Texas Commission on Environmental Quality (TCEQ)
Office of Air
Tax Relief for Pollution Control Property Advisory Committee
November 8, 2019
10:00 A.M. – 12:24 P.M.

Minutes

Opening Remarks

a. Mr. Bob Adair called the meeting to order at 10:00 A.M.

b. The following Committee members were present: Mr. Bob Adair, Mr. Charles Allred, Mr. Daryl Attaway, Mr. Roland Bieber, Mr. Paul Coon, Mr. Michael Ford, Mr. Lloyd Graham, Mr. Timothy Jones, Mr. Don Lee, Mr. Gregory Maxim, Mr. Michael Nasi, and Dr. Cyrus Reed.

c. Mr. Bob Adair re-stated the public comment policy. No action was taken.

d. General comments from Committee members and the public were solicited. No comments were received.

Consideration of advice regarding how to determine use percentages for future use determinations for applications that include heat recovery steam generators (HRSGs)

Documents listed and linked to below were submitted by Committee members.

Industry Proposal

Government Proposal

Proposal - Dr. Cyrus Reed

Draft Letter - Mr. Bob Adair

Mr. Bob Adair referenced the three proposals submitted by Committee members and asked Mr. Paul Coon to review the industry proposal. Mr. Coon referred to two tables he provided at the October 17, 2019 Committee meeting, which were provided again for today's meeting. He stated that one input into the spreadsheet is net nominal heat rates and the analysis compares two plants of equal capacity. One plant is a simple cycle plant and one is a combined cycle plant and both plants have capacities of 500 megawatts (MW). Two types of turbines are involved - one is conventional and one is an advanced turbine. The spreadsheet calculates the percent reduction in heat rate with conventional turbine compared to a conventional combined cycle and the percent reduction in heat rate with an advanced turbine and the advanced combined cycle plant. The percentages of reduction in heat rates were then averaged.

Another input into the spreadsheet is the nitrogen oxides (NO_X) performance concentrations in parts per million (ppm) for simple cycle versus combined cycle. One table compares 9 ppm for simple cycle, which is the NO_X performance for conventional low NO_X burner technology for simple cycle plants to 2 ppm for combined cycle. The other table compares 5 ppm for simple cycle, to 2 ppm for combined cycle. The 9 and 5 ppm levels of performance for simple cycle plants are compared to a typical level of performance for combined cycle plants, which is 2 ppm. The percent reduction due to lowering the NO_X concentration is added to the total percent NO_X reduction on an output basis - pounds per megawatt hour (lb/MWh) of production. The result is displayed in the lower right-hand side of each table.

For the same amount of power generated for a simple cycle plant versus a combined cycle plant, on an output basis, and for a plant emitting 9 ppm of NO_X going to a plant emitting 2 ppm of NO_X, there is an 85.5% reduction of lb NO_X/MWh. Comparing a 5 ppm plant to a 2 ppm

plant, the percent reduction is 73.9%. Mr. Coon stated the concentrations in ppm are common Best Available Control Technology (BACT) levels for new construction.

Mr. Coon thanked everyone who put forth information for today's meeting including Dr. Cyrus Reed and TCEQ and asked Mr. Charles Allred to review some of the analysis he did.

Mr. Allred searched to get more detail on the permits associated with the plants TCEQ provided as examples. He went through TCEQ data to match the plants and find the NO_X limits (in tons per year) and other factors such as heat inputs to see what the NO_X emission limits in pounds per hour were for each plant. He said that some permits included a NO_X limit expressed in lb/MWh and more often, they included a NO_X limit expressed in ppm. Mr. Allred compared average limits in ppm in permits for simple cycle plants to the combined cycle plants' limits, which was 2 ppm for all the combined cycle plants. The reduction in NO_X emissions between the two types of plants is 74.01%. Mr. Allred also converted the NO_X emissions limits from the permits to an output-based limit and compared the average of the limits for simple and combined cycle plants. The reduction in NO_X emissions is 67.97%. Mr. Allred asked Mr. Coon to check his work.

Dr. Reed asked why Mr. Allred thought comparing permitted tons per year was not a good measure for the Committee to review. Mr. Allred responded that the tons per year is limited by the number of hours a plant runs and since the simple cycle plants have a limit on the amount of hours they can operate, it seemed to make more sense to look at the emissions on an output basis. Mr. Allred added that lb/MWh emissions are much lower from a combined cycle plant than a simple cycle plant, which is probably why the combined cycle plants are allowed to run more. Since the simple cycle plant average is based on a limited run time, if they were running more, the differential would probably be more.

Mr. Greg Maxim added that he looked at a direct-fired boiler on a repower project on both tons-per-year and pounds-per-hour bases. He found a 91% difference between a direct-fired boiler and a combined cycle plant. Dr. Reed stated that he recalled the difference from his calculations resulted in a 50-55% range for the plants TCEQ provided examples of.

Mr. Michael Nasi added that there are two scenarios. The first is comparing a combined cycle plant to a simple cycle plant and steamer getting repowered. Mr. Nasi said the utilization of the unit for a simple cycle/steamer versus the next years after repower was almost equivalent in a real-world example he looked at. The average difference tonnage of NO_X emissions between the two configurations was dramatic. Mr. Nasi shared that he found data from the Energy Information Administration (EIA) that showed the average heat rate from a 2018 new steamer was 10,455. The heat rate in 2000 of the 1970s steamer was 10,460.

Mr. Lloyd Graham asked how old the old steam generator was and how the technology for a steam generator has changed over time. Mr. Maxim said the original plant was from the mid-1970s and stated the heat rate comparison between the older plant and the repower was almost the same. Mr. Graham asked if efficiency of the older generator was different from the repower. Mr. Nasi asked if the heat rates have dramatically changed over time. Mr. Coon stated he was not aware of dramatically improved heat rates in boilers. Dr. Reed asked if the Committee should be comparing combined cycle versus a simple cycle or if it should be comparing both combined cycle versus a simple cycle and steam boiler that are not run together. Mr. Allred discussed and offered to share the information he found and the full spreadsheet he developed with the Committee. Mr. Coon thanked Mr. Allred and the TCEQ staff for their work.

Mr. Adair summarized the industry documents by saying that industry recommendation is that HRSGs be placed on the Tier I Table with a partial use percentage of 75%.

Dr. Reed said he thought the existing cost analysis procedure (CAP) does not work for HRSGs, but that does not mean that a modified CAP could not work. Dr. Reed stated that the Committee is talking about giving advice for new plants, not plants on the ground now. Mr. Don

Lee stated that the advice will apply to existing HRSGs that apply for a use determination going forward that were not part of a lawsuit.

Dr. Reed stated the following should be considered: cost differential between a combined cycle plant versus the alternative of an equivalent capacity, capacity of the plants, and assumption of how much they would run over a year. He also said there should be a production capacity factor for both the new capital equipment and the alternative. He stated there is an environmental benefit to the HRSG and added that he does not think the 75% percentage from the documents presented by industry is outlandish. He said he is uncomfortable with the industry approach since it does not take into account the production increase due to a HRSG. Mr. Maxim indicated that would be a Tier IV application, and such an approach has not worked in the past.

Mr. Nasi clarified that the industry approach recognizes there is an economic benefit and the use percentage is not 100% for HRSGs. He added that the tool available for deriving the economic benefit contradicts what he thinks is the environmental goal of the Tax Relief Program by rewarding inefficiency. He said that the industry approach evaluates the environmental benefit and assumes that since it is less than 100%, the economic benefit is accounted for.

Dr. Reed stated that when you only look at lb/MWh and do not factor in how much the unit runs, you may overemphasize the actual pollution benefit because the combined cycle is probably going to run more than a simple cycle. He said that approach does not factor in the fact that more MWh are being sold and therefore more money is being made. Dr. Reed thinks there might be a way to make a modified CAP formula work.

Dr. Reed also stated if the concept was applied to other property (non-HRSGs) that it could be a death spiral in property taxes since every manufacturing process that is more efficient and less polluting could argue their property is eligible for a tax exemption. He is uncomfortable with the approach that goes with just the environmental benefit since it is difficult to calculate the production benefit. Dr. Reed appreciated all the work that has gone into the numbers.

Mr. Lee asked why the current CAP fails for HRSGs. Dr. Reed responded that he thought it does not account for the production of both the old and new equipment. Dr. Reed does not think it is fair to only assume the new equipment has production benefit but the old one does not. Dr. Reed said he found documentation that shows HRSGs are used as part of BACT and EPA acknowledges there is an environmental benefit to HRSGs.

Mr. Lee asked if the current CAP was unfair for other types of equipment where the percentage reduction in pollution is not included. He went on to say that in the Tax Relief Program, the percentage of environmental use has based the use determination on the percentage of pollution reduction. He asked what makes HRSGs unique that requires the committee to include the percentage of emissions reductions to be fair to it.

Mr. Nasi responded that other equipment is 100% because it is pollution control equipment and does not have an economic benefit. He added that two things make HRSGs different: 1) most other things the committee has tried to evaluate have been on an input basis and HRSGs have to be evaluated on an output basis, and 2) the legislature required that HRSGs be treated differently to assume an environmental benefit unless there is a compelling reason to disagree and take it off the list. Mr. Nasi stated the HRSG approach taken by the committee should not create precedent for other equipment. Mr. Nasi said he does not believe the increased utilization of combined cycle units over simple cycle units counteracts the benefit of combined cycle units. The industry approach is an attempt to average both actual and theoretical factors, and the tonnage of NO_x emissions will not increase due to an increase use of combined cycle.

In response to Mr. Lee's question, Dr. Reed stated that HRSGs are different from property on Tier III applications and gave the example of a plant that is not in the business of selling sulfur but that installs equipment to remove sulfur for pollution control purposes and that sulfur is then sold as a byproduct. In that scenario, the property would not be eligible for a 100% use

determination (the CAP would need to be completed for the use determination application). He said that HRSGs are different in that they are part of the production process and they have an environmental benefit.

Mr. Lee asked what if there were not a marketable product adjustment and the committee looked at the cost of a HRSG versus the cost of the alternative steam source. He does not believe the delta between the two is 105%, as one could get applying the CAP. Mr. Greg Maxim stated that if the plant is losing money (the net present value in the CAP is negative), you could get to over 100% use determination. Mr. Maxim said the value generated by the CAP is for the whole back end of the plant, but the use determination is limited to just the HRSG by rule.

Dr. Reed said he is not sure the comparison of a HRSG with a boiler is the right comparison and suggested the comparison should be the system that is built versus a system that generates an equivalent amount of power. Mr. Lee thinks what Dr. Reed is saying is that the application should not be for the HRSG only, but would be for the whole back end of the plant. Dr. Reed agreed, but said the use determination percent would apply only to the cost of the HRSG. Mr. Maxim agreed with Dr. Reed's statement. Mr. Nasi stated that many applicants that wanted the use determination percentage to apply to the whole back end of the plant. However, industry is recommending that the percentage apply only to the HRSG.

Mr. Daryl Attaway commented that he is confused by the discussion about the net present value of the marketable product. The discussion is based on a cost to produce the steam, but in reality the steam is worth what the market will pay for it, not what it costs to produce it. He stated the value of the product can be removed from the formula and the cost of a combined cycle/HRSG to a non-HRSG should be considered.

Mr. Maxim explained that the steam is used to turn the turbine to produce electricity (megawatts), which is how the steam plays into the calculation. Mr. Maxim asked if Committee members had the math to compare the cost of a combined cycle/HRSG to a non-HRSG/HRSG alternative. Mr. Nasi asked how an apples-to-apples cost comparison could be made without the non-HRSG steam generator. Mr. Attaway said he looked at comparisons of total combined cycle systems versus a gas-fired steam boiler operation and that comparison can be made.

Mr. Lee said that applicants and Tax Relief Program staff work together and figure it out. Mr. Attaway said he accepts there are emissions reductions from a HRSG and HRSGs qualify. What the committee is trying to do is determine how much of an exemption the HRSG is eligible for when the cost of a HRSG versus a non-HRSG are compared. Mr. Maxim asked to see Mr. Attaway's math.

Dr. Reed offered an example of 2017 data from the National Renewable Energy Lab (NREL) which showed that the capital cost of a conventional combined cycle is $1,010 per kilowatt and the cost for a conventional combustion turbine is $864 per kilowatt. He stated the difference is 15-20%, so looking at that data, the percentage would be 15-20% if you just looked at capital costs.

Mr. Nasi said the combustion turbine does not make steam. Dr. Reed said that is why he said the comparison should be to a conventional turbine plus a steam unit. Dr. Reed added that if you apply their formula to that, probably a steam unit would cost more than a gas unit. He guessed the outcome would be in the 15-20% range.

Mr. Attaway said he has seen some information that shows a steam boiler operation would cost more than a combined cycle costs per kilowatt-hour to install and other information shows the opposite. Mr. Attaway said that if you only look at the capital costs – this is all about property values – if you look at the cost of a combined cycle plant versus the cost of steam boiler operation and the cost of the combined cycle plant costs more than the steam boiler to install, then the program allows for an exemption on the difference.

Mr. Adair stated that it seems that cost is less relevant to determine how much of the property is attributable to pollution control. He added that the CAP in Tier III applications is far from

perfect. He thinks the Committee is becoming distracted from the task at hand. In his opinion, it seems like the benefit of listing HRSGs at a fixed percentage on the Tier I Table is so the Committee does not have to get into how it might affect other property and whether it is fair for HRSGs to have a different Tier III calculation.

Mr. Lee said he was not sure how the listing HRSGs on the Tier I Table attains those benefits. He asked if that is an attempt to get efficiency/efficient production declared as something that equates to a tax exemption. Mr. Allred said the combined cycle must meet much lower emissions limits and that efficiency comes with stricter environmental requirements than a comparable simple cycle plant. Mr. Lee said that the proposal is a significant change in how the Committee approaches the pollution control tax exemption.

Mr. Adair asked for an overview of the government proposal. Mr. Bieber asked how other property such as flue gas recirculation components, syngas purification, exhaust gas recovery and sulfur recovery units would be revisited if the marketable product is not accounted for. Mr. Lee said the Committee would not use the principles it has used. Mr. Nasi stated that nothing in the recommendation he is prepared to vote for says to the commission that they should analyze any of those things differently than how the CAP currently does. Mr. Nasi stated the program needs to take a look across the board. He continued that the tool seems to contradict the intent of the statute and rewarding inefficiency and that this cannot be the way it should be done. He said the committee is going to have the commission distinguish between the environmental and productive benefit by focusing on the environmental benefit of the property. Mr. Nasi said the tools produce a result that is consistent with the fundamental purpose of the statute and one has not been offered by other Committee members.

Mr. Lee disagreed, and he believes the industry proposal is inconsistent with the statute. Mr. Nasi asked what Mr. Lee's proposal is. Mr. Lee responded the CAP should be used appropriately. Mr. Nasi asked Mr. Lee to clarify and to provide cost information. Mr. Nasi suggested Mr. Lee run a Tier III analysis on a steamer application. Mr. Nasi said it is just as inappropriate to rule out such an approach as it is to focus on just the cost comparison. Mr. Nasi said the economic valuation proposals have not proven to be a good solution.

Mr. Lee stated the following. The point being discussed was the intent of the statute and that the intent of the statute was never to incentivize efficiency. The intent was to not tax additional investment for property used for pollution control purposes. The statute never said the property had to be used efficiently. Inefficient pollution control property is 100% tax exempt and is just as tax exempt as more efficient pollution control property. Making production more efficient was never what was to be incentivized. When benefit is found, the agency (the TCEQ) has to delineate between the proportion of the property used for pollution control purposes and the proportion used for production purposes. He said the CAP is for add-on technology, not replacement technology. He said the CAP was the best proxy for value the committee came up with that compares the property value of equipment used in the old way of production to the property value of equipment used in the new way to achieve the same production. The difference would be not taxable and that is his proposal. He has not heard a distinguishing argument for why that does not work for HRSGs. He also said he is not against having a Tier I Table item for HRSGs, but thought that since the cost varies, a case-by-case approach would be more appropriate than a Tier I Table item. Mr. Lee said his advice is to have staff work with applicants to determine the capital cost old and capital cost new and that the value of the steam should not be included in the calculation. He is open to consider other views, but he does not know how percentage reduction in emissions equates to percentage of property used.

Mr. Adair redirected the committee to the goal from the July 19th letter which is to resolve longstanding issues and consider options for proceeding with future applications. He said that to him, it seemed that a tweak to Tier III would continue longstanding issues.

Mr. Lee asked what he was missing and Mr. Adair replied that Mr. Nasi's point about rewarding inefficiency is a good one. Mr. Lee asked if that is because it is not producing a number high

enough. Mr. Adair said he is not aware of any of the calculations that had a preconceived number and he expected the number to be lower.

Dr. Reed said he agrees that some version of cost should be included, but that the difficulty is the comparison of a HRSG versus an alternative. He said he does not think the steam boiler is the right comparison to a HRSG, which is why the whole plant has to be considered and then that percentage applied to just the HRSG. There is not an equivalent component in a steam boiler to the HRSG. He thought an appropriate comparison to capture the HRSG component would be to compare simple cycle and steam unit to a combined cycle plant.

Mr. Lee asked the staff to comment on the Committee's discussion. Mr. Walker Williamson with the TCEQ Air Quality Division said staff are looking to take the Committee's recommendation and evaluate that and that it would not be appropriate to comment at this time.

Mr. Attaway stated that if staff and applicants are not able to come up with a percentage greater than zero and less than 100, there should be a floor number for applicants.

Mr. John Kennedy with the Texas Taxpayers and Research Association commented that cost is irrelevant to the commission's job, but that it is relevant to the appraiser's job. The commission's goal is to determine what proportion is for pollution control and what proportion is for production benefit and cost has nothing to do with that. The percentage of use is based on use factors.

He stated he thinks there are two ways to determine the use. The first way is to determine how much the use of a HRSG reduces the amount of pollution that is produced to produce the same amount of product than a non-HRSG unit produces. The other way is to figure the difference in production using the material input and let the environmental benefit be the residual. He added that the cost information is relevant to valuation, which is not the commission's job. Dr. Reed agreed that both production and environmental benefit should be considered when determining the use percentage.

Mr. Kennedy said he remembered the CAP formula came about because the Committee could not figure out how to determine the production and environmental benefit of property at the time, but that cost information was available so that was used as a surrogate for a methodology that would determine use. He also stated at that time, the Committee was looking at ways to handle add-on equipment, not new ways of doing things.

Mr. Lee gave examples of electric tugs replacing diesel tugs at airports and electric pumps replacing natural gas pumps on a pipeline and said that both examples were of replacement technology, not of add-on technology. Mr. Lee said the CAP allows for the difference in cost between the electric tug and the diesel tug to not be taxed.

Mr. Kennedy said the CAP does not work because the net present value will be different based on the year the exemption is applied for. Mr. Bieber said that has always been the case. Mr. Lee said that in the specific case for HRSGs, the net present value of the steam cancels out since the byproduct is the same for the old and new technologies, leaving just the cost. Mr. Kennedy said cost does not matter.

Dr. Reed asked Mr. Adair if the intent was for the committee to vote today, or if an additional meeting would be of value. Mr. Adair responded he is trying to submit advice by Thanksgiving, and that an additional meeting could be of value. He added that one option is to vote to not provide advice, although he does not think that is a viable option. Dr. Reed said he thinks the Committee should provide advice and he feels there is more work to be done.

Mr. Nasi commented that since the mid-2000s the commission has been grappling with this issue and every applicant came up with a little different way to calculate the use determination percentage. They did so unsuccessfully in the eyes of the commission and the commission could not come up with a methodology that it felt comfortable with using its existing tools, resulting in a zero. He said if you are distinguishing between productive value and

environmental benefit, you have to start at one and then consider the other. He stated that the fundamental problem with starting with productive value, is that inefficiency will always be rewarded in terms of the net percentage of reduction. He said that for HRSGs alone, when a more efficient dispatch of HRSGs per NO_x emitted is achieved, there is an environmental benefit so starting with the environmental benefit and assuming the remainder is productive capacity is more consistent with the statute and the commission's job. By starting on the efficiency side, and assuming the remainder is environmental benefit, he said, is saying the pollution control percentage is higher when the unit is less efficient. He thinks the industry proposal is technically supportable and the committee should vote.

Mr. Bieber asked if anyone has done the calculation starting at the marketable product and letting the pollution control be the residual. He also asked if anyone has the calculation showing that inefficiency is rewarded. Mr. Maxim replied that for a Tier III calculation if you have a lower heat rate, it costs less and if you have a higher heat rate, it costs more so if you have a higher cost and less revenue, an inverse proportion results.

Mr. Adair asked if industry had a pre-conceived percentage going into the calculation. Mr. Nasi responded that the only pre-conceived notion was to focus on the HRSG and not allow the whole back end to be included. He added that he thinks that is a concession. Mr. Lee said the issue the Committee has been tasked with is specific to the HRSG and that the Committee is not in a position to give opinions on the whole back end of the plant. Mr. Nasi said he thought the Committee could speak to it.

Committee members discussed how the production and environmental benefits of HRSGs are related. Mr. Adair reminded the Committee that 30 Texas Administrative Code §17.24 defines environmental benefit and the last sentence of the definition says "for the purposes of this chapter the terms pollution control and environmental benefit are synonymous." Mr. Lee stated that a small part of the property might produce tremendous environmental benefit, but only that small part of the property is exempt since it is only the small part that is used to control pollution. Mr. Maxim stated that the benefit of the industry proposed calculation is that it is for the whole back end of the plant, but the percentage is only applied to the HRSG.

Mr. Graham asked what the ratio of the cost of the HRSG to the whole backside of the plant is. Mr. Maxim responded it is around 30-40%, depending on the system.

Mr. Adair asked for additional comments and provided the option for a break. Mr. Graham suggested that Dr. Reed's proposal might warrant additional consideration. Dr. Reed thinks the right range might be around 40%. He added that using the CAP using the cost of combined cycle versus single cycle and without considering the net present value, the percentage is around 15%, but considering the production and environmental benefit, the percentage is higher. Dr. Reed stated he would like more time to work out the calculations. Mr. Graham supports giving Dr. Reed more time. Mr. Nasi said he was okay with having an additional meeting to allow for more review.

Dr. Reed said there is an agreement on the third item on the letter (the possibility of removing HRSGs from the expedited review list) and thinks the Committee could take action on that item. Mr. Nasi made a motion that the advice the Committee provides to the commission include that the Committee does not believe HRSGs should be removed from the expedited review list. Mr. Lloyd Graham seconded the motion. The motion passed unanimously.

The committee discussed scheduling a date and time for the next advisory Committee to be held via conference call. November 19th at 2:00 P.M. was agreed upon, pending the availability of the room.

Mr. Adair asked the Committee members if they have any comments of concerns on the draft letter he provided. No comments were made.

Note: The Advisory Committee plans to submit advice to TCEQ Commissioners before Thanksgiving.

Other

No old or new business and no other comments from the public.

Action Items

Dr. Reed agreed to work on his calculations to help distinguish between the environmental and production benefit of HRSGs.

Adjourn

The meeting adjourned at 12:24 P.M.