VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY

Northern Regional Office

INTRA-AGENCY MEMORANDUM

13901 Crown Court Woodbridge, VA 22193

Permit Writer	John R. McKie		**Date**	
Air Permit Manager	James B. LaFratta		**Date**	
Memo To	Air Permit File			
Facility Name	Dominion Possum Point Power Station			
Registration Number	70225			
County-Plant I.D.	153-00002			
GIS Coordinates	38.538333	**Latitude**	-77.280833	**Longitude**
Elevation (feet)	30			
Distance to Nearest Class I Area (select one)	87	**SNP (km)**		**JRF (km)**
FLM Notification Required (Y/N)	N			
Plant Title V Permit Program (TM, SM, SM80, Major)	Major	**Before permit action**	Major	**After permit action**
Pollutants for Which the Source is Title V Major	NOx, SO_2, PM-10, CO, VOC, GHG, HCl, HF, As, Benzene, Cr, Formaldehyde, Mn Ni	**Before permit action**	Same	**After permit action**
PSD Major Source (Y/N)	Y	**Before permit action**	Same	**After permit action**
Pollutants for Which the Source is PSD Major	NOx, SO_2, PM-10, CO, VOC, GHG*	**Before permit action**	Same	**After permit action**

*These are the pollutants for which the whole source is PSD major (PTE>100 tpy). The pollutants for which the PSD-permitted units are major are NOx, CO, PM-10, VOC.

I. Introduction

The facility is known as the Possum Point Power Station (PPPS). It is an electric power generating plant that is technically owned and operated by the Virginia Electric and Power Company, a wholly-owned subsidiary of Dominion Resources. However, the owner is usually referred to as "Dominion Virginia Power," or simply "Dominion." The facility is located on the shore of the Potomac River at 19000 Possum Point Road, Dumfries, Virginia 22026.

The facility began operations in 1948 as a coal-fired boiler generating station. Over time, the use of coal was phased out, with the last of the coal-burning boiler generating units being converted to natural gas firing as part of the plant modifications for which the original Prevention of Significant Deterioration (PSD)/Major Non-attainment New Source Review (NSR) permit was issued on October 5, 2001. (Hereafter, that permit, the one to which this amendment applies, is referred to as simply the "PSD permit.") The facility also uses distillate fuel oil and No.6 residual fuel oil. As of 2010, the net output capacity of the facility was 1733 MW in summer (higher in winter). There have been no significant modifications to generation equipment since then, so assume the output is still approximately 1733 MW.

The DEQ received from Dominion on October 28, 2013, an application to significantly amend the PSD permit and a companion application to significantly modify the Title V permit to allow the switching of fuels (aka, "fuel transfer") in the Unit 6A & B combustion turbines (CT's) from natural gas to distillate fuel without first completely shutting down the units. Each permit currently allows those CT's to burn either natural gas or distillate fuel oil. The permits do not explicitly prohibit switching fuels while the CT's are operating, but the process of switching involves changing temporarily the configuration of the burners being fired, resulting in short spikes of NOx and possibly CO concentrations in the flue gas in excess of the permit limits. However, the permits do not apply those emission limits during periods of start-up and shutdown, as defined in the permit appendices. Therefore, Dominion has been shutting down the CT's and starting them up again on the different fuel to avoid the problem of being out of compliance during the short spikes in emissions.

There are still short spikes of excessive emissions associated with a complete shutdown and restart; in fact, Dominion has presented data from a similar facility to show that the total emissions associated with a complete shutdown and restart are somewhat greater than when making the switch while in partial operation, but as currently permitted, the complete shutdown and restart avoids a non-compliance issue. However, the complete shutdown and restart strategy, besides creating more emissions, is less fuel-efficient and results in more stress on the equipment than does a fuel switch while in partial operation. Thus, Dominion chose to apply for a permit amendment (permit modification in the case of the Title V permit) to allow an "alternate operating scenario" that is also exempt from the same short-term emission limits.

The DEQ considered Dominion's request for the significant amendment to the PSD permit and corresponding significant modification to the Title V permit and concluded that it would be better for all parties involved if Dominion would abandon the alternate

operating scenario pursuit. Instead Dominion could request that DEQ issue a minor amendment to the PSD permit and a minor modification to the Title V permit to clarify that the definitions of startup and shutdown can apply even when the CT's do not shut down completely, at least in the case of switching fuels. An alternate operating scenario, if even applicable to this type of situation, which is questionable, would almost certainly require a more complex and time-consuming permitting action than the minor amendment/modification process. DEQ believes that the minor amendment/modification process could be utilized for clarifying the definitions as long as there is no change in a case-by-case emission standard or significant monitoring change, which there should not be.

Around the same time as DEQ decided to recommend against the alternate operating scenario, the permit writer realized that there is some confusing text in the definitions at existing Appendix A to the PSD permit. Appendix A is where the definitions of startup and shutdown for the Unit 6A & 6B CT's are found. The term shutdown is used in the definition of startup, but the term shutdown has a different meaning there than it does in the definition of shutdown. Therefore, some clarification of the definitions in Appendix A is required, regardless of the fuel switching issue.

By e-mail dated March 28, 2014 from John McKie (DEQ) to Elizabeth Willoughby (Dominion) DEQ's preference was expressed for clarifying the definitions of startup and shutdown to be similar to how they appear in the PSD permit for Dominion's Bear Garden Power Station (Reg. No. 32004) rather than pursuing the alternate operating scenario. On May 28, 2014, DEQ received from Dominion separate requests to amend the application dated October 13, 2013, for a significant amendment to the PSD permit, and to amend the application dated October 13, 2013, for a significant modification to the Title V permit. The May 28 requests would change the permitting actions to a PSD minor amendment and a Title V minor modification, respectively.

The May 28, 2014 requests to amend the October 13, 2013 applications are nearly identical for each permit, but the request pertaining to the PSD permit requests that it be handled as a minor amendment (9VAC5-80-1945) and the request pertaining to the Title V permit requests that it be handled as a minor modification (9VAC5-80-570). In addition to the change in type of amendment process that each permit would undergo, Dominion requested that the fuel sampling method specified in the PSD permit for determining compliance with the limits on sulfur content of the distillate fuel burned in the Unit 6A and 6B combustion turbines be ASTM D4294 or another ASTM method incorporated in 40 CFR 60 by reference instead of exclusively ASTM D4294-90 as the permit reads now. The reason for this additional request is that 40 CFR 60 sometimes is revised to require different ASTM methods that are either more up-to-date or accurate and Dominion does not want to have to seek an additional permit amendment each time that happens. The permits were deemed complete as of the date (May 28, 2014) those requests for amending the October applications were received.

The air permitting history of this facility is as follows:

02/07/1973 – Permit to construct and operate for Unit 5 issued.

06/12/1995 – RACT Consent Agreement for NOx and VOC signed.

10/22/1996 – Amended RACT Consent Agreement (vacating NOx portion) signed.

12/18/1997 – Title IV Phase-II Acid Rain permit issued.

07/21/2000 – S.O.P. issued to implement NOx RACT.

09/26/2000 – S.O.P. issued as part of the SIP for Wash DC-MD-VA Nonattainment Area

10/05/2001 – PSD/Major-Nonattainment NSR permit issued for: construction of Unit 6A&B CT's with heat recovery, aux. boiler, and nat.gas pipeline heaters; conversion of Units 3 and 4 boilers from coal to nat. gas; removal of Units 1 and 2. VOC offsets secured.

11/18/2002 - PSD/Major-Nonattainment NSR permit significant amendment.

02/28/2003 - Title IV Phase-II Acid Rain permit renewed.

12/08/2004 - PSD/Major-Nonattainment NSR permit minor amendment.

07/11/2008 - PSD/Major-Nonattainment NSR permit minor amendment.

07/31/2008 – Permit exemption letter issued for Unit 6A&B vane control software change.

01/20/2009 – Initial Title V permit issued.

02/10/2010 – Title V permit significant modification.

05/20/2011 - PSD/Major-Nonattainment NSR permit minor amendment.

05/25/2011 - Title V permit significant modification to include Title IV Phase-II Acid Rain permit renewal.

11/22/2011 - Exemption for air intake modification on Unit 6A&B

06/11/2013 - PSD/Major-Nonattainment NSR permit minor amendment.

II. Emission Unit(s) / Process Description(s)

The two emission units directly affected by the proposed amendment are the two combustion turbine (CT) electric generators designated by Dominion as Units 6A and 6B (Title V permit reference numbers ES-13 and ES-14). The reason for saying "units directly affected" is that Units 6A and 6B have heat recovery units associated with them that employ natural gas burners (Title V permit reference numbers ES-15 and 16) for supplementary heat as needed, that are indirectly affected. The subject CT's are identical General Electric (GE) Model 7FA combustion turbines, each with a nominal design rating of 171 MW_e and 1,937 MMBtu/hr fuel heat input when firing natural gas or 2,080 MMBtu/hr when firing distillate fuel oil. The heat recovery process adds another 217 MW of electrical output by producing steam for a steam turbine powered generator.

To avoid possible confusion, it should be noted that the PPPS also has six very small and old distillate oil fired CT's that are used infrequently for peak power generation. They are designated as Units 6 through 11 (Title V permit reference numbers ES-6 through ES-11), but generally, if someone refers to "Unit 6" at the PPPS they mean the large Units 6A and 6B, which are the subject of this amendment.

It is the process of switching the CT's from firing on natural gas to fuel oil or vice-versa that precipitated a need for the requested amendment. It is the arrangement of multiple burners and the air and fuel supply that minimize the NOx emissions. When the CT's are shut down or started up, firing must occur in some burners while not in others until full shutdown or fully normal operations are achieved. This deviation from the ideal burner firing arrangement sustained when at normal operation results in higher NOx emissions for the amount of fuel being burned, allowing NOx emissions to exceed permitted lbs/MMBtu limits. The ideal firing arrangement cannot be sustained while switching fuels either, but a comparison of one-time instrument-monitored NOx and CO emissions at an identical CT generator at Dominion's Bear Garden showed that the time to reach normal operation when switching from gas to oil without a complete shutdown was less than half the time it took from a full shutdown. For that same example, the total monitored CO emissions when switching fuels while continuing operation were approximately 58% of the amount while starting up from a complete shutdown. The NOx emissions for switching at continued operation were less than 10% as much as during a full start-up.

It should be noted that there are other emission units at this facility, including a 786 MW (net) residual oil fired-boiler generating unit that is considerably more polluting per MW. However, because of their high efficiency, the Unit 6A and 6B CT's are dispatched into service more frequently than the other generating units. They are also the only units for which fuel switching is an option and meeting the ASTM D4249 standard is required. Therefore, the other generating units are not a factor in this permitting action.

III. Regulatory Review

A. 9 VAC 5-80-1100 *et seq.* (Article 6) - Minor New Source Review

This permitting action does not involve any "modifications," as defined at 9VAC5-80-1110; and therefore, does not meet the Article 6 applicability criteria at 9VAC5-80-1100 A. Dominion's request that the permit be amended to clarify that the definition of a Hot Start Startup includes when the unit reduces load and switches from operating on one fuel to operating on another fuel could be considered as a "change in the method of operation," but it is not a change that "increases the uncontrolled emission rate of any pollutant into the atmosphere by the unit or that results in the emission of any regulated air pollutant into the atmosphere not previously emitted." The change would just clarify when the uncontrolled emission rates are allowed.

Also, the potential to emit (PTE) will not change, because the emission limits, which include the federally-enforceable annual emission limits upon which PTE is based, will not change. The actual annual emissions, as measured by the continuous

emissions monitoring system (CEMS), are expected to decrease slightly, presuming the demand on the units and the ratio of firing on natural gas versus fuel oil remains the same. The emissions during fuel switches are expected to decrease significantly (See Attachment 1 – CALCULATIONS), but these periods typically comprise a very small portion of the hours of operation in a year, so the net effect is slight.

B. 9 VAC 5 Chapter 80, Article 8 - PSD Major New Source Review

This permitting action is for an existing source that already has a PSD permit for a portion of the facility, including the emission units that are the subject of this action. However, the action, a permit amendment, does not involve any "net emission increases," as defined at 9VAC5-80-1615; and therefore, does not meet the definition at 9VAC5-80-1615 of "Major modification". That means it does not meet the Article 8 applicability criteria at 9VAC5-80-1625 B, except as Article 8 otherwise provides. Article 8 does otherwise provide, where permit changes are concerned (the case here), at 9VAC5-80-1625 F and 9VAC5-80-1925, but the majority of the requirements in Article 8 apply only if a new major stationary source or major modification is involved.

9VAC5-80-1625 F just says the board can make changes as provided in 9VAC5-80-1925. The pertinent sections of that regulation in this case are: 9VAC5-80-1925 A.2, which allows permit changes to be initiated by the permittee; and 9VAC5-80-1945 A, which allows a permit change under "minor permit amendment procedures" if the following criteria are met:

- Do not violate any applicable federal requirement.
- Do not involve significant changes to existing monitoring, reporting, or recordkeeping requirements that would make the permit requirements less stringent...
- Do not require or change a case-by-case determination of an emissions limitation or other requirement.
- Do not seek to establish or change a permit term or condition (i) for which there is no corresponding underlying applicable regulatory requirement and (ii) that the source has assumed to avoid an applicable regulatory requirement to which the source would otherwise be subject.
- Are not required to be processed as a significant amendment under 9VAC5-80-1955; or as an administrative permit amendment under 9VAC5-80-1935.

The primary request is to clarify that the definition of Startup in the Appendix A definitions includes, as a "hot start," the reduction of load for a period of no more than three hours during which a fuel switch occurs. (See more on the logic of that request in Section XIII. Other Considerations.) At first thought, one might think this changes a case-by-case determination of an emissions limitation and/or a reporting requirement. However, that is not true. No emission limitations are being changed. Only the text stating when some of the limitations are inapplicable is being changed. One might argue that changing when the emission limits apply can itself be interpreted as a change in the determination of an emissions limitation. Given that

the text of the permit as a whole already allows the permittee to conduct a fuel switch, but with greater emissions than under the proposed rewording, there is no benefit from accepting that interpretation, so we are not.

The monitoring and recordkeeping requirements are not being changed, because the emissions during the startup are still being recorded and reported and totaled monthly for compliance with annual limits. Effectively being changed are only the circumstances under which the recorded short term emissions may be exempt from a determination of non-compliance. That could be a cause for concern if it were for the purpose of exonerating the permittee for past or present violations, or if the total emissions (actual or potential) were likely to increase, but neither is the case. The permittee has been operating in compliance with a strict interpretation of the relevant text of the current permit.

The added request to revise the requirement regarding the specified ASTM standard for fuel sampling might be construed to be a change to a monitoring requirement, but <u>not</u> a change that would make the permit requirements <u>less stringent</u>, since it is just clarifying that the method to be used is whatever the latest version of the same NSPS requires. An update to the NSPS might allow an easier-to-employ method, but not one that is likely to be less stringent with respect to precision and accuracy. In one respect, the requested change in text will make the requirement <u>more</u> stringent. The permittee has requested that the clause in the sampling method requirement that reads "or an equivalent method approved in advance by the NRO Air Compliance Manager" be replaced with "or another ASTM method incorporated in 40 CFR 60 by reference." This implies less flexibility for the permittee, but in reality the Air Compliance Manager would not approve a method that is not prescribed by the appropriate NSPS, so the stringency is unchanged.

The ASTM standard for fuel sampling that is in the current permit is numbered (ASTM D4294-<u>90</u>) to refer to the 1990 version of that standard; yet, there is a 2002 update numbered ASTM D4294-02, which is what is now specified in 40 CFR 60, Subpart GG. Requiring the permittee to use a method no longer in the NSPS runs counter to the first and fourth criteria above, so applying the "minor amendment" procedures to this permit change seems very appropriate.

C. <u>9 VAC 5 Chapter 50, Part II, Article 5 – NSPS</u>

There are no new emission units or any currently operating units being modified as a result of this amendment, so there are no additional NSPS that apply. The request to revise the specification of an ASTM standard for fuel sampling does pertain to an NSPS (40CFR60, Subpart GG), but does not affect any NSPS applicability. The requested revision is that the sampling method specification be changed to read "The sampling method used shall be ASTM D4294 or another ASTM method incorporated in 40 CFR 60 by reference." ASTM D4294 is one of several methods specified in Subpart GG, but EPA has updated the method from the version (ASTM D4294-90) specified in the current permit and may very well update it again. The amendment will reflect approval of the requested revision, so that in the future the permittee will

not need an additional amendment to the PSD permit and an accompanying modification to the Title V permit each time the sampling method specification in Subpart GG is updated.

D. 9 VAC 5 Chapter 60, Part II, Article 1 - NESHAPS

There are no new emission units or any currently operating units being modified as a result of this amendment, so there are no NESHAPS to be discussed for this permitting action.

E. 9 VAC 5 Chapter 60, Part II, Article 2 - MACT

There are no new emission units or any currently operating units being modified as a result of this amendment, so there are no MACT to be discussed for this permitting action.

F. 9 VAC 5 Chapter 80, Article 7 – New and Reconstructed Major Sources of HAP

Although the existing source is a major source of HAP (but not the emission units in question), there will be no construction or reconstruction of anything as a result of this amendment, so Article 7 does not apply.

G. 9 VAC 5 Chapter 40, Part II, Existing Sources - Emission Standards

There are no new emission units or any being modified as a result of this amendment, so there are no new or modified units to which existing source emissions standards could apply.

IV. Best Available Control Technology (BACT) Review (9 VAC 5-50-260 and/or 9 VAC-5-60-320)

There are no new emission units or any currently operating units being modified or any potential increase in emissions created as a result of this amendment, so no BACT of any type applies.

V. Summary of Controlled Emissions Increase

As stated above in Section III. Regulatory Review, there will be no emissions increase as a result of this amendment. Actual emissions may decrease slightly during fuel switches due to a change in the operational limitations (See Attachment 1 – CALCULATIONS), but potential controlled emissions remain the same.

VI. Dispersion Modeling

There are no emission increases or new emissions as a result of this amendment, so dispersion modeling is unnecessary.

VII. Boilerplate Deviations / Changes from Existing Permit

This permitting action is to amend an existing permit. Therefore, no boilerplate was utilized; except that the signature page format was altered a little to more closely conform to the current NRO policy for amended permits. Specifically, the listing of the previous amendment dates is changed, although they are not all given a separate line as would be under current NRO policy, because there are too many for one page. Differing from the DEQ Nov 2012 "Skeleton NSR Boilerplate," but consistent with the NRO policy is that the signature block is for the Regional Director rather than the DEQ Director and it is not left justified. The cover letter is all new and follows the DEQ Jan 2013 "NSR Permit Cover Letter" template.

Aside from the changes noted in the paragraph above, the changes to the permit are:

All pages – The date of the current amendment has been added to the list of amendment dates in the header.

Page 2, Condition 1 – The dates of the application (initial request) for this amendment and the additional submittal amending the request (October 18, 2013 and May 28, 2014) have been added as dates of amendment information.

Page 7, Condition 19 - The method of sampling for fuel sulfur content has been changed from "...shall be ASTM D4294-90 or an equivalent method approved in advance by the NRO Air Compliance Manager" to "...shall be ASTM D4294 or another ASTM method incorporated in 40 CFR 60 by reference." The reasons are given in Sections III. B and C above. The sentence regarding sampling frequency for sulfur and nitrogen content has been moved to the end, so as not to disrupt the statements regarding sulfur content determination methodology. Some thought was given to deleting the word nitrogen from that last sentence, since there is no requirement to sample for nitrogen content in the permit, but because nitrogen content sampling frequency for gaseous fuels is mentioned at 40 CFR §60.333 (i)(2), it was decided to retain the sentence as is. Also, leaving it as is alleviates any question of the applicability of "minor" amendment procedures to such change.

Page 29, Appendix A - The words "shutdown period" have been replaced in the Startup definitions of cold, hot, and warm starts by the words "no fuel has been burned for a period." This change was necessary to avoid confusion, because a definition of Shutdown is provided immediately below the Startup definitions, but that definition means something different from a period of no fuel being burned.

Page 29, Appendix A – The definition of hot start has had the following sentence added. "A hot start is also defined as when the unit reduces load and switches from operation on one fuel to operation on another fuel and shall last no more than three (3) hours." This is to clarify for purposes of determining emission standard applicability that a startup does not have to begin from a complete shutdown when it is for the purpose of starting up on a different fuel.

VIII. Compliance Demonstration

No new conditions have been established to demonstrate compliance. However, the two substantive changes in this amendment pertain to compliance demonstration. Condition 19 states what methods are acceptable for fuel sulfur and nitrogen content determination. In order to comply with 40 CFR 60, Subpart GG, and therefore, 9VAC5-50-410, they must be methods specified in 40 CFR 60.334. The existing permit has wording that seems to allow other sampling methods if approved by the Regional Compliance Manager, so this wording is being changed to assure that will not happen and that the ASTM specification is not so specific that it precludes updates.

IX. Title V Review - 9 VAC 5 Chapter 80, Article 1

This source is a Title V major source and has a Title V permit that is currently up for renewal. A timely and complete renewal application was submitted, so the source is operating under authority of the application shield (40 CFR 70.7(b)). This amendment does not bear on the source's status as a Title V major source, but because this amendment when approved would change the underlying requirements of the Title V permit, either a minor modification to the Title V permit per 9VAC5-80-570 will be in order or alternatively DEQ must include the changes as part of the permit renewal process. The permittee, Dominion, submitted a minor modification request application with the application for the PSD permit amendment request. Per 9VAC5-80-570 F.1, the filed minor modification application was grounds to proceed with the changes until such time as DEQ might deem them unacceptable. Whether the DEQ proceeds to issue a minor modification to the permit or, instead, just adds the changes at permit renewal, the consequences to this permit amendment are the same; it must be issued before or concurrent with the Title V permit revisions.

X. Site Suitability –

There will be no new construction or equipment modification associated with this amendment. The facility will appear and function the same as before. The only operational change will result in slightly less emissions and more consistency in the noise; i.e., less ramp up noise that may be alarming to wildlife and any persons who can hear the facility. Therefore, the suitability of the facility for this site with respect to the criteria at §10.1-1307 E, should improve slightly, if it is affected at all.

XI. Public Participation Requirements

There are no public participation requirements for the proposed minor permit action.

XII. Permit Fee

The application fee of $7,118.0 for this major NSR permit amendment was received by DEQ and deposited on October 31, 2013. No additional application fee was charged for amending the permit amendment request by application dated May 28, 2014, because the amended request was largely at DEQ's request and most of the work already done by DEQ was applicable to the minor amendment.

XIII. Other Considerations

The following previous CEDS actions involved the combustion turbines (Units 6A & 6B) that are addressed in the current permit action. Please see the engineering memoranda for these previous actions for additional information on these emission units.

CEDS Application Number	Permit/Exemption Issuance Date
1	01/20/2009
2	10/05/2001
4	09/26/2000
5	11/18/2002
7	02/28/2003
8	12/08/2004
9	05/25/2011
11	07/31/2008
12	07/31/2008
13	05/25/2011
17	05/20/2011
18	11/22/2011
22	06/11/2013

Inspections:

07-31-2014 – The last FCE with a site visit was conducted by W. Chiasson. The results for both the PSD and Title V permits were "In Compliance."

08-01-2014, 08-06-2014, 08-01-2014, 08-06-2014, 08-06-2014, 08-08-2014, 08-08-2014, 08-08-2014, 09-08-2014,09-08-2014, 09-08-2014 – These are dates since the last FCE for separately recorded PCE's, all of which indicate "In Compliance."

Attachment 1 - CALCULATIONS

Project: **Possum Pt. – PSD Minor Amendment**	Preparer: **J. McKie** Date: 9-12-2014	Page: **1 of 2**
Item(s) Calculated: **Emissions Change**	Checked by: Date:	File: Calc-sheet_9-12-2014.docx

The following table was included in the significant amendment request dated Oct. 18, 2013. The amended request of May 28, 2014 refers to the Oct. 18, 2013 document for information not provided in the latter application, such as this table. This table shows emissions measured from a Bear Garden Generating Facility combustion turbine that is identical to units 6 A&B at Possum Point Power Station (PPPS) during a period that meets the definition of "Startup" in Appendix A of the existing PPPS PSD permit (as amended June 11, 2013) compared to emissions during a full period of reduced load when switching from natural gas to fuel oil. The latter period would meet the proposed amended definition of "Startup."

Bear Garden Generating Facility - Emission Calculations

Duration	Bear Garden startup	HI (actual) (mmBtu/hr)	CO CEMS (lbs)	SO2 (lbs)	NOx CEMS (lbs)	PM 2.5 (lbs)	VOC (lbs)	CO2e (lbs)
79 minutes	BG 1A (oil) startup emissions	995.43	713.32	1.00	264.62	8.46	0.90	37,975.28

Duration	Bear Garden transfer (gas to oil)	HI (actual) (mmBtu/hr)	CO CEMS (lbs) (gas & oil combined)	SO2 (lbs)	NOx CEMS (lbs) (gas & oil combined)	PM 2.5 (lbs)	VOC (lbs)	CO2e (lbs)
33 minutes	BG1A (gas) transfer emissions	339.99	-	0.31	-	0.68	0.02	17,246.76
31 minutes	BG1A (oil) transfer emissions	394.80	410.83	0.39	24.67	3.36	0.36	15,061.55
61 minutes (4 minute overlap)	Total trasfer emissions	734.79	410.83	0.70	24.67	4.04	0.38	32,308.31

Summary of Emissions	HI (actual) (mmBtu/hr)	CO CEMS (lbs)	SO2 (lbs)	NOx CEMS (lbs)	PM 2.5 (lbs)	VOC (lbs)	CO2e (lbs)
BG1A startup emissions	995.43	713.32	1.00	264.62	8.46	0.90	37,975.28
Total Transfer emissions	734.79	410.83	0.70	24.67	4.04	0.38	32,308.31
Total emission savings		302.49	0.29	239.95	4.43	0.52	5,666.98

	Oil	Gas
EF for SO2 (lb/mmBtu)	0.001	0.0009
EF for PM 2.5 (lb/mmBtu)	0.0085	0.002
EF for VOC (lb/mmBtu)	0.0009	0.00006
EF for CO2e (lb/mmBtu)	38.15	50.73

Basis for emisison factors: SO2, PM2.5, VOC - initial compliance test
NOx & CO - CEMS data
CO2e - Table C-1 of Subpart C of Part 98

In this example, a startup on oil (79 minutes) is compared to a fuel transfer from gas to oil (61 minutes) resulting in an emissions savings for all observed pollutants.

In the above data, the duration of the startup on oil following a complete shutdown is 20% longer [(79 min/61 min) – 1) x 100%] than the fuel switch (transfer) without a complete shutdown. So, the lesser emissions under the proposed

clarification of the meaning of startup could be due to the shorter period, rather than the proposed amendment resulting in less emissions in lbs/hr. However, further examination reveals that this is NOT the case.

The hourly CO emissions from a startup from complete shutdown (not including any emissions during the shutdown)

= 713 lbs/79 min x 60 min/hr = 542 lbs/hr

The hourly CO emissions from a startup as proposed to include fuel switching without complete shutdown

= 411 lbs/61 min x 60 min = 404 lbs/hr

The hourly NOx emissions from a startup from complete shutdown (not including any emissions during the shutdown)

= 265 lbs/79 min x 60 min/hr = 201 lbs/hr

The hourly NOx emissions from a startup as proposed to include fuel switching without complete shutdown

= 25 lbs/61 min x 60 min/hr = 25 lbs/hr

The emissions cannot be expected to be exactly the same for every similar period at either the Bear Garden or PPPS units, but the difference in emission rate between types of "startup" in this sample, which favors the "without complete shutdown" type, is too great to dismiss as a fluke, especially with respect to NOx.