BEFORE THE CORPORATION COMMISSION OF OKLAHOMA

IN THE MATTER OF THE APPLICATION OF OKLAHOMA GAS AND ELECTRIC COMPANY FOR COMMISSION AUTHORIZATION OF A PLAN TO COMPLY WITH THE FEDERAL CLEAN AIR ACT AND COST RECOVERY; AND FOR APPROVAL OF THE MUSTANG MODERNIZATION AND COST RECOVERY	)))))))	CAUSE NO. PUD 201400229

REDACTED

Rebuttal Testimony

of

Robert J. Burch

on behalf of

Oklahoma Gas and Electric Company

January 26, 2015

Q. **Please state your name, by whom you are employed, and your business address.**

A. My name is Robert Burch. I am employed by Oklahoma Gas and Electric Company ("OG&E") and my business address is 321 N. Harvey, P.O. Box 321, Oklahoma City, Oklahoma 73101.

Q. **What position do you hold with OG&E?**

A. I hold the position of Director, Power Supply Services at OG&E.

Q. **Did you previously file Direct Testimony in this proceeding?**

A. Yes.

Q. **Have you reviewed the Responsive Testimony filed in this cause?**

A. Yes.

Q. **What is the purpose of your testimony?**

A. The purpose of my testimony is to rebut certain arguments made by the intervenors. These intervenors include Mr. Craig Roach, representing the Oklahoma Corporation Commission ("OCC"), Mr. Scott Norwood and Mr. Mark Garrett, representing the Oklahoma Industrial Energy Consumers ("OIEC") and Mr. Daniel Peaco representing Oklahoma Cogeneration. These arguments are related to OG&E's plan to modernize the Mustang Plant with combustion turbines.

I. Need to Retire Mustang

Q. **Mr. Norwood indicates that OG&E can simply defer the retirement of the Mustang Units 3 and 4 past 2017 to the dates listed in the 2012 IRP or beyond.[1] Do you agree?**

A. No. Mr. Norwood points to a 2012 condition assessment study performed by Burns and McDonnell that indicates, with significant investment, the maximum service life OG&E could reasonably expect is 65 years. The Burns and McDonnell study indicates that, assuming the Mustang Units 3 and 4 are utilized to the maximum useful life, certain investments would be necessary for these units to have the capability of reaching such maximum life. However, Mr. Norwood fails to recognize that the study concentrates only on needed investments for a few key areas such as the boiler, control systems and main electrical transformers.

Q. **How much investment does the Burns and McDonnell study identify to keep the Mustang Units 3 and 4 operational to 65 years of service life?**

A. The Burns and McDonnell study recommends almost $60 million in investment in Mustang Units 3 and 4. This ignores the need for investment in areas such as high energy piping and headers, plant infrastructure and large rotating equipment, such as turbine generators and boiler feedwater pumps.

Q. **What is OG&E's opinion about the approximately $60 million investment?**

A. Even if you do not consider the other necessary investments, making approximately $60 million dollars in investments in the last few years of an asset's remaining useful life does not make sense. A good analogy would be replacing the transmission in an old car immediately before deciding to take the car to the salvage yard.

Performing such work in those timeframes could also leave stranded assets when the units are retired since all of the listed items are sized and designed specifically for those units, which are already among the oldest in the nation and could not be reused or sold.

[1] Responsive Testimony of Mr. Norwood: Page 40-41.

Q. **Would this investment eliminate the need to invest in replacement capacity at Mustang?**

A. No. The investment indicated only defers OG&E's need to invest in replacement capacity until the existing Mustang units retire.

Q. **Does making the investment advocated by Burns and McDonnell guarantee a service life of 65 years?**

A. Absolutely not. Making the investment noted in the Burns and McDonnell report does not guarantee a 65 year life. As I have said, the Burns and McDonnell report only focuses on certain areas and omits other critical areas.

Q. **What are some of the other critical components and areas of the plant not identified in the Burns and McDonnell report that could fail unexpectedly?**

A. The Burns and McDonnell report did not address the risk of failure associated with critical high energy piping systems, such as superheater and reheater piping and headers that operate at high temperatures and pressures. Another area not considered was the circulating water system that is comprised of very large underground piping, cooling towers, large pump and motor combinations, and condenser tubing. Burns and McDonnell also did not include investment in aging plant infrastructure including high and low voltage wiring and switchgear, which is becoming obsolete. The report also did not include large rotating equipment such as steam turbine/generator combinations and boiler feedwater pumps. The cost of replacing each of these components vary; however, each individual component could run in the millions of dollars with a total steam turbine replacement approaching as much as $70 million, as I describe later in this testimony.

Q. **What are some of the risks if a critical component experiences a significant failure?**

A. Clearly the ability to generate electricity would be interrupted, likely for months. Many of these components are obsolete and the lead times for replacing these parts can be long, assuming the parts are even available. Additionally, failures in these components have the potential to cause secondary damage. One example would be a fire in the facility

caused by the failure of aging wiring. A fire is unpredictable, but could easily damage or destroy other adjacent equipment or cause injury to personnel.

Q. **Do you have an example of a component failure at Mustang that would fit into the category of not being addressed in the Burns and McDonnell report?**

A. Yes. As I mentioned in my direct testimony, the main turbine on Mustang unit 4 experienced a crack in the low pressure turbine rotor in 2010. The crack was extensive so as to preclude making a welded repair. The alternatives were to fabricate a replacement at significant cost and with significant lead time (forgings can take 18 -24 months), find a used replacement or immediately retire the unit. The ultimate solution involved finding a used forging in the salvage yard of a turbine manufacturer. However, OG&E was fortunate as there is no guarantee that such a forging will be available in the future. Should a similar failure occur today, the decision might be to retire the unit immediately due to cost and lead time of replacement parts.

Q. **Had the turbine been damaged so significantly that repair was not possible, what is the estimated cost and delivery of a modern replacement turbine?**

A. OG&E has not solicited bids for such a specific replacement at Mustang. However, for illustrative purposes, public information from Black and Veatch suggests a new steam turbine can cost approximately $150/kW.[2] For a nominal 250 MW unit like Mustang 4 this can be between $30 and $40 million dollars. However, the complexity of installing a new turbine into an existing facility can increase the cost significantly. Based on my nearly 30 years of experience building and maintaining power plants, it could be expected that the replacement of a steam turbine similar in size to Mustang unit 4 would approach as much as $70 million if installed as a retrofit at the Mustang site. This is because each retrofit installation is different and, to accurately estimate installation costs with any precision, extensive site specific engineering work would be required. This is further complicated by a brand new steam turbine needing to be customized to fit within the

[2] It should be noted that the $150/kW cost used was for a coal unit steam turbine because the Black and Veatch report did not have the granularity on the combined cycle estimates to determine steam turbine costs. Steam turbines are not designed and constructed differently based on the steam source.

constraints of the existing plant, such as foundation anchor points and building steel, condenser connections, and high energy piping connections.

Delivery times vary, but my experience is that the minimum time to fabricate a new steam turbine approximates 18 months with some vendors taking longer than 18 months. This time would also be influenced by the amount of custom fabrication necessary for a retrofit application. Also, installation at Mustang would likely take at least 6 additional months beyond fabrication.

Entergy recently disclosed in its January 2014 filing with the SEC its annual report on Form 10-K that its Baxter Wilson plant, which began commercial operation several years after Mustang Units 3 and 4, experienced a catastrophic failure. The cost of that event was reported between $45 and $60 million, which further illustrates that aging plants are subject to unpredictable and expensive failures.

Q. **Why should OG&E plan to retire the units on a predetermined schedule instead of seeing if the units make it to the recommended retirement age?**

A. OG&E does not believe it to be appropriate to make planning decisions based on a rolling of the dice. Making informed decisions and taking calculated actions insulates the customer from the volatility associated with decisions of chance. For example, should a failure such as that described above with the Mustang 4 turbine happen during a hot summer, finding short term replacement capacity may be extremely expensive, if possible at all. OG&E also would have to secure intermediate term capacity while it makes permanent plans for replacement generation.

Q. **Are there any other concerns that OG&E would have with running these units past 2017?**

A. Yes. OG&E has concerns with the safety of our employees. While OG&E exercises the appropriate measures of safety with our generating units and can minimize the exposure to our employees through access control, we cannot completely eliminate all risks to our employees. Units of this age are subject to experience failures such as pressure part failures and failures of high speed rotating equipment, which could place our employees in harm's way. Inspection and maintenance practices can help identify areas of concern,

but it is not possible to fully inspect every component and have complete certainty that an event cannot occur.

Q. **Did OG&E consider replacing the Mustang units before 2018?**

A. Replacing the capacity before the 2018 summer peak represents the earliest OG&E can design, permit, procure and install the combustion turbines at Mustang. In addition, OG&E prefers to make capacity replacements and additions in a planned fashion as opposed to making sudden changes in our fleet that have unplanned impacts to our customers.

Q. **Is the decision to retire the Mustang units in 2017 in any way inconsistent with retirement decisions being made by other utilities or with past OG&E decisions?**

A. No. As described in my Direct Testimony, the retirement of Mustang Units 3 and 4 will come at an age that makes them either the oldest or nearly the oldest units in their class in the United States. As an example and per my Direct Testimony, Mustang Unit 3 is among 6 of the oldest units running today. Mustang Unit 4 is the oldest of 7 running units in its class. Other utilities, including OG&E, have retired a majority of this type of unit in the US fleet at earlier ages than these units. It should also be pointed out that OG&E has retired units at earlier ages than Mustang Units 3 and 4. For example, the Arbuckle Unit was retired after 31 years of service, Muskogee Unit 3 was retired after 55 years of service, the Osage Plant was retired after 50 years of age and the Belle Isle Plant was retired after 50 years of age. All were legacy steam units similar to Mustang Units 3 and 4. The reasons behind the timing of those decisions certainly vary by utility and in some case by unit. However, these decisions show a pattern of industry actions consistent with OG&E's decision to retire Mustang Units 3 and 4 in 2017.

Q. **If 2017 represents OG&E's present retirement date, why did that change from the 2012 IRP, which lists 2020 and 2024 respectively for Mustang Units 3 and 4?**

A. In 2011, OG&E identified the need to align plant retirement dates with retirement assumptions in our depreciation study results. The desire was to identify dates that reflect, to the best of our knowledge, expected retirement dates. OG&E commissioned a

study by Burns and McDonnell to help determine what those dates and costs should be. That study was delivered in 2012, not long before OG&E was required to submit the IRP. In the months following the submittal of the 2012 IRP, OG&E had the opportunity to more fully understand the study and the details within it. Those details included the amount of investment and the timing of such investment on units with short remaining useful lives at best. OG&E also was able to understand the critical areas not included in the study such as major rotating equipment and other significant infrastructure areas. When OG&E considered these factors in conjunction with other factors, such as the dwindling availability of parts for the components not listed in the Burns and McDonnell study, the decision was made to retire and replace all the units before the summer peak of 2018. This date represents the earliest those units could be retired and replaced in a planned fashion while maximizing the ability to utilize the existing site air permits.

Q. **Mr. Norwood suggests the Mustang Units 3 and 4 are still running well and cites the Equivalent Availability Factors (EAF) as proof of reliability.[3] Is EAF an appropriate measure for these units?**

A. No. The EAF is a measure of reliability taken across all period hours. Any unit that runs with a low capacity factor would be expected to have a high EAF. EAF is the wrong measure for units like Mustang Units 3 and 4 that are on reserve standby for long periods of time.

Q. **Is there an appropriate measure of reliability for this type of unit?**

A. Yes. While EAF would be a good reliability measure for base load units such as coal plants, an appropriate measure for the Mustang units is the Equivalent Unplanned Outage Rate (EUOR). This measure gauges the reliability across the period of service hours and does not give credit for time spent in reserve standby status. The average EUOR for Mustang Units 3 and 4 over the last six years is significantly worse (greater than [redacted]%) than the expected reliability of modern CTs. As an example, the expected EUOR provided by the likely vendor for the new Mustang CTs is below [redacted]%.

[3] Mr. Norwood's Responsive Testimony: Page 28, lines 8-10.

Q. **Mr. Roach testifies that OG&E "should have done what it could" to extend the retirement of the Mustang units.[4] What is your response?**

A. As mentioned earlier, OG&E evaluated the Burns and McDonnell recommended investment for the units and concluded that it did not represent all the costs or risks; and that, even at the cost recommended, those investments did not make sense. Additionally, OG&E has taken steps to keep the units in reliable service, including re-using hard to find parts from previously retired plants such as Arbuckle and Muskogee Unit 3. These parts have been invaluable in keeping the units operational; however, that source is now nearly depleted.

II. Technology Selection for Mustang

Q. **Some intervenors have asserted that Combustion Turbines may not be the appropriate technology to be installing at Mustang. Do you agree with their assertions?**

A. No. OG&E is confident the appropriate technology at Mustang is simple cycle combustion turbines.

Q. **Why did OG&E select CTs to replace the existing Mustang assets?**

A. This decision was driven by a number of factors. First and foremost, as I'll discuss in section III of this testimony, OG&E wanted to capitalize on the value of the Mustang site. OG&E believes CTs will support the development of renewable resources, such as wind and solar and other distributive generation resources, and the need for additional CTs has been identified by SPP in its most recent ITP 10 and 20 resource plans. Finally, CTs have been identified in the IRP analysis as the lowest reasonable cost option for customers at the Mustang site.

[4] Mr. Roach Responsive Testimony: Page 49, line 13.

Q. **In their responsive testimonies Mr. Roach, Mr. Peaco and Mr. Norwood have suggested that OG&E should be considering combined cycle units to replace the existing Mustang units[5]. Why does OG&E believe simple cycle units better fit its generation needs?**

A. As Witness Howell discusses, the results of our IRP show a preference for CTs. Quick start CTs are able to start quickly and come to full load faster. These characteristics are better suited to meet market demands and to complement the growth of intermittent energy, such as wind and solar. Additionally, combined cycle units typically have longer start times and are not well suited to multiples starts per day. They also typically have longer minimum run times resulting in fewer available starts per week.

Q. **Could OG&E get a permit for a combined cycle plant at the Mustang site?**

A. While the netting process could be used to permit a combined cycle plant at Mustang, the resulting permit would contain enforceable operating conditions that significantly limit the hours of operation. As indicated in response to data request OCC 2-11, the resulting capacity factors available under such a permit would be between 27% and 38% based on the emissions profile of the OG&E combined cycle plants. Capacity factors this low typically do not justify the level of capital investment necessary to build a combined cycle unit. Capacity factors in this range do support the installation of CTs, such as those being installed at Mustang.

Q. **What evidence does OG&E have to support the claim that CTs are of value by the SPP?**

A. The SPP will cycle units as necessary to obtain the best economic solution for the SPP footprint while taking into account the reliability of the transmission system. In reviewing the SPP ITP20 planning documents, CT and CC units are identified as a needed resource in the next 20 years. Additionally, since the start of the SPP IM market, SPP has utilized units that have short start up times, short required run times, and short minimum down times to cover the peaks and short term emergency needs. CTs provide

[5] Responsive Testimony of Mr. Roach: Page 31-32; Responsive Testimony of Mr. Peaco: Page 10; Responsive Testimony of Mr. Norwood: Page 34.

these attributes and provide additional flexibility to the SPP IM. As an example, OG&E has two CTs at its Horseshoe Lake plant. In the 10 months since the SPP Integrated Marketplace ("IM") went live, these units have had a combined 302 starts, including instances of multiple starts per day. In the three years previous to the SPP IM market, these units had a combined average of 120 starts per year.

Q. **How is the ability for the unit to be turned on and off quickly valuable for the customer?**

A. The ability to be turned on quickly and provide energy to the system when prices are advantageous and turned off quickly when they are disadvantageous translates into fuel savings for customers. All the units that OG&E operates or have under contract are protecting OG&E's customers from market price volatility. However, the operational inflexibility of some of these units does not provide for intraday protection from the SPP IM due to the start-up times of those units. Quick start combustion turbines being installed at Mustang provide additional protection against any potential intraday price volatility.

Q. **What other value does a quick start unit provide?**

A. As mentioned in the SPP ITP20, Table 5.1, more than 2000 MW of wind are planned in the SPP during the planning cycle. Quick start CTs fill the need for complementing generation and address the variability of that resource. As shown in SPP ITP20, Figure 5.1, the SPP has identified the need for more than 7500 MW of additional CTs and a lesser amount of CC over the next 20 years. If wind increases above their assumptions, additional CTs will be needed. The quick start CT units are able to ramp up quickly when wind speeds decrease.

Q. **Can the existing units at Mustang operate in a quick start manner?**

A. No. While the existing units have experienced some daily cycling in the SPP IM, they were not designed for and cannot meet the characteristics of quick start units. The units are clearly not capable of a 10 minute cold start time. The Mustang units' cold start times

vary but are all in excess of 10 hours. So while they can perform some daily cycling, they do not provide the flexibility of new modern CTs.

Q. **Throughout his responsive testimony, Mr. Peaco criticizes OG&E for not considering the Oklahoma Cogen unit as an alternative for capacity needs instead of the CTs. Is Oklahoma Cogen's unit capable of operating as a quick start unit like the CTs being installed at Mustang?**

A. No. The Oklahoma Cogen unit is a combined cycle type unit and is not designed to be a quick start CT. As this unit is under contract with OG&E, the experience of our generation dispatch group is that this unit takes several hours to achieve full output.

Additionally, as noted by Witness Howell, the Oklahoma Cogen capacity is already included in the OG&E 2018 and 2019 capacity. This means OG&E cannot use the Oklahoma Cogen capacity to provide the additional incremental capacity needed in 2018 and 2019.

Q. **Mr. Roach suggests that the number of actual unit cycles at Mustang is not in line with 2012 and 2014 IRP projections so additional damage is not taking place.[6] Do you agree?**

A. No, the cycling that is occurring at Mustang is shortening the remaining lives of the units. The issue is not related to how many cycles the units have in comparison to the projections of the IRP. The issue is whether these units are cycling much more frequently than their design basis and much more frequently than in previous years, further shortening their lives.

Q. **How many cycles did the Mustang Units have in 2014?**

A. The Mustang units cycled 114 times in 2014 compared to an average of 33 times per year in the previous 5 years, an increase of almost 350%.

[6] Responsive Testimony of Mr. Roach: Page 46, line 17-20, Page 47, lines 1-5.

Q. **Can the number of starts currently being experienced impact plant reliability and increase risk of component failures?**

A. Yes, cycling of baseload units and associated problems are well documented in the industry and, while impacts to reliability may not be immediate, industry experience indicates they should be expected.

Q. **Intervenor Peaco points out that the new units will have capacity factors between 10-20% which is similar to Oklahoma Cogen so OG&E should have considered that plant for capacity and energy needs.[7] Do you agree?**

A. No. In response to Mr. Peaco's comments, while the capacity factors may be close to the same as Oklahoma Cogen, the technology OG&E is installing is not the same as Oklahoma Cogen. The new Mustang CTs are designed for peaking service and to provide quick start capability. As previously mentioned, Oklahoma Cogen is a 25 year-old combined cycle unit that is primarily designed for base load and intermediate load service. Recent experience suggests the low capacity factor exhibited by this unit may be the result of unreliability. As an example, the OG&E dispatch group reports that Oklahoma Cogen has reported as unavailable [redacted] hours from the time the IM began through the end of 2014.

Q. **From a different perspective, Intervenor Garrett seems to suggest that the new units are not a good economic alternative to Oklahoma customers since they will have a capacity factor less than 20%.[8] Do you agree?**

A. No. With regard to Mr. Garrett's comments, the new units at Mustang will be peaking units. Peaking units are designed to come on line during times when base load and intermediate load units, such as coal and combined cycle, are at full output, but system load has not been met. Examples would be morning and evening hours in extremely hot or cold weather. Units that generate to meet system needs primarily during these time periods have lower capacity factors. As Witness McAuley explains, peaking units such as the CTs being installed at Mustang are important tools to control voltage and ensure

[7] Responsive Testimony of Mr. Peaco: Page 25, lines 11-17.
[8] Responsive Testimony of Mr. Garrett: Page 22.

transmission system reliability. The OG&E fleet has included peaking units as a part of its portfolio for many years.

Q. **What role does OG&E see for CTs in the new SPP IM?**

A. OG&E believes the CTs at Mustang will play an important role in the following ways. First, CTs will serve to complement the variability of renewable resources such as the wind that is anticipated to grow significantly in the SPP region. Second, CTs will provide important tools for the transmission System Operator to control voltage and ensure system reliability on OG&E's system as Witness McAuley explains and finally to provide operational flexibility to the SPP balancing authority in order to quickly respond to system upsets and or to maintain adequate operating reserves.

III. Value of the Mustang Site

Q. **Do you believe there is any value in the Mustang site?**

A. The Mustang site is very valuable for a number of reasons. First, it brings a lower cost to the customer in the form of an established site with fully depreciated improvements. Second, it enables OG&E to obtain air permits through a netting process. Third, generation at Mustang enhances the reliability of the transmission grid by having generation close to OG&Es largest load area, the OKC Metro area. Witness McAuley will discuss the value of Mustang to system reliability. Witness Rowlett will explain the value that having generation at Mustang brings to the local community and the Oklahoma economy at large.

Q. **Mr. Peaco indicates that the estimate for the new Mustang generation includes items such as roads, buildings, and switchyard.[9] Does this imply the advantage of in place infrastructure is overstated?**

A. No. While it is true the estimate for the new combustion turbines contains certain infrastructure line items such as an allowance for some roads, as pointed out in response to data request QOSC-4.3e, these roads and other mentioned facilities are incremental to the current OG&E facility. No site is perfectly developed for an expansion; however,

[9] Responsive Testimony of Mr. Peaco: Page 14, lines 6-11.

existing sites do offer many advantages and Mustang is no exception. Mustang has many items that are already fully depreciated and that will be reused. The land itself is of significant value, both in its monetary value and its proximity to the OKC Metro area. The site also has existing permits, a secure perimeter, storage buildings that will be re-used, water rights, existing pipeline infrastructure, and existing switchyard and transmission facilities, including interconnect agreements. As a general rule of thumb, the costs to develop a site are approximately 10 – 12% of the total installed costs. In this case, the low end of that range when compared to the estimated cost of the new units sets the value of the site at approximately $40 million.

Q. **Can you provide some specific examples of the value of developed infrastructure included in the 10-12% number that Mustang has that a greenfield site would not have?**

A. Yes. One specific example is the combined 138 kV and 69 kV switchyards. Costs to recreate these facilities would be estimated at $40,000,000. This does not include or incorporate the value and cost of the transmission lines that have already been constructed to terminate at this site, which would need to be created at a new location. Another example is the land itself. Land close to our load center of Oklahoma City comes at a premium price and could be difficult to obtain in continuous tracts large enough for a generating plant. Prices approaching $20,000/acre based on a 160 acre section would not be uncommon. This leads to a value of $3,200,000.

Q. **Please explain why having existing air permits is a value.**

A. Obtaining permitting for any new site is becoming increasingly difficult, particularly in metropolitan areas. Additional regulations such as ozone NAAQS and the potential for non-attainment in the OKC metro area could add additional difficulties to that task. As Witness Turner will explain, the Mustang site offers the opportunity to obtain new permits based on a netting approach that other sites could not utilize.

Q. **Are there timing considerations for preserving the value of the Mustang site?**

A. As stated previously, OG&E intends to permit the new generation through a process known as netting. Netting allows the generation owner to permit emissions from new sources against the emissions from retiring sources. When netting, a new source is limited to the same emissions contained in the highest consecutive 24 months within the last 60 months prior to an air permit application. An additional limitation is that new generation must be operating within 36 months of the retirement of the existing generation. In order to maximize the amount of generation OG&E can install at Mustang, it must have an accurate and complete permit application into the Oklahoma Department of Environmental Quality ("ODEQ") by August 1, 2015 to take advantage of the highest emission years. In addition, the new capacity must be available to run by 2018 to capture the share of emissions from Mustang Unit 1, which will retire in 2015. Missing either of those dates means the opportunity to maximize the amount of new generation that can be installed at Mustang begins to decline.

Q. **What value does the Mustang site provide by having a Generation Interconnect Agreements (GIA) and Transmission Service Agreements (TSA) in place?**

A. Having these agreements in place avoids the need to conduct new studies that would cost approximately $150,000 and take approximately 2 years to complete. Since no studies are required, there would be no costs to perform transmission system upgrades, which can cost millions of dollars. For other sites, studies, modifications and upgrades would be necessary for each of the transmission voltage systems requiring an interconnection. In the case of Mustang, there are already interconnections to both the 138kV and 69kV transmission systems.

Q. **Would any other site in the OKC area be able to provide this value without incurring these costs?**

A. I am not aware of any site in the OKC metro area with existing GIA and TSAs in place to support an additional 400 MWs of generation. Therefore, any new site would be subject to study and upgrade costs to the transmission systems.

Q. **Are there any non-monetary risks that would be avoided by reusing the Mustang site?**

A. Yes. One specific example is water rights. OG&E presently controls almost 12,000 acre feet of water rights at the Mustang site. Water rights are becoming a valuable asset and the ability to obtain these rights is now and will continue to be a challenge. Having control of such rights at the Mustang site is an advantage to our customers.

IV. Update on Project Progress

Q. **Can you provide an update on OG&E's progress on its Environmental Plan Projects?**

A. Yes. Since filing my Direct Testimony, OG&E has entered into a contract with a scrubber equipment vendor and is negotiating a contract with the installation contractor. OG&E is expecting to have signed contracts by the end of February 2015. While negotiation is ongoing, OG&E has sufficient pricing information to be confident scrubber costs will be consistent with the $530 million estimate we previously reported.

Activated Carbon Injection is proceeding according to schedule. Contracts have been signed for equipment. Installation specifications are being developed with contracts expected in mid-2015. All work is proceeding according to schedule and OG&E is confident that work will be complete prior to the compliance date of April 16, 2016 and will be in line with the $24.3 million estimate stated in my Direct Testimony.

Low NO_x burner installation will be complete on the coal units following the spring 2015 outage on Muskogee Unit 4. Installation at Seminole will commence in the spring of 2015 and conclude following the spring of 2017. OG&E has entered into a contract for all of the low NO_x burners and is in negotiation with vendors for equipment installation. Overall low NO_x burner costs are expected to be consistent with the $99.4 million estimate in my Direct Testimony. As an example, Low NO_x burner installations at Sooner were accomplished for slightly less than $21 million as compared to budget estimates of slightly under $25 million.

Engineering is still in progress on the conversion of Muskogee Units 4 and 5 to natural gas. Specifications are being evaluated and optionality is being evaluated at this time. Based on this progress, OG&E's indicative class estimate of $38 million per unit

plus minor site costs is still representative of what OG&E plans to spend. More refined estimates are expected in late June 2015 with procurement activities beginning in 2017.

Q. **Can you provide an update on OG&E's progress on its Mustang Modernization Plan?**

A. Yes. Since my direct testimony, OG&E has performed preliminary engineering for the installation of simple cycle CTs and has conducted a bid event for those CTs. Presently those bids are being evaluated and OG&E is confident that the cost of this project will be at or below the $411 million estimate in my direct testimony. As part of the engineering work product, OG&E believes there is a savings opportunity to install fewer CTs of higher capacity in a single year as compared to the ten 40 MW CTs discussed in the 2014 IRP.

Q. **Does this conclude your testimony?**

A. Yes, it does.