

Texas Commission on Environmental Quality (TCEQ)  
Office of Air  
Tax Relief for Pollution Control Property Advisory Committee  
October 17, 2019  
10:00 A.M. - 11:58 A.M.

## Minutes

### *Opening Remarks*

- Mr. Bob Adair called the meeting to order at 10:00 A.M.
- The following committee members were present: Mr. Bob Adair, Mr. Charles Allred, Mr. Daryl Attaway, Mr. Roland Bieber, Mr. Paul Coon, Mr. Lloyd Graham, Mr. Gregory Maxim, Mr. Michael Nasi, Mr. Don Lee, Mr. Bill Longley, and Dr. Cyrus Reed.
- Mr. Bob Adair re-stated the public comment policy. No action was taken.
- General comments from committee members and the public were solicited. Mr. Walker Williamson of the TCEQ introduced Ms. Nikki Clark, the new Team Leader for the Stationary Source Programs Team. No additional 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 the specified committee members.

Mr. Daryl Attaway - [Combined versus Simple Cycle Cost Example](#)

Mr. Paul Coon - [Advice Regarding Future Heat Recovery Steam Generator Applications](#)

Mr. Paul Coon - [Comparison of Heat Rate and NO<sub>x</sub> Emission Performance in Combustion Turbine Simple Cycle and Combined Cycle Plants \(5ppm\)](#)

Mr. Paul Coon - [Comparison of Heat Rate and NO<sub>x</sub> Emission Performance in Combustion Turbine Simple Cycle and Combined Cycle Plants \(9ppm\)](#)

Dr. Cyrus Reed - [Proposed Total NO<sub>x</sub> Emissions Method](#)

Dr. Cyrus Reed - [Comparison of NO<sub>x</sub> Annual Levels from Simple-Cycle and Combined-Cycle](#)

Mr. Bob Adair asked Mr. Paul Coon to review the documents he provided. Mr. Coon stated that a fair number of members contributed to the documents. The documents begin with a summary of the letter from the Executive Director of the TCEQ dated July 19, 2019 and restate the three questions included in it. The documents suggested that the Commission should not propose rulemaking to remove HRSGs from the Expedited Review List; HRSGs provide pollution control benefits.

A document Mr. Coon provided referenced a publication from the United States Environment Protection Agency (EPA) "*Output Based Regulations: A Handbook for Air Regulators*" that states that "Improving efficiency is one of the best forms of pollution prevention. Avoiding pollution through energy efficiency can have long-term cost benefits through less reliance on emission control equipment and reduced fuel use. Gains in efficiency produce multiple pollutant benefits without creating adverse secondary environmental impacts that are common among end-of-pipe approaches."

The document states that the existing Cost Analysis Procedure (CAP) is not adequate for determining a use determination percentage for HRSGs as previously discussed by the committee. Mr. Coon stated the CAP is troublesome for HRSGs and has the adverse consequence of reducing a use determination for higher efficiency. Mr. Mike Nasi stated that if the committee can come up with a set of interpretations and surrogate inputs for the CAP, it could work, but the CAP does not seem to work for HRSGs. Mr. Nasi stated that by putting HRSGs on the Tier I Table, the committee could revisit the HRSG use percentage

every three years and not establish a precedent on how to use the CAP. Mr. Nasi added that trying to find a fix to the CAP is not the focus the committee should have.

Mr. Don Lee stated the CAP was not designed for add-on equipment but was designed to address replacement equipment. He gave the example of gas-fired boilers that previously had add-on scrubbers that were replaced with electric-fired equipment. Property owners were claiming, and getting, 100% exemptions for the electric-fired boilers. He stated that situation was analogous to the HRSG situation. He added that he is not sure that a proper use of the CAP in the current rules would result in a decreased determination of pollution control use because of greater efficiency. Mr. Lee went on to say that he is not sure the steam from a HRSG is a marketable byproduct.

Mr. Nasi stated that what comes out of the committee should not have a lot of qualitative discussion about the history of the HRSG issue. Mr. Nasi suggested the committee could state that it is hard to make the CAP work for HRSGs. He also stated attempts to use the CAP for HRSGs have resulted in rewarding inefficiency, but that to make that characterization across the board is beyond the scope of the committee. Mr. Lee asked for additional explanation about how the CAP rewards inefficiency. Mr. Greg Maxim responded to Mr. Lee explaining the CAP is based on the net present value. If the CAP is based on data from a year the plant was not running, the expenses for that plant would be greater than the expenses for a plant that was running. Mr. Maxim stated the expenses and exemptions are inversely proportional so that by not running, the exemption would be increased for a similar plant that was running.

Mr. Adair reminded the committee that the Tier I Table used to have partial use percentages and the TCEQ recommended removal of those items because the documentation in support of those percentages was not available. He recommended that the committee provide sufficient documentation to retain a partial use percentage on the Tier I Table.

Mr. Coon continued reviewing the documents he provided and stated that the Committee has explored four different characteristics for evaluating the environmental benefits of HRSGs. While none of these characteristics, by themselves, fully demonstrate the environmental benefit of HRSGs, when incorporated as part of a comprehensive methodology, the environmental benefit of HRSGs is clearly demonstrated. Each of these characteristics is discussed in the document.

The first characteristic is the Best Available Control Technology (BACT) standards and nitrogen oxides (NO<sub>x</sub>) concentrations. The BACT standards are useful in demonstrating the environmental benefit in conjunction with other features of HRSGs. They are merely a starting point and are dynamic because BACT standards can evolve over time due to improvement of industrial and control technologies. Mr. Coon confirmed that the BACT standards and other data were provided by the TCEQ. He said the review included information from the turbine table and summary of simple and combined cycle plants. The BACT standards and NO<sub>x</sub> concentration limits were considered in the development of the documents.

The second characteristic was output-based emissions which take into consideration not just how much NO<sub>x</sub> is emitted per unit of fuel consumed, but go beyond that, and take into consideration the power output from the generator.

The third characteristic is the state issued permits that have annual emission limits. Mr. Coon stated that Dr. Cyrus Reed looked at the simple and combined cycle lists. He thinks that Dr. Reed may have said in his summary that one of the problems with this approach is that simple cycle turbines and HRSG combined cycle units very likely do not have the same

annual capacity factor. Dr. Reed stated he thinks it is a good thing to look at the permitted emissions. His conclusion was on an annual basis; a combined cycle plant is permitted to emit about half of what a simple cycle is per megawatt of capacity. He added that the committee could delve into more detail on actual capacity factors or hours of operation.

Mr. Lee stated that he understands that HRSGs are property that is put on a simple cycle plant that allows it to produce more electricity with no additional fuel and asked if that was correct. Committee members responded that, in general, that is a fair characterization.

Mr. Lee said that a lot of the committee's discussion is to look at the efficiency of a simple cycle plant versus a combined cycle plant. Mr. Lee said the committee isn't talking about a pollution control determination for a combined cycle plant. They are talking about a pollution control exemption for one piece of the combined cycle plant. He asked if the committee should be looking at just the one component of the plant. Since the committee is looking at one piece of the plant, he questions whether the analyses apply because they are talking about the entire combined cycle plant.

Mr. Lee asked what the cost is of generating steam the "dirty" way versus doing it the "clean" way. He said the cleaner way is to put a HRSG in instead of a fuel-powered heat source. He asked for a comparison in the cost between a HRSG and the fuel-powered heat source and said the difference should not be taxed.

Mr. Nasi responded that the CAP is the tool the commission developed to try to deal with partial use percentages. Because the way HRSGs work, the CAP rewards inefficiency and non-use. It is proven difficult to provide an exemption that rewards the right attribute. Mr. Nasi said it is not that the premise of Mr. Lee's question is not a sound way to start. Mr. Nasi said the committee should identify the environmental benefit because the economic comparison creates other issues like if other pieces of equipment should be included. Mr. Nasi said the document does apply to just the HRSG, not other equipment such as a turbine.

Mr. Lee said the committee should exclude the dispatch question from the discussion and said the committee should focus on the difference in the cost between the "clean" way and the "dirty" way and not tax the difference. He asked how much more expensive a HRSG is versus fuel-fired equipment powering the second turbine, with no consideration of dispatch. Mr. Lee reminded the committee that he has concerns about looking at environmental impact to determine use.

Mr. Daryl Attaway stated he has a hybrid approach that includes the cost of the HRSG and the environmental impact. His document contains an example for a generic 300-megawatt plant with just the turbine cost. He was trying to determine the difference in cost between a simple cycle plant versus a combined cycle plant, determining that difference was \$178 million for the example. He deducted the installed cost of the HRSG to get to just the cost of the HRSG itself and came up with \$95 million. He then applied the assumption that if 45% of the HRSG is for environmental use and the remainder is for productive use, the 45% is applied to the cost of the HRSG. The calculation results in approximately 24% of the value of the total plant. As an appraiser, he determines a total plant value for property tax reasons and then makes an adjustment for the percentage for the pollution control.

Mr. Nasi understands the approach of trying to identify the HRSG piece. But no matter what the number is, there is other property like the steam turbine which is also in the Texas Tax Code at §11.31(k) (k-list). He does not want the committee to take an approach that would require the committee to recommend a use percentage for every piece of equipment because the total exemption will add up to a bigger number. He stated that focusing on the environmental benefit is important. He added that identifying an environmental benefit

percentage and saying that the remainder of the property is productive value is a huge logical leap. He said that if the committee is just looking at the value difference, they need to look at the environmental benefit in a different way and suggested the number would be 75-80% based on the information provided by Mr. Coon.

Dr. Reed asked if the committee is clear that the benefit is coming from the HRSG itself when comparing the environmental benefit of simple cycle and combined cycle plants and if other pollution control equipment such as selective catalytic reduction (SCR) is accounted for. The use determination recommended by the committee should be based on the environmental benefit of the HRSG and not include other equipment. Mr. Nasi said that yes, the tables do account for the installation of other pollution control equipment because the BACT limits assume the installation of controls.

Mr. Coon stated that BACT is a case-by-case determination and is not the same for every applicant. He explained that simple cycle turbines with low NO<sub>x</sub> burners generally meet 9 parts per million (ppm) of NO<sub>x</sub> emissions, which is BACT for a simple cycle turbine. With SCR on a combined cycle plant, it generally meets 2 ppm. He said there are some examples where simple cycle plants have met 5 ppm with SCR. Mr. Nasi said that if assuming the best controls, on both simple and combined cycle plants, the result is 2 ppm and 5 ppm. If controls are taken off, at the result is 2 ppm and 9 ppm. Mr. Attaway clarified that the apples to apples comparison is 2 ppm and 5 ppm. Mr. Nasi agreed.

Mr. Coon explained that the tables he provided take into account the differences in NO<sub>x</sub> concentrations and heat rates of a simple and combined cycle plant. The heat rate is about 35% lower for the combined cycle plant when compared to a simple cycle plant. If the NO<sub>x</sub> concentration is 5 ppm for a simple cycle plant and 2 ppm for combined cycle plant, that is a 60% reduction.

Both heat rate and NO<sub>x</sub> concentrations contribute to the environmental benefit of a combined cycle plant. Mr. Coon clarified that if the same capacity factor is assumed and assuming they run the same amount, the percent reduction is the same for actual emissions.

Dr. Reed said he calculated 50-55% by dividing total permitted output by megawatts (tons per megawatt capacity) and did not take into actual operation or how many hours a plant is permitted to operate. One concern Dr. Reed has is that sometimes operators will run the combined cycle plant and sometimes will run just the simple cycle part. He asked if that should be factored in. Mr. Nasi said that dividing permitted emissions by capacity is not an indication of the environmental performance of the equipment and will be highly variable and that the dispatch of the unit will affect the environmental performance of the equipment. Mr. Nasi stated if HRSGs are added to the Tier I Table, the committee could revisit use percentage every three years as BACT standards change.

Dr. Reed asked whether a recommended percentage would apply to applicants going forward and if existing combined cycle units would get that percentage. Mr. Walker Williamson of the TCEQ responded that the intent is for the recommendation to apply to new applications coming in. Mr. Nasi clarified that equipment that is currently constructed can reapply.

Mr. Attaway noted that some plants can operate in simple cycle or combined cycle depending on demand. He stated that if a plant has the ability to operate as a simple cycle and then operates as a combined cycle because of demand, they should get zero exemption because they are operating for productive purposes, not for environmental purposes.

Mr. Adair said that if there are significant changes, the applicant is required to submit

changes to the TCEQ. Mr. Maxim stated that the chief appraiser can make the applicant reapply for the exemption on an annual basis. Mr. Nasi stated the intent assumption is very overstated and that if a plant is looking to relieve congestion, it would run in simple cycle instead of combined cycle. Mr. Nasi stated the statute and the court has determined HRSGs are pollution control equipment and the committee has been asked to make a recommendation based on environmental improvement versus production use.

Mr. Attaway stated that plants that operate only as combined cycle have environmental benefit and qualify for some exemption. But plants that have the ability to operate in simple cycle mode and the only reason they operate in combined cycle mode is because they have a higher demand from the market, which is a production issue not an environmental issue. Mr. Nasi responded that that is not the only reason. He stated that the reason the permits allow for flexibility is because the market demands it, but it does not eliminate the benefit of the HRSG.

Mr. Adair redirected the committee back to Mr. Coon. Mr. Coon reiterated the tables are intended to look at the heat rate improvement, NO<sub>x</sub> reduction, and how together they affect output-based NO<sub>x</sub> emissions, and compares simple cycle operating to combined cycle operation. Mr. Maxim discussed the information sources named in the documents.

Dr. Reed asked if the NO<sub>x</sub> output-based emissions and NO<sub>x</sub> concentrations on the tables Mr. Coon provided are based on tables from the TCEQ or based on general EPA BACT. Mr. Coon responded the green text are input values and that the 500 megawatts assumption normalizes the analysis. The heat rates come from a document from the Energy Information Administration (EIA) and the BACT numbers come from the TCEQ BACT table.

Dr. Reed asked if Mr. Coon used the examples and information provided previously by the TCEQ for simple and combined cycle; specifically, did the 85% reduction come from the TCEQ tables or somewhere else. Mr. Coon responded that the percent reduction was calculated and nothing was gleaned from the tables provided by the TCEQ for the documents he provided. Mr. Nasi added that he thought the examples would fall in a range between 2 ppm and 9 ppm. Dr. Reed said it would be helpful to see how the percentages calculated in Mr. Coon's documents compare with actual examples.

Mr. Lee agreed that the committee needs to look at what a HRSG costs versus what generating that steam with fuel costs. He went on to say that he understands that using the BACT analysis answers the question about whether the HRSG has environmental benefit but does not understand how it isn't arbitrary to use it to determine a percentage of use. He added that if the analysis in three years shows that HRSGs are reducing pollution by half as much as the committee's analysis now shows, he's not sure if they are any less tax exempt. If the property is reducing pollution then whatever that additional cost is for being an environmentally friendly steam source, that should be tax exempt whether it is reducing pollution by 10% or 90%. Mr. Nasi stated that the commission exempts property at 100% regularly, regardless of how much more expensive it is. Mr. Lee agreed, and Mr. Nasi said that Mr. Lee's statement had a premise that there is some marketable product value that the committee is supposed to discount. A brief discussion by the committee followed about what the marketable byproduct is, and it was agreed upon that steam is the marketable product.

Mr. Lee said he thought the committee has to look at what the additional costs are to generate in an environmentally friendly way. Mr. Nasi said he was not opposed to continuing to evaluate the cost difference, but he said the statutory direction is on determining productive and environmental benefit and he stated the environmental benefit has nothing to do with the cost. Mr. Lee asked if the statute is about coming to the percentages of environmental use versus productive use and whether this is the same as

environmental benefit. Mr. Nasi said he was trying to determine what the environmental benefit is. He stated the statutory charge should be a consideration of both environmental and productive use benefit. He said he does not think the committee should focus on the cost differential or identifying the productive use benefit and assuming the rest is environmental benefit. He said the committee has to focus on the environmental benefit.

Mr. Nasi said Mr. Lee's argument is an input-based assessment and problems with input-based assessments are that they can be highly variable based on dispatch and they can create disincentives. Mr. Nasi stated that looking at output-based performance does a better job of determining the benefit can be done.

Mr. Lee said that a modified CAP could be used by the committee to determine a recommended percentage. He also said he is uncomfortable with basing the number on emissions reduction; the environmental benefit is disassociated with environmental use. He gave the example that 100% exemptions are granted for equipment that reduce pollution by a fraction of 100%. Mr. Nasi said the difference between that example and the HRSGs is that the property getting the 100% exemption has no productive value and that is what is unique about HRSGs.

Mr. Nasi stated the documents provided by Mr. Coon are a reflection of what the environmental benefit is. He explained that if nominalizing capacity factors and looking at the NO<sub>x</sub> concentration/BACT numbers, gives the environmental benefit.

Mr. Lloyd Graham commented that Mr. Attaway's point on when the HRSGs run and don't run is not lost on him. Mr. Graham also said that Mr. Nasi's point on what the HRSG costs when installed appears to be problematic because the investment is made in the HRSG whether it is operated or not. Mr. Graham said the question of why the HRSG is operated is moot if the committee comes up with an environmental benefit for it. Mr. Graham said Mr. Maxim's point about a HRSG that is not operating increasing its exemption is completely lost on him. Mr. Graham said that if the HRSG is off, it is not creating any environmental benefit. Mr. Graham asked how the committee was going to find the environmental benefit and that it is not 100%. Mr. Nasi agreed it is not 100% and supported the idea of including in the recommendation the assumption that the HRSG is being deployed, but that the recommendation should not say the HRSG has to run 100% of the time.

Mr. Adair reminded the committee that "environmental benefit" is defined in 30 TAC §17.2. He asked if there were comments from the public or committee members. Mr. Charles Allred asked for a copy of what Mr. Attaway submitted. Mr. Adair replied "sure."

Mr. Attaway made the point that in the past, the committee determined what the productive use of equipment was and assumed the balance was environmental benefit. He stated the committee is now doing the opposite by determining the environmental use and assuming the balance is productive use. Mr. Attaway does not think that is the case.

Mr. Lee says the committee is not coming up with environmental use but that it is coming up with environmental benefit. Something may have 100% environmental benefit, but only half of it may be used to produce that benefit. There is not a relation between environmental benefit and percentage reduction in pollutants and use. Mr. Lee did not find the logical connection.

Mr. Nasi said that the committee has to come up with an appropriate apples-to-apples comparison of the methods of electricity production and determine the environmental difference; this is the environmental benefit. Mr. Nasi said he is open to a dialogue about how to factor the productive use in as well. Mr. Nasi said it would be nice to know what percentage the CAP generates and how this compares to the percentages from the output-

based emissions analysis.

Mr. Attaway stated that the cost data in the documents he provided were based on the publication *Gas Turbine World*. He tried to identify the cost of just the HRSG and then tried to apply the environmental analysis provided by Dr. Reed. He then determined the percentage of the value of the plant that is attributable to the environmental benefit of the HRSG.

Mr. Nasi said that comparing the cost of a piece of equipment to the total of the plant is no measure of its productive use or environmental use. Mr. Nasi said this approach opens the program to look at every piece of the backend at the plant. He added that the environmental benefit comes from the whole plant, but the committee should focus on the HRSG. Mr. Nasi said he doesn't think it is appropriate to factor in cost of the HRSG relative to the whole plant.

Mr. Graham asked Mr. Nasi to remind him why people build HRSGs. Mr. Nasi responded that the goal would be to dispatch more megawatts for less fuel when the market conditions serve that purpose.

Mr. Adair said he appreciated those who pulled the data together. He also reminded the committee that the recommendation should be supportable and align with the Court's decision.

Mr. Attaway asked Mr. Adair to review the process going forward. Mr. Adair said there will be a meeting in November and the committee is hoping to put something forth. Mr. Attaway asked what happens if the committee doesn't come to a consensus. Mr. Adair said the committee prefers a consensus, but if a consensus is not reached, the committee would take a vote and there could be minority dissent. Mr. Adair asked the committee members to be prepared to have a vote on November 8<sup>th</sup>.

Mr. Nasi said he would try to come up with what a CAP calculation would look like. Mr. Lee asked if the committee could do a simplified CAP to determine the difference between a steam generation unit versus a HRSG that produces the same amount of pounds per hour. Mr. Maxim also agreed to work on a CAP analysis that looks at the difference in environmental benefit and the difference in cost.

Mr. Adair pointed out that the preamble to the Tier I Table will need some revisions if the committee recommends a partial use percentage.

Mr. Adair asked if there were any additional comments from the committee members and the audience. He stated the next meeting is scheduled for November 8<sup>th</sup>. He also reminded the committee about the recommendations made to the commission last year and said he envisioned the process would be similar and allow for the committee to make comments before the recommendation is submitted to the commission.

Mr. Adair asked the TCEQ staff to remind the committee why the advice was requested in November. Mr. Williamson responded that the TCEQ will need to do rulemaking for legislative changes and the previous recommendations from the committee. The TCEQ plans to group all the rulemakings together, including any HRSG-related rulemaking if needed. Mr. Williamson said rulemaking should start no later than the summer of 2020.

Mr. Lee thanked Mr. Coon for his efforts on the documents he provided.

***Note: The Advisory Committee plans to submit advice to TCEQ Commissioners before Thanksgiving. An additional public meeting regarding this item is scheduled for November 8, 2019.***

***Other***

***a. Old Business***

No old business.

***b. New Business***

No new business.

***c. Other General Comments from the Public***

None.

***Action Items***

The committee will send a copy of the document Mr. Attaway provided to Mr. Allred.

Mr. Nasi and Mr. Maxim will work on CAP analyses; a CAP that looks at the difference in environmental benefit and the difference in cost.

***Adjourn***

The meeting adjourned at 11:58 A.M.