needs for the Units. As soon as reasonably practicable but in no event more than twenty-four (24) hours after the completion of such Performance Guarantee Tests (or as soon thereafter as such reports are first available to Contractor) following the applicable test or inspection, Contractor shall forward copies of all test or inspection results together with such other information Owner reasonably requires in relation thereto.

1.4 Retesting.

Prior to any retest of a Subproject, Contractor shall give reasonable notice advising Owner that all Defects and deficiencies have been corrected and all necessary adjustments have been made. Such notice must identify the date upon which the Subproject will be ready for such retesting. Within five (5) Days, Owner shall review the adjustments or corrections made by Contractor and will determine whether a retest is warranted. Following a favorable determination by Owner, Contractor shall promptly reperform the test. After each such retest, the provisions of Section 1.3, above, shall apply. Commercial Operation Tests will be repeated until Commercial Operation has been successfully achieved. If the results of any Commercial Operation Test are inconclusive because of erroneous, corrupted or inadequate data such test must be repeated. If the results of any Extra Tests are inconclusive because of erroneous, corrupted or inadequate data, such test results will not be accepted and the test may be repeated. If a Performance Guarantee Test is re-performed for a cause attributable to Contractor, including, defects, deficiencies, or needed adjustments arising from the Work, Contractor shall be responsible as a Contractor Expense for all costs of the re-performance, including that of the qualified third party testing contractor, as well as all costs incurred by Contractor. Owner will make the Subproject reasonably available to the Contractor for this purpose; provided, that such availability is required to be consistent with Owner's operating needs for the Units.
1.5 Test Equipment. Contractor shall provide and install all permanent connections, equipment, and instrumentation as required by the Agreement, including as set forth in Exhibit A or this Exhibit G. Temporary instrumentation for testing is to be provided by the qualified third party testing contractor approved by Owner. Testing instrument accuracy must comply with applicable industry testing requirements and Applicable Law, as applicable.

1.6 Required Items. Owner will provide the following: (i) limestone meeting the requirements of Section 3.3.3, (ii) sorbent for sulfur acid mist removal, as specified in the design submitted by Contractor and approved by Owner, (iii) station service water from the Ohio River at a pressure ranging from 0 to 150 psig and temperature ranging from 36 to 86 degrees Fahrenheit, and (iv) powdered activated carbon for mercury removal, as specified in the design submitted by Contractor, and approved by Owner. Contractor will arrange for a third party testing contractor acceptable to Owner to: (i) provide all necessary temporary testing and analysis equipment including sample extraction and conditioning systems, sample pumps, filters and filter holders, continuous and grab sample analyzers, reference gases, reagents, data recorders and ancillary equipment; (ii) install, maintain and calibrate Reference Method sampling equipment and related test instrumentation prior to, during and following the test program as appropriate; (iii) provide a sufficient supply of all consumable items such as printer paper, special cleaning fluids, and magnetic data storage media for the required number of test days; and (iv) supply communications equipment (i.e., intrinsically safe two-way radios) for the core testing team and designated Owner Personnel at the Subproject to communicate with the team at ground level.
2. Performance Guarantees.

2.1 General. The Subproject shall meet the Performance Guarantees across the full range of fuels and conditions described Exhibit S. Load variations and/or transients during testing are allowed up to five percent (5%) of Full Load or Low Load Test operating points. All Performance Guarantees (other than Guaranteed Availability) are to be tested and met simultaneously in one Commercial Operation Test, except as provided in Section 2 of this Exhibit G. Test results will be corrected pursuant to Section 3.4.2 of this Exhibit G.

3. Performance Guarantee Test Procedures and Correction Criteria

3.1 Performance Guarantee Test Procedures. Performance Guarantee Test Procedures shall state the design, conditions, and procedures for performance of each of the Performance Guarantee Tests and required for measuring and proving compliance with the Performance Guarantees. Performance Guarantee Test Procedures shall be prepared by Contractor and shall be subject to approval by Owner prior to the start of any Performance Guarantee Tests.

A draft of the proposed Performance Guarantee Test Procedures for each Subproject shall be prepared by Contractor and delivered to Owner not less than one hundred twenty (120) Days prior to the Scheduled Mechanical Completion Date for that Subproject. Owner shall review such draft and provide written comments to Contractor with thirty (30) Days of receipt of the draft Performance Guarantee Test Procedures. Contractor and Owner shall cooperate and diligently work to complete an agreed final version of the Performance Guarantee Test Procedures for each Subproject no later than thirty (30) Days prior to the Scheduled Mechanical Completion Date for that Subproject. Contractor and Owner shall cooperate and in good faith finalize Performance Guarantee Test Procedures.

3.1.1 Development of Procedures. Contractor shall, at a minimum, address the following in the Performance Guarantee Test Procedures:

• The purpose of the Performance Guarantee Test Procedures
• Performance Guarantee Test division of responsibilities of Contractor and Owner
• Applicable performance corrections using the Correction Curves
• Codes and Standards, including EPA Reference Test Methods and ANSI specifications to be utilized and any exceptions or deviations to these Codes and Standards
• Data requirements and collection procedures
• Form of calculation sheets and diagrams to be used to identify the values measured
• Instrument list including both permanent plant and temporary Performance Guarantee Test instrumentation to be utilized
• Test operating parameters and the test samples collection methods
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3.1.2 Other Requirements.

No adjustments to the Work, of any kind, may be made during any Commercial
Operation Test or any Extra Test.

3.1.3 Testing Standards.
All references in this Exhibit G or in the Performance Guarantee Test Procedures to the
Society of Mechanical Engineers (ASME), EPA Reference Methods and to other similar
standards publications are to the latest issue of each as of the date of the applicable test,
unless specifically stated otherwise.

The Performance Guarantee Tests must be performed in strict accordance with the latest
editions (including any amendments and successor regulations) of the EPA Reference
60 Appendix A); Methods in Code of Federal Regulations (CFR) Title 40, Part 75,
Appendix A; Methods in Code of Federal Regulations (CFR) Title 40 Part 76; and with
agreed upon industry standard testing codes.

3.2 General Performance Guarantee Test Procedure Requirements.

3.2.1 Prior to Testing.
Prior to the commencement of the initial Commercial Operation Test, Contractor shall, at
its own expense (including personnel, test equipment, material and any other costs): (i)
carry out and complete its own preliminary testing program and (ii) make and complete
such adjustments to the Work as may be necessary to ensure suitability for testing and
optimization of the Subproject to ensure achievement of the Performance Guarantees.
Preliminary testing is to assure Owner that the Subproject will perform as required and
that the initial Commercial Operation Test should be conducted. As a condition of
commencing any Commercial Operation Test or Extra Tests, Contractor shall notify
Owner in writing of the date that the Subproject is ready for such Performance Guarantee
Tests in accordance with Section 2.1 of this Exhibit G which date must not be earlier
than five (5) Days following Owner's receipt of such notice. Contractor will be entitled
to delay commencement of the Performance Guarantee Tests on no less than three (3)
Days' notice to Owner. Any Contractor preliminary testing will be subject, without cost to Owner, to the Unit(s) load determined solely by Owner.

Contractor shall conduct preliminary testing and make adjustments to optimize Subproject performance during hot commissioning. Contractor shall submit to Owner a complete listing of all adjustments and the purpose of such adjustments, along with results of such adjustments.

Contractor shall furnish calibration certificates for the test equipment to Owner one week prior to commencement of the initial Commercial Operation Test. Contractor will give Owner reasonable advance notice of all instrument calibration activities. Owner will have full access to witness all calibrating and checking of instruments and other apparatus and all preliminary testing performed. Contractor shall provide Owner with copies of all commissioning test reports as well as all raw test data collected within forty-eight (48) hours of collection.

3.2.2 During Testing.

During a Performance Guarantee Tests, the Subproject will be operated by Owner and Contractor shall provide technical direction with respect to Subproject operations. Subproject is not to be operated with any auxiliary, standby, redundant, spare, or temporary components or equipment (whether or not constituting Equipment) during any Performance Guarantee Test or Extra Tests (e.g., one PJFF compartment designated by Owner will be out of service). All Equipment and Systems of a Subproject must be operational during each Performance Guarantee Test.

Repair of any part or replacement of any item of the Equipment and Materials that could materially alter the performance of the Subproject, the results of Commercial Operation Test or any Extra Test will not be permitted during a Commercial Operation Test or any Extra Test. If Contractor performs any repair or alterations after Commercial Operation Test or any Extra Test that could affect the results of a previously conducted Commercial Operation Test or any Extra Test, the performed test will be invalidated and Contractor shall repeat the invalidated Commercial Operation Test or any Extra Test, at its own expense, including the cost of the qualified third party test contractor.

All Performance Guarantee Test Procedures must require that the Subproject be operated within its design ratings for any Performance Test to be considered valid and successfully passed. In particular, none of the following shall occur:

• Overheating of components
• Operation of tripping or limiting devices, except where the test is intended to demonstrate such operation
• Rubbing, chaffing or other mechanism of accelerated wear
• Exceeding of Guaranteed Sound Emissions
3.2.3 Interruptions.

For the Commercial Operation Test and Extra Tests: (i) test interruptions (including interruptions resulting from malfunctions of the temporary Sorbent system supplied by Owner) will invalidate the results and will require the re-testing of the applicable Performance Guarantees; and (ii) test data gathered from an interrupted test prior to the interruption shall not be used.

Upon the occurrence of an interruption, Owner shall notify the Contractor in accordance with the Performance Guarantee Test Procedures. Upon the occurrence of an interruption, Contractor, with Owner’s assistance, will identify the cause, define the procedure for restarting the test, and identify the responsibility for any costs incurred for re-testing.

3.2.4 Corrections and Adjustments.

For conditions that vary from the guarantee conditions, Contractor shall analytically adjust Commercial Operation Test and Extra Tests results through the application of corrections to as-measured test results in accordance with the Correction Curves and Performance Guarantee Test Procedures. No tolerance, margin, or allowance for uncertainties in measurement or instrumentation will be allowed in the determination of whether the Performance Guarantees are met.

3.3 Correction Criteria, Units Operating Data and Fuel Specification.

3.3.1 Flue Gas Correction Criteria.

The flue gas criteria upon which Contractor has based the Performance Guarantees are listed in Exhibit S.

3.3.2 Fuel Specification.

The Performance Guarantees are based on burning the fuel within the range set forth in Exhibit S.

3.3.3 Limestone Reagent Properties.

The Limestone provided by Owner for use in the WFGD shall meet the following criteria: (i) a minimum of 96.5% of the CaCO₃ in the limestone shall be available as soluble CaCO₃, (ii) the reactivity shall be not less than 50%, and (iii) the limestone shall...
the ability to achieve a minimum 50% conversion after 5 minutes as determined by reacting limestone with a fineness of 75% passing through 325 mesh and 92% passing through 200 mesh with 1 Normal Hydrochloric acid at a constant pH of 4.0.

Example:
If 100 lb of limestone contains 95% CaCO₃, the amount of CaCO₃ = 95 lb. If 96.5% of the CaCO₃ is soluble under WFGD condition, the weight of CaCO₃ available for reaction with acid gases = 95 x (96.5/100) = 91.67 lb.

3.4 Performance Guarantee Test Conditions.
3.4.1 Commercial Operation Test and Extra Tests Fuel.
The fuel supply for the testing will be identified by Owner prior to the execution of the Commercial Operation Test and Extra Tests. Sampling of the fuel will be agreed between Contractor and Owner to demonstrate that it meets or to correct to the requirements for Performance Fuel prior to commencement of the Commercial Operation Test and any Extra Test. The fuel sampling protocol to be used during a Commercial Operation Test and any Extra Test must be specified in the Performance Guarantee Test Procedures. The testing contractor shall supply the necessary apparatus for taking and containing the fuel samples.

Three (3) separate samples shall be taken for each of the three (3) test sets of the Full Load Test Run and the Low Load Test Run during a Commercial Operating Test. A minimum of eighteen (18) fuel samples shall be collected during a compliant demonstration of the Commercial Operation Test. Three (3) separate samples shall be taken for each Extra Test. One sample of each set of three (3) samples shall be fully analyzed by a qualified third party testing contractor acceptable to Owner and the costs of these analyses shall be borne by Contractor; provided, however, if re-performance of a Commercial Operation Test or Extra Test failed in whole or in part for reasons related to the performance of Contractor’s Work, then Contractor shall be responsible for the cost of such fuel retesting and the qualified third party testing contractor as a Contractor Expense. The other two samples of each set of three samples shall be properly labeled and one shall be handed over to Owner and the other to Contractor.

3.4.2 Correction Curves.
The Correction Curves will be utilized at the Job Site to assess, on a preliminary basis, Commercial Operation Test and Extra Tests results. Final Commercial Operation Test and Extra Tests acceptance will be based upon the final Performance Guarantee Test report, which shall include all final laboratory results and all Performance Guarantee Test results plotted graphically on the applicable Correction Curves. The Contractor shall.
3.4.3 Performance Guarantee Test Points and Instrumentation.

Contractor shall specify a list of key measurement instruments to be used during Commercial Operation Test and Extra Tests. Contractor shall provide all permanent and temporary Commercial Operation Test and Extra Tests points of measurement to allow demonstration that the Subproject performance is in compliance with the Agreement. Contractor shall provide drawings indicating the points of measurement together with necessary isolation during execution of the Commercial Operation Test and Extra Tests. Contractor shall describe the means of measurement of the necessary parameters together with the anticipated standard and accuracy of the instruments. Contractor shall cause the permanent instruments to be calibrated in accordance with the standards of a recognized national organization such as ASTM, Instrument Society of America (ISA), National Bureau of Standards (NBS), or the Performance Test Codes of the ASME. Contractor shall provide a certified calibration curve for each permanent measuring device in compliance with applicable original equipment manufacturer (OEM) measurement protocol. Contractor shall provide re-calibration certificates, as necessary. Contractor shall specify calibration procedures and Contractor shall submit them to Owner as part of the Contractor's written Performance Guarantee Test Procedures. Performance Guarantee Test Procedures must require that test data will be monitored and recorded by permanent plant instrumentation using the Units' DCS to the greatest extent possible.

Flow measuring devices for air and liquids, and thermocouples (with their indicators) that are used as test instruments and are part of the permanent instrumentation provided by Contractor must be certified by a qualified third party inspection contractor acceptable to Owner.
B. Guaranteed Air Emissions must be met at the applicable test ports (CEMS test ports or at the performance test ports) as defined in the Performance Guarantee Test Protocol.

C. EPA Method 1 must be used to determine number and location of sampling traverse points.

D. Emissions will be measured by an Owner approved, qualified third party testing contractor.

E. The applicable section of EPA Method 2 must be used to measure flue gas velocity, temperature, and volumetric flow.


G. EPA Method 3A must be used to determine percent oxygen and carbon dioxide of the flue gas and Method 4 must be used to determine the percent moisture of the flue gas.

H. An integrated multi-point sample analysis, as determined by EPA Method 3C, shall be obtained at each test station for each Commercial Operation Test or Extra Tests.

I. In the test for the Guaranteed PJFF PM Emissions, PM data shall be measured in accordance with EPA Method 17 or EPA Method 5 as applicable at the PJFF outlet.

J. In the test for the Guaranteed PJFF Sulfuric Acid Emissions, SAM data shall be measured in accordance with EPA Conditional Test Method CTM-013 at the PJFF outlet.

K. In the test for the Guaranteed PJFF Mercury Emissions, HG data shall be measured in accordance with EPA Method 30B at the PJFF outlet.

L. In the test for the Guaranteed WFGD SO2 Removal, SO2 data shall be measured in accordance with EPA Method 6C at the inlet and outlet of the WFGD. The certified plant inlet and outlet CEMS shall be utilized in the determination of compliance of the Guaranteed WFGD SO2 Removal for purposes other than Performance Guarantee Tests.
M. In the test for the Guaranteed WFGD Sulfuric Acid Removal, SAM data shall be measured in accordance with EPA Conditional Test Method CTM-013 at the inlet and outlet of the WFGD.

N. In the test for the Guaranteed WFGD HCl Removal, HCl data shall be measured in accordance with EPA Method 26A at the inlet and outlet of the WFGD.

O. In the test for the Guaranteed WFGD Particulate Matter Removal, PM data shall be measured in accordance with either the EPA Method 5 or the EPA Method 17 at the WFGD inlet and Method 5B at the WFGD outlet.

P. In the test for the Guaranteed Liquid Carryover, liquid carryover data shall be measured with a Phase Doppler Particle Analyzer Laser Probe one foot above the top mist eliminator performing equal distance multi-point measurements.

Q. In the test for the Guaranteed WFGD Mercury Removal, mercury data shall be measured in accordance with EPA Method 30B at the inlet and outlet of the WFGD.

3.6 Guaranteed Sound Emissions.
During the Commercial Operation Test the Contractor shall demonstrate that the noise emissions associated with the Subproject at the load range of the Units are less than or equal to the levels of the Guaranteed Sound Emissions. Contractor shall supply a sound emissions test protocol in the Performance Guarantee Test Procedures. The measurements must be made using a sound level meter conforming to current ANSI specifications or better. Instrument, calibration, and measurement details that are not specified herein are to be determined from information given in the appropriate ANSI specifications. No field measurement tolerances are allowed and may not be subtracted from the direct measurements. Contractor will engage an Owner-approved qualified independent third party testing contractor to perform the testing to determine whether Guaranteed Sound Emissions has been achieved. Measurements are to be reported as dB (A) Leq levels (equivalent continuous A weighted sound level), unless due to contamination from intermittent noise sources not associated with the Contractor supplied equipment, then an appropriate statistical parameter may be used.

Retests, if necessary, because of reasons attributable to the Work of the Contractor are to be a Contractor Expense.

3.7 Guaranteed Consumption Limit.
The Performance Guarantee Tests for the Guaranteed Consumption Limits shall be subject to the following additional requirements:

A. In the test for the Guaranteed Limestone Consumption Limit, (i) limestone consumption will be determined from the SO2 absorbed, limestone stoichiometry, limestone purity, and the chlorine and fluorine content of the coal, (ii) two samples of reagent will be collected using ASTM C30 at the beginning of each Commercial Operation Test or Extra Tests and retained for analysis, if required,
(iii) two samples of fresh reagent slurry will be collected, at time intervals to be determined later, throughout the test period according to the latest published version of EPRI WFGD Chemistry and Analytical Methods CS -3612; (a) one of these samples will be analyzed for percent available alkalinity, suspended calcium, and suspended magnesium and (b) the second sample will be held for future analysis, if required, (iv) the WFGD system will operate at the test conditions for a period of four hours prior to testing, and (v) each test shall have a minimum duration of twenty-four (24) hours.

B. In the test for the Guaranteed Limestone Reagent Utilization, (i) limestone reagent utilization throughout the test will be determined from the analyses of two (2) samples collected from the absorber bleed (one sample shall be analyzed using EPRI WFGD Chemistry and Analytical Methods RP 10341- 4 TOL5, November, 1988), (ii) these samples shall be washed with a gypsum solution to remove adherent liquor and dried in an oven at 50 degrees Celsius to minimize the effect of chlorides on the determination of CaCO₃ utilization, (iii) the dried solids shall be analyzed using the following methods: (a) Method H1 (Atomic Absorption Spectrophotometry) shall be used to determine suspended calcium and suspended magnesium; (b) Method L2 for suspended sulfate; (c) Method M2 for suspended sulfite; and (d) Method N3 for total alkalinity, (iv) the chloride (Method ASTM D6721) and fluoride (Method ASTM D5987- IC) content of the coal will be measured and the limestone reacted with the absorbed HCl and HF will be calculated as its molar equivalent, and (v) the second sample is to be held for future analysis, if required.

C. In the test for the Guaranteed PJFF Auxiliary Power Consumption Limit, the Guaranteed WFGD Auxiliary Power Consumption Limit, the Guaranteed Subproject 5 Auxiliary Power Consumption Limit and the Guaranteed Subproject BOP Auxiliary Power Consumption Limit, (i) total power consumption for the applicable Equipment and Materials at Full Load shall be determined through the use of recording watt-hour meters supplied and installed by the Owner, (ii) amperage shall be measured at the electrical feed(s) to the applicable switchgear(s), (iii) measurements will be continually recorded throughout the test, (iv) total power consumption requirement for the applicable Equipment and Materials does not include non-process loads such as lighting, HVAC, welding/power receptacles, etc., (v) power consumption data will be collected by an independent testing contractor acceptable to Owner via local readout or through the DCS, as applicable, and logged for reporting purposes, and (vi) for the test to be valid, the power factor during the test must be at least 0.85.

D. In the test for the Guaranteed Sorbent Consumption Limit, (i) total sorbent consumption for the Equipment and Materials at Full Load shall be determined through the use of Contractor weigh feeder data, (ii) measurements will be continually recorded throughout the test, and (iii) sorbent consumption data will be...
E. In the test for the Guaranteed PAC Consumption Limit, (i) total PAC consumption for the Equipment and Materials at Full Load shall be determined through the use of Contractor weigh feeder data, (ii) measurements will be continually recorded throughout the Commercial Operation Test or Extra Tests, and (iii) PAC consumption data will be collected by an independent testing contractor acceptable to Owner via local readout or through the DCS, as applicable, and logged for reporting purposes.

F. In the tests for the Guaranteed WFGD Water Consumption Limit and the Guaranteed PJFF Water Consumption Limit, (i) Contractor shall provide and install Owner approved permanent measurement equipment to collect water consumption data during the Water Consumption Limit Test, (ii) data from such instrumentation will be used to determine if the applicable guarantees have been achieved, and (iii) the volumetric flow rate data shall be collected via local readout or through the DCS as applicable and logged for reporting purposes.

G. In the test for the Guaranteed Compressed Air Consumption Limit, (i) Contractor shall provide and install Owner approved permanent measurement equipment to collect water consumption data, (ii) data from such instrumentation will be used to determine if the Guaranteed Compressed Air Consumption Limit has been achieved, and (iii) the volumetric flow rate data shall be collected via local readout or through the DCS as applicable and logged for reporting purposes.

3.8 Guaranteed Pressure Drops.

The Performance Guarantee Tests for the Guaranteed Pressure Drops shall be subject to the following additional requirements:

A. Pressure drop must be measured in accordance with ASME PTC 19.2 (Chapter 3) and EPA Method 2, respectively.

B. Pressure drop will be determined by taking the pressure at test ports located at appropriate locations in the Subproject (actual testing ports to be depicted in the general arrangement drawings). A local manometer will be used to take pressure measurements. The data shall be collected via local readout and logged for reporting purposes by the qualified third party testing contractor.

C. For the PJFF Pressure drop will be determined by taking the pressure at test ports located at the PJFF inlet and the PJFF outlet (actual testing ports to be depicted in the general arrangement drawings). Temporary instrumentation will be used to take pressure measurements with respect to the Guaranteed PJFF Pressure Drop. The Guaranteed PJFF Pressure Drop for a test run will be equal to the pressure drop averaged during the entire test run period. During each test run there will be...
the typical number of bag cleaning cycles that will be used for the life of the fabric filter. The Maximum PJFF Pressure Drop for a test run will be the maximum 2 second average pressure drop occurring at any time during the test run. Maximum PJFF Pressure Drop will be measured using permanent instrumentation. The data shall be collected via local readout and logged for reporting purposes by the qualified third party testing contractor.

3.9 Guaranteed WFGD Water Balance. Testing method shall be agreed between Contractor and Owner.

3.10 Turndown Guarantee. The test for the Turndown Guarantee will consist of an assessment of the Subproject’s ability to demonstrate stable operation via the DCS at all loads between Low Load and Full Load.

3.11 Guaranteed WFGD Absorber Gypsum Slurry. The Performance Guarantee Tests for the Guaranteed WFGD Absorber Gypsum Slurry shall be subject to the following additional requirements:

A. Gypsum properties will be determined by acquiring two (2) one-quart samples of gypsum solids taken from the sample point at the hydrocyclone underflow during the Full Load Test Run.

a. One sample for each run shall be analyzed for suspended calcium, magnesium, sulfate and sulfite; total alkalinity; and particle size using the latest published version of EPRI WFGD Chemistry and Analytical Methods RP CS-3612 and for the following:

i. Method F1 for weight percent solids (moisture content test)

ii. Method L2 for suspended sulfate

iii. Method M2 for suspended sulfite

iv. Method N3 for total alkalinity

v. ASTM C471 for chloride/magnesium/insoluble residue

vi. Particle size analysis by Microtrac (or equal)

vii. Method 150.1 for pH

viii. Method 160.2 for TSS

ix. Method 5220 for COD

x. Method 325.3 for Chloride

b. The second sample is to be held for future analysis, if required.

3.12 Hopper Heater Guarantee Test. The test for the Hopper Heater Guarantee will consist of an assessment of the PJFF’s ability to demonstrate performance of the hopper heating of...
system. Two test thermocouples per fabric filter shall be furnished by the PJFF Supplier for installation on hopper walls as directed by the Buyer to confirm the performance of the hopper heating system. Each test thermocouple shall terminate at a junction box located on the outside of the hopper lagging approximately 3 feet above the hopper outlet flange. The hopper heating system will be tested by the Buyer by monitoring the test thermocouples during (i) cold commissioning of the PJFF and (ii) normal fabric filter startup and operation in connection with the Performance Guarantee Tests. The Contractor may witness the tests. If the hopper heating system does not perform as specified, the PJFF Supplier shall provide all materials and labor to modify all hoppers. The modified hopper heating system will be retested by the Buyer to confirm the specified performance.

3.13 Guaranteed Availability.

The determination of Guaranteed Availability shall be subject to the following additional requirements:

A. Contractor may provide technical support (as a Contractor Expense) during this period.
B. The Owner will collect Subproject data related to Subproject Unavailability. All costs for operation and normal maintenance of the Subproject will be Owner's cost.
C. The applicable Unit(s) will operate in cooperation with the dispatch loads requested by the dispatch authority or in such other manner as Owner may determine.
D. Redundant equipment may be used at Owner's discretion.
E. Contractor shall be allowed to make minor adjustments to the Subproject, provided such adjustments do not interfere with or impact the commercial use of the Subproject. All adjustments made by the Contractor shall be recorded by Contractor in a manner to be agreed with Owner.
F. Owner may use permanent Subproject instrumentation or CEMS to validate Performance Guarantees with respect to Subproject Unavailability.
G. Upon a Unit trip (or derate) caused by the Work, Owner will not be required to return the Unit to service unless the root cause of the trip or derate has been identified and the problem has been corrected (and the entire period of time shall be considered Subproject Unavailability).

If the Subproject fails to pass the Guaranteed Availability, in addition to the payment of any applicable liquidated damages, the Contractor shall conduct a “root-cause” analysis. Following the “root-cause” analysis, the Contractor shall correct any deficiencies identified by the analysis that are specific to Work.
3.14 Guaranteed Fan Performance. The Performance Guarantee Tests procedures for the Guaranteed Fan Performance shall be agreed to by the Owner and Contractor based on industry standards and at MCR.

4. Commercial Operation Test Results. Contractor shall calculate preliminary corrected performance figures at the completion of each Full Load Test Run and Low Load Test Run (each a "Commercial Operation Test Run") to allow Owner to preliminarily determine if the test run completed was satisfactory or whether it should be repeated.

Contractor shall provide three (3) copies of the preliminary report of each Commercial Operation Test Run to Owner within seven (7) days of the completion of each Commercial Operation Test Run.

After completion of the Commercial Operation Test, the testing contractor shall provide, within thirty (30) Days, all calculations, diagrams, reports, and final laboratory results for the Commercial Operation Test.

The testing contractor shall produce a full and complete report of the Commercial Operation Test results and shall provide three (3) hard copies in a 3 ring bound binder and 3 CDs (produced from output of the native format with minimized scanned pages), of same to each of Owner and Contractor within thirty (30) Days of the completion of the Commercial Operation Test. The official Commercial Operation Test reports shall include, as a minimum, the following details, as applicable:

- Date and time of test start and finish
- Full procedure utilized
- Instrumentation details and calibration data including signed and approved instrument calibration forms
- Full schematic of the Units with instrument locations
- The standard to which the Commercial Operation Test was carried out and the performance test code(s) followed, plus other reference data used
- The operating conditions prior to the Full Load Test Runs and Low Load Test Runs.
- Summary of Commercial Operation Test readings, results and conclusions
- Laboratory analyses and calculations
- Pre-test uncertainty calculations
Copies of Commercial Operation Test data sheets or other raw data

Copies of final laboratory tests

Notes on any unusual observations, data or conclusions

Attendance

Results of the Commercial Operation Test

Upon completion of the Performance Guarantee Test Procedures, testing contractor shall prepare an emission compliance test report for submittal to the appropriate Governmental Authorities by Owner. The testing contractor shall be responsible for making any report modifications required for approval.

Contractor shall provide a report documenting results of any Extra Tests.