COMMONWEALTH OF PENNSYLVANIA
Department of Environmental Protection
Southwest Regional Office

MEMO

RE Comment and Response Document
Shell Chemical Appalachia LLC
Petrochemicals Complex, Ethylene and Polyethylene Manufacturing
Permit Decision: Approved
Potter and Center Townships, Beaver County
Public Comment Period: March 28, 2015 – May 15, 2015
Public Meeting and Hearing: May 5, 2015
APS # 841785, Auth # 1024467, PF # 775836

DATE June 18, 2015

TO Air Quality Permit File PA-04-00740A

FROM Alan A. Binder AAB
Air Quality Engineering Specialist
Air Quality Program

THROUGH Mark R. Gorog, P.E.
Regional Manager
Air Quality Program

RTP Environmental Associates, Inc. ("RTP") submitted a plan approval application on behalf of Shell Chemical Appalachia LLC ("Shell") on May 1, 2014, for the construction of a petrochemicals complex and associated electric and steam cogeneration plant to be located in Potter Township, Beaver County. A small part of the property would be located in neighboring Center Township. The Department of Environmental Protection's ("Department's") review of the submitted application has been completed and the public comment period has expired. This memo documents activity that has taken place since the Department's review memo was finalized.

Notice of intent to issue the plan approval was published in the *Pennsylvania Bulletin* on March 28, 2015; published in *The Times (Beaver County Times)* on April 1-3, 2015; sent to United States Environmental Protection Agency ("EPA") on April 1, 2015; and sent to WV DEP and OH EPA on April 2, 2015, in accordance with the requirements of 25 Pa. Code §§127.44-127.46. All required methods of public notice were fulfilled as of April 3, 2015, and the regulatory 30-day public comment period would have ended at the close of business on May 4, 2015 (May 3, 2015, was a Sunday). The public comment period was extended until May 15, 2015, because the record remained open for 10 days after the public hearing held on May 5, 2015.

Notice of intent to issue was provided to the applicant on March 25, 2015, and the applicant fulfilled the requirement to publish the notice within 10 days of receipt, in accordance with the requirements of 25 Pa. Code §127.44(c). Copies of the proposed plan approval and review memo were emailed to Shari Keller, Sr. Staff Environmental Specialist – Air Compliance, Shell Oil Products.

Received comments are substantively addressed in this document below the list of commentators. Note that this is a proposal to issue an air quality plan approval and multiple comments received are considered to be outside of the scope of this plan approval application review. Regardless, responses are given to many of the comments which may be considered outside of the scope of this review. Comments have been identified, summarized, and categorized where possible. Numbers in parentheses following each comment identify to which commentators the comment applies.

LIST OF COMMENTATORS

1. Joseph Otis Minott, Esq.
   Executive Director, Clean Air Council

2. Ryan H. Knapick
   Staff Attorney, Clean Air Council

3. Adam Kron
   Attorney, Environmental Integrity Project

4. Sparsh Khandeshi
   Attorney, Environmental Integrity Project

5. Citizen's for Pennsylvania's Future

6. Steve Hvozdovich
   Pennsylvania Campaigns Director, Clean Water Action

7. Joe Osborne
   Legal Director, Group Against Smog and Pollution

8. Joanne Kilgour
   Chapter Director; Sierra Club, Pennsylvania Chapter

9. Lonnie Fritz
   Citizen, Brighton Township, Beaver County

10. Dawne Sohn
    Citizen, Moon Township, Allegheny County

11. Don Naragon
    Member, League of Women Voters® of Pennsylvania

12. Susan Carty
    President, League of Women Voters® of Pennsylvania

13. Elizabeth Tatham
    Vice President, Issues and Action, Natural Resources and Public Health

14. Kevin Sunday
    Manager, Government Affairs, Pennsylvania Chamber of Business and Industry

15. Larry Nelson
    Secretary – Treasurer, Beaver County Building and Construction Trades Council

16. Dennis Nichols
    Beaver County Commissioner

17. Joe Spanik

Beaver County Commissioner

18. Rebecca Matsco
    Chairwoman, Potter Township (Beaver County) Board of Supervisors

19. Ken Zapinski
    Sr. Vice President, Allegheny Conference on Community Development

20. Wesley Hill
    Beaver County Emergency Management Coordinator

21. Joy Ruff
    Director of Planning/Community Relations, Dawood Engineering

22. Erica Loftus
    President, Beaver County Chamber of Commerce

23. Jack Manning
    Board Member, Beaver County Chamber of Commerce

24. Gail Neustadt
    Citizen

25. Mike McDonald
    Business Manager, Laborers' District council of Western Pennsylvania Local 833

26. Jim Palmer
    President, Beaver County Corporation for Economic Development

27. Steven Davis
    Industrial Development Manager, CSX Transportation

28. Dr. Stephen Cleghorn
    Citizen, Punxsutawney, Jefferson County

29. Mack Flood
    Business Development Manager, McCutcheon Enterprises, Inc.

30. David Schauer
    Project Manager, Brandenburg Industrial Service Company

31. Matt Crocco
    Pennsylvania Chemical Industry Council

32. Joyce Turkaly
    Director of Natural Gas Market Develop., Pennsylvania Independent Oil & Gas Assoc.

33. Peter Deutsch
    Citizen, Center Township, Beaver County
    Associate Professor of Physics Emeritus Penn State University Monaca

34. Celia Janosik
    Citizen, Economy Borough, Beaver County

35. Reverend James Hamilton
    Citizen, Ambridge Borough, Beaver County

36. Karl Koerner
    Engineering & Technical Coordinator, Clean Air Council

37. Robert Schmetzer
    Citizen, South Heights Borough, Beaver County

38. Stephanie Wissman
    Director, Associated Petroleum Industries of Pennsylvania

39. Richard Doyle
    General Manager, Trumbull Corporation

40. Diane Sipe
    Member, Protect Our Children

41. Lou Hancherick
    Coordinator, Fossil-Free Energy Fair

42. Melvin Clark
    Chairman & CEO, G.W. Peoples Contracting Company, Inc.

43. Shari Keller
    Sr. Staff Environmental Specialist – Air Compliance, Shell Oil Products

44. Terrie Baumgardner
    Citizen, Aliquippa Borough, Beaver County

45. Himanshu Vyas
    Environmental Engineer, EPA Region III

Air Dispersion Modeling (EPA)

1. **Comment:** Shell's cumulative modeling analysis contained model violations of the 1-hr NO_2 and 24-hr PM-10 NAAQS and the modeled 24-hr PM-10 Increment. Upon further examination, Shell's analysis concluded that its proposed facility did not exceed the Significant Impact Levels (SILs) during any of the NAAQS violations and therefore Shell would not be required to take any corrective actions. Shell's contribution to modeled PM-10 24-hour increment violations were assessed using Bee-Line Software. According to Shell's results, the proposed facility was not a significant contributor to the modeled PM-10 increment violations.

   PA DEP is responsible for a timely and adequate response to fully address these modeled NAAQS and PSD increment violations. To that end, PA DEP should provide an outline of its response to these modeled violations, what corrective actions it intends to implement to mitigate them and a rough timeline regarding when actions will be taken to correct these modeled violations. (45)

   Response: The Shell air quality analysis demonstrates that the plant's proposed emissions would not cause or contribute to air pollution in violation of any National Ambient Air Quality Standards (NAAQS) or Prevention of Significant Deterioration (PSD) increments. Pursuant to the EPA's longstanding policy, the issuance of a plan approval for an individual project, such as the Shell project, is not dependent on the Department addressing modeled violations of the NAAQS or PSD increments. The Department intends to address modeled violations in accordance with the EPA's July 5, 1988, memorandum from Gerald A. Emison, "Air Quality Analysis for Prevention of Significant Deterioration (PSD)," which states, "the proposed source may be issued a permit (even when a new violation would result from its insignificant impact), but the State must also take the appropriate steps to substantiate the NAAQS or increment violation and begin to correct it through the State implementation plan (SIP)." The Department intends to work closely with the EPA to correct the modeled violations.

2. **Comment:** US EPA Region 3 has the following comments that may help address and/or alleviate some of these modeled violations.

   1-Hour NO_2 NAAQS: Nearly 95% of the model receptors included in the cumulative analysis exceeded the NAAQS with a maximum modeled 1-hour NO_2 concentrations nearly fifteen (15) times the 1-hour NO_2 NAAQS. Shell's analysis did not explicitly determine which sources in the cumulative analysis were contributing to the modeled 1-hr NO_2 violations though it tried to demonstrate that its contributions were below the interim 1-hour NO_2 SIL. A more thorough culpability analysis for all sources should be done using AERMOD's source groups and MAXDCONT functions.

   EPA believes that Shell's analysis does not completely demonstrated that it is not significantly contributing to any of the modeled 1-hr NO_2 violations. The MAXDCONT output file shows that there is still one modeled violation of the NAAQS at the 365^{th} rank. Additionally, an examination of the MAXDCONT output file indicates the number of model receptors decreases through the concentration ranks. The heading for the 8^{th}

highest model concentration states there are 10,435 model receptors, the total number of model receptors included in the cumulative analysis. By the 365th rank, the heading indicates the number of model receptors has decreased to 326. The number of model receptors in the MAXDCONT file should remain constant for all of the ranks and indicates there may be a problem with how the Bee-Line software is running the MAXDCONT function.

Shell's contribution to the lone model receptor violation (1-hr NO_2) at the 365th rank in the MAXDCONT files cannot be assessed. The group contributions at this lone receptor are all zeros preventing one from determining if Shell's contribution is below the interim 1-hour NO_2 SIL. Rerunning this with EPA's version of AERMOD did not alleviate this problem. We recommend Shell and/or PA DEP re-examine the off-site inventory used in the cumulative analysis to ensure source emissions rates that could be contributing to the modeled 1-hour NO_2 NAAQS violations are correct. EPA believes the largest contributors to the modeled violations are probably AES Beaver Valley and Bruce Mansfield power plants. Total modeled NO_x emission rates were approximately 6,000 tpy and 52,000 tpy respectively. Actual 2013 NO_x emissions from PA DEP's eFACTS system were 280 tpy for AES Beaver Valley and 15,286 tpy for Bruce Mansfield. Contributions from the Beaver Valley Nuclear Plant may also be important. EPA, however, questions the high modeled NO_x emission rates for the nuclear plant, which exceed 500 tpy for multiple sources at the facility (actual 2013 NO_x emissions were under 20 tpy). NO_x controls and permit limitations should be reexamined to determine if modeled emission rates can be revised downward to alleviate some of the modeled violations at the higher MAXDCONT ranks. (45)

Response: Shell's air quality analysis demonstrates that the plant's proposed emissions would not cause or contribute to air pollution in violation of the 1-hour nitrogen dioxide (NO_2) NAAQS. The Department intends to determine which nearby sources are contributing to the modeled violations of the 1-hour NO_2 NAAQS in the course of addressing the modeled violations in accordance with the EPA's July 5, 1988, memorandum from Gerald A. Emison, "Air Quality Analysis for Prevention of Significant Deterioration (PSD)." The Department will consider the EPA's suggestions for addressing the modeled violations of the 1-hour NO_2 NAAQS.

Shell initially executed AERMOD with "partitions" using Oris Solutions' BEEST software. The BEEST software "partitions" divide AERMOD's receptor input into subsets, allowing AERMOD to execute faster by simultaneously processing each receptor subset. According to Shell, Oris Solutions determined that the issue noted by the EPA regarding the decreasing receptor count through the ranks in the output for the MAXDCONT option occurs when these "partitions" are used; however, the model results are not compromised. In response to this comment, Shell provided the Department with an AERMOD run that Oris Solutions executed without the "partitions" using BEEST software and the receptor count did not decrease through the ranks in the output for the MAXDCONT option.

The Department, EPA Region III, and Shell suspect that the EPA's AERMOD code contains an error which prevents source contributions from being written in the output file for the MAXDCONT option when violations of the 1-hour NO_2 NAAQS occur at the 365th rank. To work around this issue, Shell re-ran AERMOD with just the violating receptor at the 365th rank to determine Shell's contribution. AERMOD's primary output

file (not the MAXDCONT output file in which the error occurs) shows that Shell's contribution to the violation at this receptor is well below the established interim 1-hour NO_2 significant impact level (SIL). Therefore, Shell's air quality analysis demonstrates that the plant's proposed emissions would not cause or contribute to air pollution in violation of the 1-hour NO_2 NAAQS at all modeled receptors.

3. **Comment:** PM-10 NAAQS: According to Shell's modeling files, there appears to be only one model receptor that violated the 24-hour PM-10 NAAQS. Note: The max modeled 24-hr PM-10 concentration in Alan Binder's April 1, 2015 summary memo (see table 23 on page 56) is considerably higher than what's listed in Shell's modeling analysis (Appendix C, table 8 page 6-6). This modeled violation could be alleviated by using a more current (or a less conservative) background PM-10 concentration. Shell used a background concentration from the New Castle monitor generated from measurements taken between 2010 and 2012. More recent 2012-14 PM-10 concentrations from PA DEP's Air Monitoring website appear to be lower. Using these values or other a more recent PM-10 design value from the New Castle monitor should lower the background concentration and eliminate the modeled 24-hr PM-10 NAAQS violation. (45)

   Response: Shell's air quality analysis demonstrates that the plant's proposed emissions would not cause or contribute to air pollution in violation of the 24-hour PM-10 NAAQS. The Department intends to address modeled violations of the PM-10 NAAQS in accordance with the EPA's July 5, 1988, memorandum from Gerald A. Emison, "Air Quality Analysis for Prevention of Significant Deterioration (PSD)." The Department will consider the EPA's suggestions for addressing the modeled violations of the 24-hour PM-10 NAAQS.

   The Department notes the mistake in the "April 1, 2015 summary memo". Shell's application value listed in Appendix C, Table 8 page 6-6 of the "February 2015 Update" is the correct and most recent value that has been accepted by the Department. The value included in Table 23 of the Department's April 1, 2015, memorandum reflects an earlier submittal (received on October 15, 2014). Total modeled concentrations for NO_2 and CO, and Shell's contribution for NO_2 and PM_{10} were also revised in the February 2015 Update. Table 23 has been updated and is included below.

Table 23: PSD NAAQS Modeling Results[a]

Air Contaminant	Averaging Period	NAAQS	Total Conc.[b]	Exceeds NAAQS?	Shell's Contribution[c]	Class II SIL	Significant Impact?
NO_2	1-hour	188.0	~~2,835~~ **2,808**	Yes	~~6.90~~ **7.21**	7.5	No
	Annual	100.0	N/A[d]	N/A	N/A	N/A	N/A
CO	1-hour	40,000	~~6,692~~ **4,864**	No	N/A	N/A	N/A
	8-hour	10,000	~~3,866~~ **2,723**	No	N/A	N/A	N/A
PM_{10}	24-hour	150.0	~~10,432~~ **150**	Yes[e]	~~2.86~~ **0.089**	5.0	No
	Annual	N/A	N/A	N/A	N/A	N/A	N/A

[a] All values are in units of $\mu g/m^3$.

[b] Includes background concentrations.

[c] Highest contribution at any receptor with a total value in excess of the NAAQS.
[d] Annual NO_2 modeled impact was earlier determined to be insignificant.
[e] **One receptor showed an exceedance at 70.03 µg/m³ plus the background concentration of 80 µg/m³.**

Modeled concentrations for PM_{10} increment consumption (as shown in Table 24 of the Department's April 1, 2015, memorandum) were similarly updated with the February 2015 Update. Table 24 has been updated and included below.

Table 24: PSD Increment Modeling Results[a]

Air Contaminant	Avg. Period	Class II Increment	Increment Consumption	Exceeds Increment?	Shell's Contrib.[b]	Class II SIL	Significant Impact?
NO_2	1-hour	N/A	N/A	N/A	N/A	N/A	N/A
	Annual	25	N/A[c]	N/A	N/A	N/A	N/A
CO	1-hour	N/A	N/A	N/A	N/A	N/A	N/A
	8-hour	N/A	N/A	N/A	N/A	N/A	N/A
PM_{10}	24-hour	30	~~37.3~~ **51.4**	Yes	~~1.84~~ **3.42**	5.0	No
	Annual	17	~~9.4~~ **15.7**	No	N/A	N/A	N/A

[a] All values are in units of µg/m³.
[b] Highest contribution at any receptor with a total value in excess of the increment.
[c] Annual NO_2 modeled impact was earlier determined to be insignificant.

4. **Comment:** PM-10 Increment Violation: Shell relied on a Bee-Line post processor to demonstrate that it did not significantly contribute to any of the modeled PSD increment violations. There currently is no way to verify this assertion using EPA's regulatory version of AERMOD. It's not entirely clear if Shell's contributions to increment violations beyond the high-second high were examined. A total of 122 of the 373 model receptors exceeded the 24-hour PM-10 increment. (45)

   Response: Shell's demonstration of no significant contribution was not based upon Bee-Line's post processor alone. In response to this comment, Shell re-evaluated its contribution to each modeled violation of the 24-hour PM-10 PSD increment using a spreadsheet with concentration output from AERMOD's MAXIFILE option. The MAXIFILE option yielded a list of all modeled violations of the 24-hour PM-10 PSD increment which included the concentration, location, and time. The MAXIFILE option also yielded a list of all Shell exceedances of the 24-hour PM-10 significant impact level (SIL) which included the concentration, location, and time. The spreadsheet compared the two MAXIFILE lists and determined that none of Shell's 24-hour PM-10 SIL exceedances coincide with 24-hour PM-10 PSD increment violations. Therefore, Shell's air quality analysis demonstrates that the plant's proposed emissions would not cause or contribute to air pollution in violation of the 24-hour PM-10 PSD increment.

5. **Comment:** The modeled 24-hour PM-10 increment violations are probably caused by some of the high emission rates used in the increment modeling analysis. PA DEP's eFACTS website provides historic emission levels for point sources in most counties in Pennsylvania. According to PM-10 emission records from this site some of the modeled emission sources in the PM-10 increment analysis significantly exceed levels reported to PA DEP. The three (3) largest PM-10 sources in Beaver County between 1999 and 2013 appear to be Horsehead Monica Smelter, AES Beaver Valley and Bruce Mansfield Power

Plant. Total reported PM-10 emissions and modeled PM-10 emissions for these three (3) sources are listed in the following table (no PM-10 emissions were modeled for Horsehead).

PM-10 Emission Comparison (all emissions are in tons per year)

	HORSEHEAD CORP/MONACA SMELTER	FIRSTENERGY GEN LLC/BRUCE MANSFIELD PLT	AES BEAVER VALLEY LLC/BEAVER VALLEY LLC
1999	772.4	156.6	261.3
2000	767.7	180.0	307.0
2001	384.8	172.8	251.7
2002	394.5	199.6	315.8
2003	375.6	698.6	316.3
2004	367.8	776.7	315.2
2005	369.6	760.0	306.4
2006	348.9	794.0	310.6
2007	368.9	746.7	307.5
2008	334.3	761.2	276.1
2009	287.7	736.3	266.8
2010	300.0	831.9	269.6
2011	314.1	787.9	261.9
2012	321.0	751.9	405.1
2013	293.1	691.2	29.8
Modeled	Not Modeled	4,017.3	287.3

PM-10 emissions pulled from PA DEP's eFACTS site: http://www.ahs.dep.pa.gov/eFACTSWeb/criteria_facilityemissions.aspx

Shell should consider adjusting some of its modeled PM-10 emission rates. Bruce Mansfield appears to have one of the largest differences in modeled and actual PM-10 emissions. The modeled emission rate is almost five (5) times higher than historical averages. Another possible adjustment would be to account for the reductions in PM-10 emissions from the Horsehead facility. No emissions were modeled for this source when it might be more accurate to account for the closure of this facility using a negative emission rate. Both of these adjustments in the increment source inventory may alleviate or eliminate modeled PM-10 24-hour increment violations. (45)

Response: Shell's air quality analysis demonstrates that the plant's proposed emissions would not cause or contribute to air pollution in violation of the 24-hour PM-10 PSD increment. The Department intends to address modeled violations of the 24-hour PM-10 PSD increment in accordance with the EPA's July 5, 1988, memorandum from Gerald A. Emison, "Air Quality Analysis for Prevention of Significant Deterioration (PSD)." The Department will consider the EPA's suggestions for addressing the modeled violations of the 24-hour PM-10 PSD increment.

6. **Comment:** Class I Increment Analysis:

Shell did not explicitly model increment concentrations at the three (3) closest Class I areas to its proposed facility. As a proxy, Shell placed an arc of AERMOD receptors 50 km from its proposed facility in the general direction of the nearest Class I areas (see Figure 14 in Appendix C). Max modeled concentrations along this arc were then used to compare with the Class I increments and found to be below the Class I increment values for PM-10 and NO_2.

There are significant elevation differences in Shell's AERMOD receptors and the Class I receptors for Dolly Sods and Otter Creek in West Virginia and Shenandoah NP in Virginia. Average receptor elevations are provided in the following table.

Average Model Receptor Elevations for Class I Modeling Analysis

Model Receptor Grid	Average Elevation (m)
Shell AERMOD 1° Arc	334
Dolly Sods Wilderness	1,092
Otter Creek Wilderness	979
Shenandoah National Park	656

No attempt was made to determine if elevation differences between the two receptor groups would impact final modeled concentrations, which may be significantly different for the higher elevation receptors. Shell should determine if model concentrations change significantly at the higher elevations of the Class I receptors (possibly using flagpole receptors) or estimate maximum plume rise from its facility and compare it with the average elevations at the three Class I areas. (45)

Response: In response to this comment, Shell revised AERMOD's input to account for a range of elevations (minimum, average, and maximum) for each nearby Class I area. This was accomplished by entering flagpole heights for the model receptors that were placed along an arc in the direction of the nearby Class I areas at approximately 50 kilometers from the proposed location of Shell's facility. With the revised AERMOD, Shell has demonstrated that the impact of the plant's proposed emissions would be less than the EPA's proposed annual NO_2, 24-hour PM-10, and annual PM-10 Class I significant impact levels (SIL), published in the July 23, 1996, *Federal Register* (61 FR 38249). Therefore, Shell's air quality analysis demonstrates that the plant's proposed emissions would not cause or contribute to air pollution in violation of the annual NO_2, 24-hour PM-10, or annual PM-10 PSD Class I increments.

Air Dispersion Modeling (Others)

7. **Comment:** Air quality modeling used old meteorological data.

The AERMOD modeling used surface winds from the Beaver Valley Nuclear Generating Station (NGS) and upper-air data from the Pittsburgh International Airport. These data were recorded for the years 2006-2010. Since the Beaver Valley NGS station is continuous, more recent data such as 2009-2014, should be available and used in the AERMOD modeling. As stated in the US EPA Modeling Guidelines, "consecutive years from the most recent, readily available 5-year period are preferred. " (US EPA, 2005 - Appendix W, 8.3.1.2). (1-8)

Response: The Department disagrees with the comment regarding the use of 2014 meteorological data in Shell's dispersion modeling because the DEP received Shell's Plan Approval Application on May 1, 2014. The 2006-2010 meteorological data from FirstEnergy's Beaver Valley Nuclear Power Station was the "most recent, readily available" five years of data at the time that Shell's dispersion modeling effort commenced. The Department provided these data to Shell's consultant in a processed, model-ready format in March 2012. These data, unlike airport data, are not publicly available on the National Climatic Data Center's (NCDC) website. The Department obtained these data in October 2011 from FirstEnergy's consultant for use in an attainment demonstration to support its SIP revision for the 2008 lead NAAQS. From a longer term, climatological perspective, there is no reason to believe that more recent five

years of data (e.g., 2009-2013) would be more temporally representative of atmospheric conditions within the modeling domain than the 2006-2010 data used by Shell. According to subsection 8.3.1.1 of the EPA's "Guideline on Air Quality Models" (40 CFR Part 51, Appendix W), five years of data adequately ensures that worst-case meteorological conditions are adequately represented in the model and thus, adequately reduces the variability of the model's estimated concentrations.

8. **Comment:** Air quality impact analysis used old and inappropriate background concentrations.

The air quality impact analysis used background concentrations that are outdated and from far away offsite monitoring stations, e.g. the NO_2 and PM_{10} backgrounds were from the 2010-2012 measurements at Beaver Falls which is 9 km from the project site. These backgrounds are considered to be inappropriate and not representative of the project site. The maximum 1-hour NO_2 measured at Beaver Falls was 70.4 ug/m3 which is well below the NAAQS of 188 ug/m3. Yet the dispersion modeling with the AERMOD model has predicted several NAAQS exceedances around the Shell site. The AERMOD model has predicted a maximum total concentration of 2,808 ug/m3, which is located about 2.4 km from the project site. This maximum concentration is about 15 times larger than the NAAQS. Thus, backgrounds used in the impact analysis are considered to be inappropriate and Shell should conduct on-site monitoring to obtain appropriate background concentrations. (1-8)

Response: The Department received Shell's Plan Approval Application on May 1, 2014. Prior to this date, the most recent three year period of certified monitored data was 2010-2012. The monitored portion of the background in Shell's air quality analysis should represent unidentified sources such as natural sources, minor sources, and distant major sources because the modeled portion of the background included all relevant nearby sources with emissions of CO, NO_X, and PM-10 based on their maximum allowable emission limit or federally enforceable permit limit.

Shell's air quality analysis used existing CO and PM-10 data measured at the Department's New Castle monitors for 2010-2012. The two largest emissions sources (Ellwood Quality Steels and NRG Power Midwest) that are likely affecting the Department's New Castle CO and PM-10 monitors are also expressly included in Shell's dispersion modeling. Shell conservatively assumed the continuous occurrence of the highest 1-hour and 8-hour CO concentrations measured at the New Castle monitor for 2010-2012 for the monitored portion of the CO background concentration. Shell conservatively assumed the continuous occurrence of the highest 24-hour PM-10 concentration measured at the New Castle monitor for 2010-2012 for the monitored portion of the PM-10 background concentration. Thus, Shell's air quality analysis conservatively accounts for background concentrations of CO and PM-10.

Shell's dispersion modeling used existing NO_2 data measured at the Department's Beaver Falls monitor for 2010-2012. Two emissions sources (Eaton and Anchor Hocking) that are likely affecting the Department's Beaver Falls NO_2 monitor are also expressly included in Shell's dispersion modeling. In accordance with the EPA's March 1, 2011, memorandum, "Additional Clarification Regarding Application of Appendix W Modeling Guidance for the 1-hour NO_2 National Ambient Air Quality Standard," Shell dispersion modeling conservatively used 1-hour NO_2 concentrations, which vary

temporally by season and hour-of-day, based on measured data at the Beaver Falls monitor for 2010-2012 for the monitored portion of the NO_2 background concentration. Thus, Shell's air quality analysis conservatively accounts for background concentrations of NO_2.

9. **Comment:** Receptor grid is too coarse to capture maximum impacts.

   Table 8 of the Shell Appendix C indicates that a maximum total 1-hour NO_2 concentration of 2,808 ug/m3 was predicted with the inclusion of regional sources that are located within 10 km of the Shell project. This maximum concentration occurs about 2.4 km from the project site. It is located within a receptor grid with a resolution of 100 m (Table 3 of Shell Appendix C). This 100-m receptor resolution is suitable for a screening run but it is too coarse for capturing maximum impacts, especially those from the Shell project. To capture these impacts, a 25 meter spaced grid, similar to the receptors around the fenceline and railroad, should be placed around the receptors with NAAQS exceedances obtained in the screening run. Thus, the AERMOD model should be rerun with additional receptors with a 25-m spacing placed around the maximum receptors that have been predicted for 1-hour NO_2. (1-8)

   Response: In Shell's dispersion modeling, the resolution of the receptor grid was sufficient to determine that Shell's proposed emissions would not cause or contribute to air pollution in violation of the 1-hour NO_2 NAAQS. The EPA's March 1, 2011, memorandum, "Additional Clarification Regarding Application of Appendix W Modeling Guidance for the 1-hour NO_2 National Ambient Air Quality Standard," states "we deem it appropriate and acceptable in most cases to limit the cumulative impact analysis to only those receptors that have been shown to have significant impacts from a proposed new source based on the initial SIL analysis, assuming that the design of the original receptor grid was adequate to determine all areas of ambient air where the source could contribute significantly to modeled violations." The model's receptor grid used in Shell's initial SIL analysis was adequate to determine all areas of ambient air where Shell emissions would have a significant impact (i.e., be greater than the established interim 1-hour NO_2 SIL) that could contribute to modeled violations.

10. **Comment:** Project 1-hour NO_2 impacts are underestimated.

    Table 8 of the Shell Appendix C indicates that a maximum total concentration of 2,808 ug/m3 was predicted with the inclusion of regional sources that are located within 10 km of the Shell project. Table 7 shows that the region with significant impacts from Shell is extended up to 43 km. Offsite sources located within this extended region are to be included as recommended by the EPA's NSR Workshop Manual (US EPA, 1990) for NAAQS analysis. Thus, the 1-hour NO_2 modeling should be redone with the inclusion of more regional sources. Given the large magnitude of predicted NAAQS exceedances (the maximum of 2,808 ug/m3 is about 15 times the NAAQS of 188 ug/m3), the inclusion of many more regional sources in the extended region and the use of refined receptors (as discussed in the comment above), it is likely that the AERMOD model would predict NAAQS exceedances with significant impacts from the Shell project, i.e. Shell contributions higher than the Class II SIL of 7.5 ug/m3. (1-8)

    Response: More recent EPA guidance in its March 1, 2011, memorandum, "Additional Clarification Regarding Application of Appendix W Modeling Guidance for the 1-hour

NO_2 National Ambient Air Quality Standard," states "[e]ven accounting for some terrain influences on the location and gradients of maximum 1-hour concentrations, these considerations suggest that the emphasis on determining which nearby sources to include in the modeling analysis should focus on the area within about 10 kilometers of the project location in most cases. The routine inclusion of all sources within 50 kilometers of the project location, the nominal distance for which AERMOD is applicable, is likely to produce an overly conservative result in most cases." Shell's dispersion modeling included all relevant NO_X emission sources in accordance with the EPA's guidance.

11. **Comment:** Project 1-hour NO_2 impacts are underestimated by using low NO_2/NO_x in-stack ratios.

    In the 1-hour NO_2 modeling, the default NO_2/NO_x in-stack ratio of 0.50 recommended by US EPA has been used for most modeled sources, except the coal boilers at First Energy Bruce Mansfield and AES Beaver Valley. Boilers from these facilities used in-stack ratios that are much lower than the default value (0.05 for First Energy and 0.17 for AES). These ratios are not based on source-specific emission tests and, hence, are not to be used in the modeling according to the latest EPA modeling guidelines (US EPA, 2014). Thus, the 1-hour NO_2 modeling should be redone using the default NO_2/ NO_x ratio of 0.50 for all emission sources. (1-8)

    Response: Adequate justification for the NO_2/NO_X in-stack ratios used in Shell's dispersion modeling for emission sources at AES Beaver Valley and FirstEnergy Bruce Mansfield is provided in subsection 5.6 and Attachment A of Appendix C of Shell's Plan Approval Application. This states in relevant part, "The molar ratio of NO_2 to total NO_x in the stack was determined based upon information included in AP-42 Table 1.1-3 for coal-fired boilers. Footnote "c" which is located on the NO_x column header states the following:

    Expressed as NO_2. Generally, 95 volume % or more of NO_x present in combustion exhaust will be in the form of NO, the rest NO_2 (Reference 6). To express factors as NO, multiply factors by 0.66. All factors represent emissions at baseline operation (i. e., 60 to 110% load and no NO_x control measures)."

    This supports a NO_2/NO_x in-stack ratio of 0.05 for uncontrolled coal-fired boilers, and is the ratio applied to First Energy Bruce Mansfield. First Energy Bruce Mansfield is equipped with SCR controls but is not required to operate them and the "uncontrolled" NO_x emission limit was modeled. AES Beaver Valley is equipped with SNCR controls and the NO_x emission limits based on utilization of these controls was modeled. It is conservatively assumed that SNCR only controls NO (by up to 40%) thereby increasing the NO_2/NO_x ratio to ~0.08 which was then conservatively doubled to ~0.17.

    EPA has provided clarification[1] regarding the use of in-stack ratios for modeling NO_2 impacts as follows:

[1] U.S. EPA, Office of Air Quality Planning and Standards, Additional Clarification Regarding Application of Appendix W Modeling Guidance for the 1-hour *NO_2* ,National Ambient Air Quality Standard, Tyler Fox, March 1, 2011.

"(W)e recommend... General acceptance of 0.50 as a default in-stack ratio of NO_2/NO_X for input to the PVMRM and OLM options within AERMOD, in the absence of more appropriate source-specific information on in-stack ratios."

EPA has also noted on its NO_2/NO_x in-stack ratio (ISR) database website[2] that, "...the recommended default ISR may still be too conservative for many applications such that there remains a significant need for a widely available and well-documented database of ISRs, which is the impetus for the current data collection effort."

The Department has also found additional information supporting the in-stack ratios:

- A tested in-stack ratio for an uncontrolled coal-fired boiler at Healy Power Plant of 0.0054 in EPA's ISR database.
- A tested in-stack ratio for an uncontrolled coal-fired boiler at Healy Power Plant of 0.0153 in EPA's ISR database.
- A report submitted to the Alaska DEC titled *Evaluation of Bias in AERMOD-PVMRM* including a discussion of NO_2/NO_x in-stack ratios for power plant plumes which generally agrees with a 0.05 ratio[3].
- A reported submitted to EPA titled *Review of NOx Emission Factors for Stationary Combustion Sources and AP-42 Update* which appears to be the precursor to (or basis for) the Reference 6 in AP-42 1.1 used by EPA to support the 0.05 ratio for uncontrolled coal-fired boilers[4].

12. **Comment:** Project 1-hour NO_2 impacts are underestimated by using nitric oxide emissions in the modeling.

    Attachment A of the Shell Appendix C shows NO_2 and NO_x emissions for each modeled emission source, with NO_x representing nitric oxide NO. This is incorrect since NO_x is entirely NO_2 by convention. NO is 64% of NO_2 by weight. The AERMOD model requires NO_x as NO_2 emissions as inputs. Thus, using NO_x emissions as NO has underestimated the project 1-hour NO_2 impacts. (1-8)

    Response: This comment misinterprets the application. Attachment A of Appendix C in Shell's Plan Approval Application contains a table that lists Shell's modeled emissions and source parameters. The table contains two columns which list the modeled NO_X emissions for each source. The column labeled "NO_2" represents the short-term NO_X emission rates that were modeled to assess compliance with the 1-hr NO_2 NAAQS. The column labeled "NO_x" represents the long-term NO_X emission rates that were modeled to assess compliance with the annual NO_2 NAAQS and increment. Neither column represents NO emissions.

13. **Comment:** PSD Increment Consumption is underestimated.

    PM_{10} emissions from 2010-2013 of AES Beaver Valley and Bruce Mansfield #1 and #2 have been used in the PSD increment compliance modeling. These emissions are

[2] http://www.epa.gov/scram001/no2_isr_database.htm
[3] http://www.epa.gov/scram001/7thconf/aermod/pvmrm_bias_eval.pdf
[4] *Review of NOx Emission Factors For Stationary Combustion Sources and AP-42 Update*, R. J. Milligan, W. C. Sailor, J. Wasilewski, W. C. Kuby, Acurex Final Report 78-306, June 1979.

underestimated due to the effects of economic recession. Larger emissions occurring before the 2008 recession should be used in the analysis. (1-8)

Response: The Department disagrees that the emissions used in the PM-10 PSD increment analyses are underestimated. In Shell's PM-10 increment analysis, the PM-10 emission rates entered for AES Beaver Valley and FirstEnergy Bruce Mansfield Units 1 and 2 represent changes in actual PM-10 emissions since the minor source baseline date (August 1992). The change in actual PM-10 emissions at AES Beaver Valley was calculated as the maximum reported PM-10 emissions in either 2011 or 2012 (2013 emissions did not appear representative of normal operation) minus the minimum reported PM-10 emissions in either 1990 or 1991. The change in actual PM-10 emissions at FirstEnergy Bruce Mansfield was calculated as the maximum reported PM-10 emissions in either 2012 or 2013 minus the minimum reported PM-10 emissions in either 1990 or 1991. The past ten years of reported PM-10 emissions in the DEP's Air Information Management System (AIMS) for AES Beaver Valley and FirstEnergy Bruce Mansfield are listed in the table below. AES Beaver Valley reported its highest PM-10 emissions in 2012 and there does not appear to be a downward trend in the FirstEnergy Bruce Mansfield PM-10 emissions since 2008 that would suggest this facility was operating less than normal due to "the effects of economic recession."

Year	AIMS Reported PM-10 Emissions (in tons per year)	
	AES Beaver Valley	FirstEnergy Bruce Mansfield
2004	315.2	776.7
2005	306.4	760.0
2006	310.6	794.0
2007	307.5	746.7
2008	276.1	761.2
2009	266.8	736.3
2010	269.6	831.9
2011	261.9	787.9
2012	405.1	751.9
2013	29.8	691.2

14. **Comment:** Use of the AERMOD model for PSD Class I modeling is incorrect.

The PSD Permit Application has shown an incorrect modeling analysis of PSD Class I impacts using receptors located within 50 km of project sources. There are PSD Class I areas located within 300 km of the proposed Shell project. The closest Class I area, Otter Creek, is about 200 km from the proposed project. These receptor areas are well beyond the applicability of the AERMOD model since it is only applicable to predicting pollutant concentrations within 50 km of the project emission sources. For an accurate assessment of impacts at PSD Class I areas that are located beyond 50 km, the long-range transport model CALPUFF should be used as recommended by the US EPA Modeling Guidelines (US EPA, 2005). (1-8)

Response: The Department agrees that AERMOD is not the EPA's preferred model for determining source impacts at distances beyond 50 kilometers. AERMOD is likely to conservatively overestimate impacts at such distances since its steady-state, Gaussian dispersion assumptions are no longer appropriate. However, Shell's analysis utilized AERMOD within its acceptable range of 50 kilometers to conservatively estimate the

impact of Shell's proposed NO_X and PM-10 emissions on nearby Class I areas which are much farther away. This was accomplished in AERMOD with an arc of receptors placed in the direction of the nearby Class I areas at a distance of 50 kilometers from the proposed location of Shell's facility. With this conservative approach, Shell has demonstrated that the impact of the plant's proposed emissions would be less than the EPA's proposed annual NO_2, 24-hour PM-10, and annual PM-10 Class I SILs, published in the July 23, 1996, *Federal Register* (61 FR 38249). Therefore, Shell's air quality analysis demonstrates that the plant's proposed emissions would not cause or contribute to air pollution in violation of the annual NO_2, 24-hour PM-10, or annual PM-10 PSD Class I increments.

15. **Comment:** Project secondary ozone impacts have not been addressed.

The proposed project will emit NO_x (348 tpy) and VOC (522 tpy). These emissions will exceed the PSD significant emission rates (SER). Known as ozone precursors, these pollutants will react under sunlight to form ozone. The Shell Appendix C has not addressed the project ozone impacts. Located in a non-attainment area, the project will add to ozone levels in the region and interfere with the attainment or maintenance of ozone standard. US EPA may soon lower the current 8-hour average ozone standard of 0.075 part per million (ppm) to 0.06 ppm. Thus, the lower ozone standard will cause many new areas to be designated as non-attainment, and existing non-attainment areas unable to meet it. It will also emphasize the important contributions of projects with emissions exceeding the PSD SER such as the proposed Shell project. Thus, it is important that the Application present a quantitative analysis of project impacts on ozone air quality. This quantitative analysis can be carried out by photochemical modeling that utilizes the modeling databases of recent ozone modeling for the Pittsburgh area as part of the State Implementation Plan (SIP). Using existing SIP modeling databases will allow the modeling of ozone impacts of the proposed Shell project to be performed quickly and inexpensively. Photochemical modeling can also be used to assess the effectiveness of emission offsets proposed for the Shell project. (1-8)

Response: Per 40 CFR §81.339, Potter and Center Townships, Beaver County are currently designated as areas of nonattainment for annual (1997) and 24-hour (2006) particulate matter less than 2.5 microns in diameter ($PM_{2.5}$), 8-hour ozone (1997 and 2008), and lead (Pb) (2008) NAAQS. NNSR requirements apply to this project which include obtaining emissions offsets to reduce overall emissions in or affecting the nonattainment area and meeting the Lowest Achievable Emission Rate (LAER) for each nonattainment pollutant. Modeling is not required under nonattainment provisions.

16. **Comment:** Project secondary PM impacts have not been addressed.

In addition to two ozone precursors, NO_x (348 tpy) and VOC (522 tpy), the proposed project will emit PM_{10} (164 tpy) and $PM_{2.5}$ (159 tpy). These emissions will exceed the PSD significant emission rates (SER). The Shell Appendix C has presented an AERMOD modeling analysis of primary PM_{10} impacts. However, it has not addressed the project secondary impacts of $PM_{2.5}$. Fine particulates $PM_{2.5}$ are included as part of PM_{10} and secondary $PM_{2.5}$ are considered also PM_{10}. Thus, it is important that the Application present a quantitative analysis of project impacts on secondary PM impacts. This quantitative analysis can be carried out by photochemical modeling that utilizes the modeling databases of recent ozone modeling for the Pittsburgh area as part of the State

Implementation Plan (SIP). Using existing SIP modeling databases will allow the modeling of ozone/ $PM_{2.5}$ impacts of the proposed Shell project to be performed quickly and inexpensively. Photochemical modeling can also be used to determine the effectiveness of emission offsets that are required for the project. (1-8)

Response: Per 40 CFR §81.339, Potter and Center Townships, Beaver County are currently designated as areas of nonattainment for annual (1997) and 24-hour (2006) particulate matter less than 2.5 microns in diameter ($PM_{2.5}$), 8-hour ozone (1997 and 2008), and lead (Pb) (2008) NAAQS. NNSR requirements apply to this project which include obtaining emissions offsets to reduce overall emissions in or affecting the nonattainment area and meeting the Lowest Achievable Emission Rate (LAER) for each nonattainment pollutant. Modeling is not required under nonattainment provisions.

17. **Comment:** Plume visibility impact analysis of project emissions has used inappropriate meteorological data.

Project sources will emit NO_x (348 tpy), $PM_{2.5}$ (159 tpy) and SO_2 (21 tpy) that are known to reduce visibility. The VISCREEN model developed by the EPA should be used to analyze local visibility effects of project sources (US EPA, 2005). The Shell Appendix C has presented a Level 2 visibility screening analysis at the Raccoon Creek State Park. This modeling analysis has used the 1987-1991 meteorological data from Pittsburgh which is located about 40 km away from the Shell project. The same 2006-2010 meteorological data from Beaver Valley NGS used in the AERMOD modeling should also be used in the Level 2 screening analysis. (1-8)

Response: There are significant data formatting and processing hurdles in preparing the meteorological data from FirstEnergy's Beaver Valley Nuclear Power Station for use with a much older model like VISCREEN. A 5-year meteorological dataset from the Pittsburgh International Airport (KPIT) was adequate for the purpose of conducting a Level-2 screening analysis for visibility impairment because it represents atmospheric conditions on a greater regional scale, including conditions at Raccoon Creek State Park. The 1987 – 1991 meteorological dataset from KPIT is the most recent, readily available 5-year dataset for use with the VISCREEN model to conduct a Level-2 screening analysis for assessing visibility impairment. The KPIT surface data and mixing height data to develop this dataset are currently available from the EPA's Support Center for Regulatory Atmospheric Modeling (SCRAM) website. In accordance with the EPA's guidance for a Level-2 screening analysis for visibility impairment, Shell developed a table from the KPIT dataset that shows the frequency of worst-case meteorological conditions based on Pasquill-Gifford (PG) stability categories and wind speed for use with VISCREEN.

18. **Comment:** Plume blight from project sources has not been modeled for nearby sensitive receptors.

The Shell Appendix C has presented a visibility screening analysis at the Raccoon Creek State Park. However, such modeling analysis has not been performed at sensitive receptors that are located close to the Shell project, such as schools, residences and senior centers. (1-8)

Response: Shell conducted the visibility impairment analysis for Raccoon Creek State Park because it was identified as the nearest area to the location of Shell's proposed facility where potential impairment to visibility may be of interest. Also, the secondary NAAQS for NO_2 and particulate matter are established by the EPA to provide public welfare protection, including protection against decreased visibility. Shell's air quality analysis demonstrates that the plant's proposed emissions would not cause or contribute to air pollution in violation of the secondary NO_2 and PM-10 NAAQS.

Natural gas or recovered hydrogen-based tail gas will be the primary fuel combusted by the turbines and furnaces at this facility. Minimal to no visible emissions are expected due to combustion of natural gas and none are expected due to combustion of hydrogen. The plan approval includes visible emission limitations for relevant air contamination sources including flares which are required to be smokeless.

19. **Comment:** The Pittsburgh area is in a river valley—there would be air inversions causing the pollution to be trapped within the valley, which compounds the pollution in the area. (11-13)

Response: Shell's dispersion modeling adequately accounts for local terrain and local atmospheric conditions, including conditions associated with temperature inversions, by utilizing local terrain data from the U.S. Geological Survey and local meteorological data from the nearby FirstEnergy Beaver Valley Nuclear Power Station.

20. **Comment:** We note that back ground levels used in the permit request are from Beaver/Beaver Falls, Pa. It would be in "Shells" best interest for future discussions to have background data from Monaca, Pa and recommend that Shell develop back-ground data for Monaca. (11-13)

Response: The Department received Shell's Plan Approval Application on May 1, 2014. Prior to this date, the most recent three year period of certified monitored data was 2010-2012. The monitored portion of the background in Shell's air quality analysis should represent unidentified sources such as natural sources, minor sources, and distant major sources because the modeled portion of the background included all relevant nearby sources with emissions of CO, NO_X, and PM-10 based on their maximum allowable emission limit or federally enforceable permit limit.

Shell's air quality analysis used existing CO and PM-10 data measured at the DEP's New Castle monitors for 2010-2012. The two largest emissions sources (Ellwood Quality Steels and NRG Power Midwest) that are likely affecting the Department's New Castle CO and PM-10 monitors are also expressly included in Shell's dispersion modeling. Shell conservatively assumed the continuous occurrence of the highest 1-hour and 8-hour CO concentrations measured at the New Castle monitor for 2010-2012 for the monitored portion of the CO background concentration. Shell conservatively assumed the continuous occurrence of the highest 24-hour PM-10 concentration measured at the New Castle monitor for 2010-2012 for the monitored portion of the PM-10 background concentration. Thus, Shell's air quality analysis conservatively accounts for background concentrations of CO and PM-10.

Shell's dispersion modeling used existing NO_2 data measured at the Department's Beaver Falls monitor for 2010-2012. Two emissions sources (Eaton and Anchor Hocking) that

are likely affecting the Department's Beaver Falls NO_2 monitor are also expressly included in Shell's dispersion modeling. In accordance with the EPA's March 1, 2011, memorandum, "Additional Clarification Regarding Application of Appendix W Modeling Guidance for the 1-hour NO_2 National Ambient Air Quality Standard," Shell dispersion modeling conservatively used 1-hour NO_2 concentrations, which vary temporally by season and hour-of-day, based on measured data at the Beaver Falls monitor for 2010-2012 for the monitored portion of the NO_2 background concentration. Thus, Shell's air quality analysis conservatively accounts for background concentrations of NO_2.

Future modeling efforts will be required to follow Pennsylvania's federally-approved SIP program requirements.

21. **Comment:** I spoke with Shell engineers about the terrain where the plant is to be built. The plants, that they are to copy is on flat land. There is constant wind. I spoke of the Ohio River Valley and the Air Inversions that occur. (37)

Response: Shell's dispersion modeling adequately accounts for local terrain and local atmospheric conditions, including conditions associated with temperature inversions, by utilizing local terrain data from the U.S. Geological Survey and local meteorological data from the nearby FirstEnergy Beaver Valley Nuclear Power Station.

22. **Comment:** Higher Quality Data

Shell should gather more extensive background data for the ambient pollutant concentrations near the proposed site. Some data for Shell's air modeling was obtained from air monitors as far as 30 miles away from the proposed site. PaDEP should not approve Shell's permit until complete data from the closer monitor for PM_{10} located at Beaver Falls, are available.

My input on Higher Quality Data:

I urge the PA DEP to put the monitor at the Beaver Valley back in use as it is quite close to the proposed Cracker facility right along the direction of prevailing winds. See above under Public Data and Transparency also. Make the detectors close. Let them be placed along the prevailing winds and let them broadcast their data in a timely fashion. It would also be useful to place detectors along heavily traveled routes such as the nearby route 376 which runs just a few hundred yards of the proposed facility site. According to the modeling sections of the permit Application these do not now exist at least as is necessary and useful to focus on the three pollutants which are being considered. (33)

Response: The Department received Shell's Plan Approval Application on May 1, 2014. Prior to this date, the most recent three year period of certified monitored data was 2010-2012. The monitored portion of the background in Shell's air quality analysis should represent unidentified sources such as natural sources, minor sources, and distant major sources because the modeled portion of the background included all relevant nearby sources with emissions of CO, NO_X, and PM-10 based on their maximum allowable emission limit or federally enforceable permit limit.

Shell's air quality analysis used existing CO and PM-10 data measured at the Department's New Castle monitors for 2010-2012. The two largest emissions sources (Ellwood Quality Steels and NRG Power Midwest) that are likely affecting the Department's New Castle CO and PM-10 monitors are also expressly included in Shell's dispersion modeling. Shell conservatively assumed the continuous occurrence of the highest 1-hour and 8-hour CO concentrations measured at the New Castle monitor for 2010-2012 for the monitored portion of the CO background concentration. Shell conservatively assumed the continuous occurrence of the highest 24-hour PM-10 concentration measured at the New Castle monitor for 2010-2012 for the monitored portion of the PM-10 background concentration. Thus, Shell's air quality analysis conservatively accounts for background concentrations of CO and PM-10.

Shell's dispersion modeling used existing NO_2 data measured at the Department's Beaver Falls monitor for 2010-2012. Two emissions sources (Eaton and Anchor Hocking) that are likely affecting the Department's Beaver Falls NO_2 monitor are also expressly included in Shell's dispersion modeling. In accordance with the EPA's March 1, 2011, memorandum, "Additional Clarification Regarding Application of Appendix W Modeling Guidance for the 1-hour NO_2 National Ambient Air Quality Standard," Shell dispersion modeling conservatively used 1-hour NO_2 concentrations, which vary temporally by season and hour-of-day, based on measured data at the Beaver Falls monitor for 2010-2012 for the monitored portion of the NO_2 background concentration. Thus, Shell's air quality analysis conservatively accounts for background concentrations of NO_2.

Following EPA approvals, the Department moved two site locations in 2014 – Beaver Valley (Beaver County) and Scranton (Lackawanna County), due to changes in property lease holders and/or lease agreements. In October, the Beaver Valley monitoring station was relocated to property owned by the Center Township Water Authority, approximately 1/4 mile southeast of its original location at the Beaver Valley Mall.[5] Parameters remain unchanged and this location continues to monitor for lead and total suspended particulate and metals (TSP/metals).

23. **Comment:** I would like to add one more thing. The air flow in the Beaver Valley is modified by the fact that it includes a river and a valley which both channel the air flow and cause much clouding and precipitation. If these aspects are left out that could have consequences for air modeling input. (33)

    Response: Shell's dispersion modeling adequately accounts for local terrain and local atmospheric conditions, including conditions associated with temperature inversions, by utilizing local terrain data from the U.S. Geological Survey and local meteorological data from the nearby FirstEnergy Beaver Valley Nuclear Power Station.

24. **Comment:** I looked at Appendix C of the Permit Application and it did have much detail including maps of the region and attention to heights of hills and stacks. It also looked at highways such as Route 376 in some detail. I am concerned that the analysis focused mainly on the 1-hour NO_2 standard although it did claim to follow a variety of agency guidelines. (See page 1-2 of the Introduction and Summary of Results.) It also looked in some manner at the Pittsburgh International Airport region. I hope that the rough model

[5] *Commonwealth of Pennsylvania Department of Environmental Protection 2015 Annual Ambient Air Monitoring Network Plan*, Proposed, May 2015, p. 14.

used to select candidate pollutants and scenarios for further screening did not leave out important details about our geography.

Could that have altered significantly the preliminary results used for selection of materials and scenarios for the refined calculations and the final considerations? Again our geography is quite different from Texas oil country near Houston and Louisiana. There Spindletop of Gulf Oil and Texaco fame is considered a major hill. http://en.wikipedia.org/wiki/Spindletop yet by our standards it is barely a rise away from which rainstorm water flows. (33)

Response: Shell's proposed project is subject to the Prevention of Significant Deterioration (PSD) rules which require an air quality analysis for emissions of CO, NO_X, and PM-10 because, according to Shell's Plan Approval Application, these pollutants would be emitted from Shell's proposed facility in significant amounts. Shell's dispersion modeling adequately accounts for local terrain by utilizing local terrain data from the U.S. Geological Survey. Shell's air quality analysis follows applicable EPA dispersion modeling guidance and demonstrates that the plant's proposed emissions would not cause or contribute to air pollution in violation of any NAAQS or PSD increments.

25. **Comment:** I've had people who have had --- every time we get an inversion. And we get a lot of inversion. This week we got a lot of heat here in Beaver County. And there's going to be more. And every time there's an inversion, people that are elderly will have to put an oxygen mask and shut the windows and turn on the air. (35)

    Response: Shell's dispersion modeling adequately accounts for local atmospheric conditions, including conditions associated with temperature inversions, by utilizing local meteorological data from the nearby FirstEnergy Beaver Valley Nuclear Power Station.

26. **Comment:** More scrutiny also needs to be given to Shell's air quality data analysis. Shell should gather more extensive background data for pollutant concentrations near the proposed site. Surface wind data used in Shell's AERMOD modeling was gathered from 2006 to 2010 from Beaver Valley Nuclear Generating Station. This data is being gathered continuously and more recent data, such as data from 2010 to 2014 should be available. EPA modeling guidelines state that data from, quote, the most recent readily available five year period are preferred. End quote. The Council recommends Shell use the most recent surface data in their modeling, rather than data from nine years ago. Some data that Shell's used for its modeling analysis was compiled from monitors as far as 30 miles away. Shell acknowledges there are no carbon monoxide monitors in Beaver County and that data from the closest PM_{10} monitor, located in Beaver Falls is incomplete. Establishing accurate background concentrations is important when assessing the air quality in the area and the impact that a proposed facility will have on that area. The Department should require complete data for PM_{10} from Beaver Falls monitor or from onsite monitoring and should consider delaying its approval until these data are available. (36)

    Response: Regarding the use of more recent meteorological data, see the Department's Response to Comment #7. Regarding the monitors used to established background concentrations, see the Department's Response to Comment #8.

27. **Comment:** Could venting or plumes be affected by the highway? (37)

Response: Shell's dispersion modeling adequately accounts for local terrain and local atmospheric conditions by utilizing local terrain data from the U.S. Geological Survey and local meteorological data from the nearby FirstEnergy Beaver Valley Nuclear Power Station.

Air Toxics and Risk Assessment

28. **Comment:** It was alarming to note that the current EPA target cancer risk increase, is one in one million resulting from air pollutants. And yet statistics show that, as of 2005, the total lifetime cancer risk for Monaca was between 79-98 people in one million. Consider that right now both Beaver County and PA state averages exceed the national average of 50.5 per 100,000 deaths caused by lung cancer. Wonder what it will be once a cracker plant is operational. And consider that health risks include not only increased cancer, but increases in cardiovascular and lung disease as well. (24)

Response: The commenter is mistaken about EPA's cancer risk threshold. EPA's target cancer risk increase is **not** one in one million as stated in the comment, rather EPA employs a range of "one in one million" to "one in ten thousand." *See* EPA Region 6 Risk Management Addendum - *Draft Human Health Risk Assessment Protocol for Hazardous Waste Combustion Facilities*, which can be found at: http://www.epa.gov/earth1r6/6pd/rcra_c/protocol/r6add.pdf

The Risk Management Addendum, which is the de-facto EPA guidance on these issues, states, in relevant part:

"In order to evaluate potential health risks, U.S. EPA has established targets within which the Agency strives to manage risks. To evaluate potential carcinogenic risks, the Agency generally uses a risk range of 10^{-4} to 10^{-6}, and to evaluate the potential for non-cancer health effects, the Agency generally uses a hazard index/quotient of 1.0..."

"...U.S. EPA Region 6 recommends, consistent with U.S. EPA (1994c), the narrowing of the acceptable risk range to 10^{-5} to 10^{-6}; primarily to account for exposure to background levels of contamination. As a result, the total individual risk associated with exposures to potential carcinogens released from a **single facility** should not exceed 1.0×10^{-5}". (Emphasis added)

"As described above for risks,... U.S. EPA Region 6 recommends a modified target hazard level, to account for background contributions, from an *HQ* or *HI* target value of 1.0 to a target value of 0.25..."

The methodologies to assess cancer risk and non-cancer risk employed by the Department and Shell are consistent with EPA's protocol. In this way, the Department's permitting program manages risk to human health prospectively through the review of new facilities.

The estimated total excess lifetime cancer risk (ELCR) for the maximum exposed individual (MEI) for the proposed Shell cracker facility is 0.786×10^{-5}, which is below

the EPA target level of 1.0×10^{-5}. The total hazard index for the proposed Shell petrochemicals complex is 0.0754, which is below the EPA target level of 0.25. As a result, the health risks associated with the proposed Shell Facility are below EPA's recommended target levels.

29. **Comment:** On health impacts, I wish to refer to a finding reported in a study by Dr. James Argo who looked closely at what happens to young girls within 20 miles of a plant like this one what they are exposed to its emissions while their young bodies are developing. His finding: Once they put up a petrochemical plant, any female child under the age of puberty living within 18 miles of the plant has an elevated risk of breast cancer. The younger the exposure, the greater the risk. So for people planning to raise their girl children in Monaca, Freedom, Baden, Ambridge, Leetsdale, Edgeworth and Sewickley downwind of this plant, they should be very concerned that this plant could affect their girls in this way. (28)

    Response: In the report titled *Chronic diseases and early exposure to airborne mixtures: Part III. Potential origin of pre-menopausal breast cancers*[6], by James Argo, there are seven source categories identified as having a causal relationship to breast cancer, none of these categories include ethane crackers like the proposed Shell ethane cracker. The fuels of concern in the Argo report are coal, wood, wood/bark, and heavy oil, which are high sulfur fuels. The proposed Shell Facility will be primarily burning natural gas and hydrogen in the process and ultra low sulfur diesel in emergency generators, and will use ethane, a component of natural gas, as a feedstock. Natural gas contains very low levels of sulfur, and hydrogen contains none. Therefore, the Argo report is not appropriate to evaluate potential health risk from the proposed Shell Facility.

    As previously discussed, the methodologies to assess cancer risk employed by the Department and Shell are consistent with EPA's protocol. In this way, the Department's permitting program manages risk to human health prospectively through the review of new facilities.

    The estimated total ELCR for the MEI for the proposed Shell cracker facility is 0.786×10^{-5}, which is below the EPA target level of 1.0×10^{-5}.

30. **Comment:** This Cracker plant is going to introduce what hasn't been there before. And your fact sheet says it will not contribute to violations of the national air quality standards. Fine. Independent risk assessment from no unacceptable union health risks from the proposed operation. I'd like to know what acceptable risk is for children. What is acceptable? (40)

    Response: EPA defines a reference concentration as "An estimate (with uncertainty spanning perhaps an order of magnitude) of a continuous inhalation exposure to the human population (including sensitive subgroups) that is likely to be without an appreciable risk of deleterious effects during a lifetime. ...[7]"

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[6] *Chronic diseases and early exposure to airborne mixtures: Part III. Potential origin of pre-menopausal breast cancers*, Journal of Exposure Science and Environmental Epidemiology (2010), Dr. James Argo, pp. 147-159.

[7] http://ofmpub.epa.gov/sor_internet/registry/termreg/searchandretrieve/glossariesandkeywordlists/search.do?details=&glossaryName=IRIS%20Glossary#formTop

The reference concentrations and unit risk factors established by EPA and other entities take into account susceptible subgroups such as children and the elderly. Therefore, the risk assessment is protective of children since they're included in the development of the risk factors.

The estimated total ELCR for the MEI for the proposed Shell cracker facility is 0.786×10^{-5}, which is below the EPA target level of 1.0×10^{-5}. The total hazard index for the proposed Shell cracker facility is 0.0754 which is below the EPA target level of 0.25.

LAER VOC

31. **Comment:** Shell conducted its LAER analysis for equipment leaks improperly. Specifically that the analysis was conducted out of order with the controls being proposed first with comparisons following. (1-8)

Response: The LAER analysis for equipment leaks was conducted properly. Because imposing a numerical emission limit or an emission rate is technically infeasible, the approach and process used is appropriate and follows well established EPA guidance.

EPA's New Source Review Workshop Manual (NSRWM) provides guidance on determining LAER. It states, "Several technological considerations are involved in selecting LAER. The LAER is an emissions rate specific to each emissions unit including fugitive emission sources. The emissions rate may result from a combination of emissions-limiting measures such as (1) a change in the raw material processed, (2) a process modification, and (3) add-on controls. The reviewing agency determines for each new source whether a single control measure is appropriate for LAER or whether a combination of emissions-limiting techniques should be considered."

The NSRWM further explains, "The reviewing agency also can require consideration of technology transfer [when setting LAER]. The two types of potentially transferable control technologies: (1) gas stream controls, and (2) process controls and modifications. For the first type of transfer, classes or categories of sources to consider are those producing similar gas streams that could be controlled by the same or similar technology. For the second type of transfer, process similarity governs the decision."

Finally, the NSRWM states; "Where *technically feasible*, LAER is specified as both a numerical emissions limit (e.g., lb/MMBtu) and an emissions rate (e.g., lb/hr). Where numerical levels reflect assumptions about the performance of a control technology, the permit should specify both the numerical emissions rate and limitations and the control technology. *In some cases where enforcement of a numerical limitation is judged to be technically infeasible, the permit may specify a design, operational, or equipment standard*; however, such standards must be clearly enforceable, and the reviewing agency must still make an estimate of the resulting emissions for offset purposes."

Establishing a numeric limit for fugitive emissions from equipment leaks was not technically feasible, neither an emission rate nor an emission limit can be determined and enforced. Therefore, the Department employed technology transfer to establish LAER as an operational standard. The fugitive emissions from component leaks from this source category were considered against the broad base of fugitive emissions from other component equipment leaks. This evaluation satisfies the requirement to evaluate the

technology transfer based on process similarity. After evaluating applicable emissions-limiting techniques and operational standards the Department determined that "The resultant LDAR program will be more stringent than that which is found in any NSPS or NESHAP (applicable or not) EPA's RBLC database for other sources, and SIP programs such as TCEQ's 28LAER LDAR program [8]."

The Department acknowledges that LAER for fugitive emissions from component equipment leaks is not a numerical emission limit or emissions rate because those limitations are technically infeasible. Measures such as add-on controls are also technically infeasible. Thus, the "top down" LAER analysis typically employed to set numeric LAER is not applicable to setting LAER for equipment leaks.

The conditions and nature of equipment leaks necessitates establishing LAER by a "combination of emissions-limiting techniques" and clearly enforceable "operational standards," which are included as plan approval conditions. These techniques and standards can be found under Section D Source ID 501 Conditions #005 - #008 on pages 70 - 71 of the proposed plan approval. Additionally, an estimate of the resulting emissions for offset purposes has been included in Table 3 on page 23 of the Department's April 1, 2015, memorandum, and Section C Condition #005 on page 15 of the proposed plan approval.

See also Response to Comment #32.

32. **Comment:** Multiple comments received request that Shell implement fenceline monitoring for VOC and/or HAP. Specifically, Shell must evaluate fenceline monitoring as a LAER technology for controlling equipment leaks and other fugitive emissions. (1-8, 33, 34, 36, 44)

Response: Fenceline monitoring is included in U.S. EPA's Proposed Petroleum Refinery Sector Risk and Technology Review and New Source Performance Standards. This proposed rule targets the reduction of hazardous air pollutants from petroleum refineries to reduce cancer risk and chronic health effects. Monitoring is proposed under the rule for concentrations of benzene with action levels complied with on a 2-week rolling annual average. The referenced citation of this proposed rule related to fenceline monitoring states that, "Fenceline monitoring will identify a significant increase in emissions in a timely manner (*e.g.*, a large equipment leak or a significant tear in a storage vessel seal), which would allow corrective action measures to occur more rapidly than it would if a source relied solely on the traditional infrequent monitoring and inspection methods.[9]" Shell's LDAR program goes beyond "traditional infrequent monitoring and inspection methods" by requiring more frequent inspection of non-bellows seal valves and eliminating skip periods. These frequency-related improvements are in addition to others which include expansion of service type to include all organic compounds, reducing the organic compound percentage monitoring exemption threshold, inclusion of additional component types, and lower leak definition thresholds. Beyond the LDAR program, employees will be required to conduct observations of all air contamination sources, air cleaning devices, stacks, fugitive emission areas, and process

[8] See Department of Environmental Protection Southwest Regional Office, Plan Approval Application Memorandum, PA-04-00740A, April 1, 2015, p. 41.
[9] Petroleum Refinery Sector Risk and Technology Review and New Source Performance Standards, *Federal Register*, Vol. 79, No. 125 Monday, June 30, 2014, Proposed Rules, p. 36920.

equipment at a minimum of once per shift while the Facility is in operation for the presence of visible stack emissions, fugitive emissions, and potentially objectionable odors. Employees will be required to undergo a training program to make these observations.

Fenceline monitoring is actively performed at other existing petrochemical plants. Two such referenced facilities include Flint Hills Resources' Port Arthur chemical plant (Port Arthur), and Shell Chemical LP's Deer Park chemical plant (Deer Park).

Port Arthur implements fenceline monitoring for 1, 3-butadiene and benzene with action thresholds as part of a settlement with U.S. EPA for alleged violations of Clean Air Act requirements for three steam-assisted flares at that facility. U.S. EPA has published a summary of this settlement on its website[10]. This summary states in part that "benzene is used as a feedstock in the production of cyclohexane on-site and 1,3-butadiene is sold as a component in a mixed hydrocarbon stream." Shell's proposed facility will have neither of those components. The summary continues in part stating that the Consent Decree is estimated to reduce "Hazardous Air Pollutants by approximately 255 tpy". Shell's potential to emit for its proposed facility includes 30.5 tpy of HAP, 0.99 tpy of benzene, and approximately 0.3 tpy of 1, 3-butadiene. Greater than two thirds of the HAP PTE is calculated from stack sources which would be minimally picked up by fenceline monitoring.

Deer Park implements fenceline monitoring for benzene as a supplemental environmental project as part of a settlement with U.S. EPA for alleged violations of Clean Air Act requirements for twelve steam assisted flares at that facility. U.S. EPA has published a summary of this settlement on its website[11]. This summary states in part that "...the chemical plant produces approximately 8000 tons per day of petrochemical and chemical products, such as ethylene, propylene, butylene, isoprene, butadiene, benzene, toluene, xylene, phenol, acetone and cumene". Deer Park is also co-located with a refinery. Shell's proposed facility will not produce benzene as a chemical product and is not co-located with a refinery. The summary continues in part stating that the Consent Decree is estimated to reduce "Hazardous Air Pollutants by approximately 264 tpy". Shell's potential to emit for its proposed facility includes 30.5 tpy of HAP and 0.99 tpy of benzene.

Shell submitted an inhalation risk assessment considering approximately 53 compounds of potential concern (COPC). These COPC primarily include organic HAPs such as 1, 3-butadiene; benzene; hexane; and naphthalene; as well as metallic HAPs such as chromium and lead. According to Shell's inhalation risk assessment, benzene is the primary driver for acute non-cancer risk with a hazard quotient of 0.21 compared to the Department's benchmark of 1. Additionally, the Department's independent inhalation risk assessment found a benzene acute non-cancer risk hazard quotient of 0.08 using a different reference concentration that has a higher priority on the Department's internal hierarchy. A follow-up inhalation risk assessment is also required based upon the final as-built design parameters of the air contamination sources prior to startup of the facility.

In consideration of the above information, the Department does not consider fenceline monitoring for VOC or HAP to be necessary at this time.

[10] http://www2.epa.gov/enforcement/flint-hills-resources-port-arthur-clean-air-act-settlement
[11] http://www2.epa.gov/enforcement/shell-deer-park-settlement

See also Response to Comment #31.

Flare VOC

33. **Comment:** The Department must amend Shell's permit to include federally and practically enforceable limits on emissions from Shell's flares that are based on Shell's plan approval application representations. Specifically that annual emission rates calculated in the application for the LP and HP Systems are much lower than the physical or operational design capacity of each system. (1-8)

34. **Response:** The Department finds that throughput limits on VOC input to the LP and/or HP Systems is unnecessary with the inclusion of a facility-wide VOC (and VOC ERC) limit. Nonattainment New Source Review (NNSR) requirements for VOC including LAER and offsets (ERCs) may be satisfied without specific throughput limitations in this case. LAER is satisfied for the LP incinerator with a 99.9% VOC destruction efficiency requirement; and for the multipoint ground flare (MPGF), HP ground flares, and emergency elevated flare with a flare minimization plan and work practice requirements to ensure a minimum 98% VOC destruction efficiency. Offsets (ERCs) are satisfied with a facility-wide VOC (ERC) limit and the requirement to secure sufficient ERCs prior to commencement of operation. Compliance with the facility-wide VOC (and VOC ERC) limit will be demonstrated through measurements of VOC input to the LP and HP Systems; tested VOC destruction efficiency (for the LP incinerator); and 98% destruction efficiency for the MPGF, HP ground flares, and emergency elevated flare (and complying with minimum net heating value and maximum exit velocity requirements).

An additional requirement to maintain records of monthly 12-month rolling totals of actual VOC emissions will be added to the final plan approval in order to evaluate compliance with the facility-wide VOC limit in this case. The availability of these records was already necessary in order to maintain records of VOC (ERC) emissions but will now be explicitly stated. Section C Condition #014 shall be changed as follows:

"The Owner/Operator shall maintain the following comprehensive and accurate records…

g. **Monthly** rolling 12-month totals of calculated **actual VOC and** VOC (ERC) emissions in accordance with Equation 1 specified in this Plan Approval…"

35. **Comment:** The Department must require Shell to verify the destruction efficiency it assumes for the LP incinerator. (1-8)

Response: The Department agrees that Shell must verify the required VOC destruction efficiency of 99.9% for the LP incinerator (and 99% for the Spent Caustic Vent incinerator). Section D Source ID: 204 Condition #006 on page 47 of the proposed plan approval requires monitoring for compliance with the 99.9% destruction efficiency to be performed in accordance with 40 CFR §63.985(c). (A similar condition is proposed for the Spent Caustic Vent incinerator.) This was intended to encompass the performance test requirement for nonflare control devices under 40 CFR §63.985. However; it is clear that the included citation is too limited in scope and a separate condition to demonstrate

the destruction efficiency is appropriate. The following special conditions shall be added to the final plan approval:

Section D Source ID: 204 Low Pressure (LP) Header System:

The Owner/Operator shall perform VOC destruction efficiency testing upon the LP incinerator in accordance with 40 CFR §63.985(b)(1)(ii). Initial performance testing is required within 180 days of startup of the LP incinerator or on an alternative schedule as approved by the Department. Subsequent performance testing is required at a minimum of once every 5 years thereafter. Extension of the initial and subsequent performance testing deadlines may be granted by the Department in writing in response to a written request from the Owner/Operator and upon a satisfactory showing that an extension is justified [25 Pa. Code §127.12b].

Section D. Source ID: 206 Spent Caustic Vent Header System:

The Owner/Operator shall perform VOC destruction efficiency testing upon the Spent Caustic Vent incinerator in accordance with 40 CFR §63.985(b)(1)(ii). Initial performance testing is required within 180 days of startup of the Spent Caustic Vent incinerator or on an alternative schedule as approved by the Department. Subsequent performance testing is required at a minimum of once every 5 years thereafter. Extension of the initial and subsequent performance testing deadlines may be granted by the Department in writing in response to a written request from the Owner/Operator and upon a satisfactory showing that an extension is justified [25 Pa. Code §127.12b].

36. **Comment:** Why do EPAs new flaring numbers not apply to Shell? (34)

Response: Shell has used flaring emission factors and rates which the Department considers to be more conservative and more accurate than the updated industrial flare emission factors published by U.S. EPA. U.S. EPA published new and updated industrial flare emission factors for CO and VOC in AP-42 Chapter 13.5 – Industrial Flares.[12] These new and updated emission factors were developed using a collection of test data from flares almost exclusively located at petroleum refineries and chemical plants.

Collected test data resulted in an updated CO emission factor of 0.31 lb/MMBtu compared to the more conservative factor of 0.37 lb/MMBtu used by Shell in the application materials. U.S. EPA classifies the updated CO emission factor as "Poorly" representative.

Collected test data resulted in a new VOC emission factor of 0.57 lb/MMBtu and is considered less accurate than using site-specific VOC input rates and the minimum required control efficiency of 98%. U.S. EPA still maintains that a properly operated flare achieves at last 98% destruction efficiency in the flare plume, and Shell's plan approval will require more stringent operating practices than are necessary to achieve this 98% destruction efficiency. U.S. EPA classifies the new VOC emission factor as "Poorly" representative.

[12] AP-42, Fifth Edition, Volume I, Chapter 13: Miscellaneous Sources, Section 13.5 Industrial Flares, Table 13.5-2.

Emission Reduction Credits (ERCs)

37. **Comment:** The requirements of 25 Pa. Code §127.206(d) related to ERCs must be fulfilled before the Department "may issue a plan approval for construction" of a new facility. Specifically, Section 127.206(d)(1) requires a plan approval to demonstrate that the proposed facility either has or will secure the appropriate ERCs which are suitable for use at the specific facility. The ERCs shall be identified in a Department approved and federally enforceable permit condition for the ERC generating source." (1-8, 34)

    Response: The Department agrees that Shell must comply with all the applicable ERC general requirements under 25 Pa. Code §127.206(d) specifically, and 25 Pa. Code Chapter 127 Subchapter E in general. However; the commenter has not provided the full context of the regulatory requirement. 25 Pa. Code §127.206(d)(1) continues: "...ERC generating source. The permit condition will provide that the ERCs are properly generated, certified by the Department and processed through the registry no later than the date approved by the Department for commencement of operation of the proposed new or modified facility." Shell has demonstrated on page 1-5 of the February 2015 Update application that it will secure the proper ERCs prior to operation. Section C Condition #034 on pages 23 and 24 of the proposed plan approval requires Shell to secure the appropriate quantity of properly generated and certified ERCs prior to commencement of operation. Once the proper ERCs have been secured, the Department will incorporate them into the plan approval through a modification.

38. **Comment:** The requirements of 25 Pa. Code §127.208 related to ERC use and transfer requirements must be fulfilled. Specifically that Shell must first obtain ERCs from facilities in the Pittsburgh-Beaver Valley nonattainment area and then areas with equal or higher nonattainment classification and that contributes to exceedances of the NAAQS in the Pittsburgh-Beaver Valley nonattainment area. [The commenter then lists available ERCs in Counties located within the Beaver-Valley nonattainment area and the upwind Steubenville-Weirton area] (1-8, 33, 34, 36, 44)

    Response: The Department agrees that Shell must comply with all the applicable ERC use and transfer requirements under 25 Pa. Code §127.208 specifically, and 25 Pa. Code Chapter 127 Subchapter E in general. 25 Pa. Code §127.208 is an applicable requirement and shall be added to the plan approval for clarification.

39. **Comment:** ERCs obtained by Shell must improve air quality in the Pittsburgh-Beaver Valley MSA [Metropolitan Statistical Area]. (1-8)

    Response: Pennsylvania currently has a federally-approved State Implementation Plan (SIP) designed to bring an area of nonattainment with the NAAQS into attainment. ERCs must be obtained by Shell in order to offset its potential to emit for each nonattainment pollutant or precursor which exceeds the major source threshold at this new facility. Shell's actual emissions are required not to exceed its potential to emit and in practice are expected to be less than its potential to emit. Obtained ERCs must meet the requirements of 25 Pa. Code §§127.206 through 127.208 which includes that they be "surplus, permanent, quantified, and enforceable". They must also be obtained in a ratio between 1:1 and 5:1 depending on the pollutant and nature of the emission (fugitive or flue) in accordance with 25 Pa. Code §127.210. Obtained ERCs are removed from the

Department's ERC Registry System thereby reducing the baseline actual emissions in an area of nonattainment with the NAAQS.

40. **Comment:** The Pennsylvania Environmental Quality Board (EQB) should consider exercising its authority under 25 Pa. Code §127.206(b) because the Pittsburgh-Beaver Valley nonattainment area has a history of noncompliance with the NAAQS and previous measures have been unsuccessful in achieving compliance with the NAAQS. 25 Pa. Code §127.206(b) states: "The EQB may, by regulation and upon notice in the *Pennsylvania Bulletin* and opportunity for public comment, proportionally reduce the quantity of registered ERCs not previously included in a plan approval, or may halt transfer activity, in a nonattainment area or throughout this Commonwealth only as necessary when the other measures required by the Clean Air Act and the act may fail to achieve NAAQS or SIP requirements." (1-8)

    Response: Pennsylvania currently has a federally-approved SIP designed to bring an area of nonattainment with the NAAQS into attainment. Consideration of the attainment status of the region or state as a whole is outside of the scope of this plan approval application review. The commenter may petition the EQB to proportionally reduce the quantity of registered ERCs according to the EQB petition policy and through the available petition form at: http://www.portal.state.pa.us/portal/server.pt/community/eqb_rulemaking_petitions/21512.

41. **Comment:** ERCs are only a paper decrease and don't change actual emissions in a region that fails the NAAQS for ozone. (28)

    Response: The Department disagrees. ERCs represent past actual emission reductions which are "surplus, permanent, quantified, and enforceable". All ERCs in the Department's ERC Registry System meet these four criteria, and Shell is required to obtain ERCs from a nonattainment area in accordance with the provisions of 25 Pa. Code Chapter 127 Subchapter E. Obtained ERCs are removed from the Department's ERC Registry System thereby reducing the baseline actual emissions in an area of nonattainment with the NAAQS. Shell is required to obtain ERCs in the appropriate ratios for NO_x and VOC (as ozone precursors) and $PM_{2.5}$ prior to commencement of operation.

    Also see Response to Comment #15

Health Effects

42. **Comment:** Multiple comments received expressed general concern over the project and potential health effects. Specific concerns include asthma, cardiovascular and lung disease, lung and breast cancer, risks to young children and elderly, and birth defects. (1-10, 24, 34, 36, 37, 40, 41)

    Response: The Department has evaluated the air contamination aspects of this proposed facility in accordance with the applicable regulations derived from the U.S. Clean Air Act and the Pennsylvania Air Pollution Control Act. This facility has been identified as a major source/facility subject to multiple state and federal regulations.

The Clean Air Act required EPA to set National Ambient Air Quality Standards (NAAQS) for pollutants considered harmful to public health and the environment and establishes two levels of national ambient air quality standards. Primary standards set limits to protect public health, including the health of "sensitive" populations such as asthmatics, children, and the elderly. Secondary standards set limits to protect public welfare, including protection against decreased visibility, damage to animals, crops, vegetation, and buildings. Potter and Center Townships, Beaver County are designated as areas of attainment for all NAAQS except for annual (1997) and 24-hour (2006) particulate matter less than 2.5 microns in diameter ($PM_{2.5}$), 8-hour ozone (1997 and 2008), and lead (Pb) (2008). Additionally, Potter Township, Beaver County is designated as an area of nonattainment for sulfur dioxide (SO_2) (2010).

Pennsylvania currently has a federally-approved State Implementation Plan (SIP) designed to bring an area of nonattainment with the NAAQS into attainment. Consideration of the attainment status of the region or state as a whole is outside of the scope of this Plan Approval application review. The Department follows nonattainment new source review (NNSR) requirements for major projects in nonattainment areas. This authorization is not a major source for Pb or SO_2, but is major for ozone precursors NO_x and VOC, as well as $PM_{2.5}$. NNSR requirements have been applied to this project which include obtaining emissions offsets to reduce overall emissions in or affecting the nonattainment area and meeting the Lowest Achievable Emission Rate (LAER) for each nonattainment pollutant.

Pennsylvania has adopted the federal Prevention of Significant Deterioration (PSD) regulations for major projects in attainment (or unclassifiable) areas. This authorization is subject to PSD requirements for emissions of nitrogen dioxide (NO_2), carbon monoxide (CO), filterable particulate matter (PM), particulate matter less than 10 microns in diameter (PM_{10}), and greenhouse gas (GHG) carbon dioxide equivalents[13] (CO_2e). PSD requirements have been applied to this project which include conducting an air quality modeling analysis and Best Available Control Technology (BACT) for each attainment pollutant. The use of computer models is the recognized method for predicting ambient air impact for new and modified sources under the PSD regulations. These models consider background air quality, emissions from nearby sources, and representative meteorological data. Shell's air quality analysis demonstrates that it will not cause or contribute to air pollution in violation of the NAAQS for CO, NO_2, or PM_{10}[14].

Shell submitted an inhalation risk assessment considering approximately 53 compounds of potential concern (COPC). These COPC primarily include organic HAPs such as 1, 3-butadiene; benzene; hexane; and naphthalene; as well as metallic HAPs such as chromium and lead. The Department's technical review[15] concludes that Shell's inhalation risk assessment was conducted according to the Department-approved protocol

[13] Each different GHG emission is considered to impact global warming at varying levels. CO_2e emissions are the combined impact of each GHG emission after it is normalized to the impact of CO_2 as a reference.
[14] There is no NAAQS for "filterable" PM or CO_2e. The PM NAAQS has been redefined as separate PM_{10} and $PM_{2.5}$ NAAQS. Emissions of greenhouse gases or CO_2e are considered on a larger global scale.
[15] Craig Evans, Chief, Air Toxics and Risk Assessment Section, Pennsylvania Department of Environmental Protection, Bureau of Air Quality, *Air Quality Modeling and Inhalation Risk Evaluation,* Shell Chemical Appalachia LLC, March 19, 2015.

and is acceptable. Furthermore, the Department's independent inhalation risk assessment concludes that chronic cancer and noncancer risks as well as acute noncancer risks do not exceed the Department's benchmarks. Pennsylvania's Department of Health is in agreement with this inhalation risk analysis for chronic and acute risk exposures, based on the air modeled estimated concentrations for various chemicals in the ambient air.

Also see Response to Comments #29…

Miscellaneous

43. **Comment:** There are no CO monitors in Beaver County. It is recommended that the Department and Shell construct a CO monitor adjacent to the proposed facility to monitor for compliance with the CO NAAQS. (36)

    Response: Shell's air quality analysis has been independently evaluated by the Department and shows that it will not cause or contribute to air pollution in violation of the NAAQS for CO. Ambient air monitoring for compliance with the CO NAAQS is outside of the scope of this Plan Approval application review. All of Pennsylvania is currently designated as unclassifiable or attainment with the CO NAAQS. Ambient concentrations of CO in Pennsylvania (and at the national scale) have shown a downward trend for the past several decades. No site in Pennsylvania reported results that exceeded one-third of the 8-hour NAAQS, or one-fourth the 1-hour NAAQS, during the previous ten years.[16] The nearest active CO monitoring site operated by the Department is in Charleroi, PA. There are currently no plans at this time to expand the CO monitoring network in Pennsylvania (except for near-road monitoring in urban areas in accordance with U.S. EPA requirements).

44. **Comment:** Long-term studies should be conducted in the area of question to evaluate the cumulative health impacts for this proposed facility and other industrial interests. (1-8)

    Response: Shell's air quality analysis demonstrates that it will not cause or contribute to air pollution in violation of the NAAQS for CO, NO_2, or PM_{10}. Additionally, the Department's independent inhalation risk assessment concludes that chronic cancer and noncancer risks as well as acute noncancer risks do not exceed the Department's benchmarks. A follow-up inhalation risk assessment is also required based upon the final as-built design parameters of the air contamination sources prior to startup of the facility[17].

    Long-term cumulative health impact studies are outside of the scope of this plan approval application review.

45. **Comment:** Multiple comments received requested an extension of the public comment period. Specifically that the comment period should include up to and including the public hearing, and for 30 days after the hearing. [Commenters expressing uncertainty regarding the extent or end date of the comment period were addressed prior to the end of the period] (1-3, 11-13, 33)

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[16] *Commonwealth of Pennsylvania Department of Environmental Protection 2014 Annual Ambient Air Monitoring Network Plan*, July 2014, p. 35.

[17] See Section C Condition #033 on page 23 of the proposed plan approval.

Response: In accordance with 25 Pa. Code §127.44(a), notice of intent to issue the plan approval was published in the *Pennsylvania Bulletin* on March 28, 2015, thereby opening the formal public comment period for this proposed plan approval. Subsequently, in accordance with 25 Pa. Code §127.44(c), notice was published by the applicant (Shell) in *The Times (Beaver County Times)* on April 1-3, 2015. Each of the above notices stated that a 30-day comment period existed from the date of publication, in accordance with 25 Pa. Code §127.44(f)(2). Notice of the Department's intent to hold a public hearing was simultaneously published in all formats indicating that a public hearing was to be held on May 5, 2015, for this proposed plan approval. This public hearing was considered to be part of the public comment process. In accordance with 25 Pa. Code §127.49(c), written statements were accepted by the Department for 10 days after the scheduled hearing, ending after May 15, 2015. The Department has accepted public comments through May 15, 2015, effectively providing for an extended public comment period of 48 days (March 28, 2015, through May 15, 2015). No comments have been received by the Department after this date although the Department may in its discretion consider any comment received prior to issuance of a plan approval including comments received after the regulatory established timeframe. There has been no formal extension of the public comment period beyond the regulatory established timeframe.

46. **Comment:** An additional public hearing should be held in Pittsburgh. Pittsburgh is only 30 miles southeast of Monaca, often downwind, and includes several hundred thousand potentially affected residents (many of which don't have access to a car). (11-13)

Response: The Department elected to hold a public hearing under the discretion granted by 25 Pa. Code §127.48(a). It is the Department's common practice to locate such a hearing as near to the proposed facility as possible and in a location that will accommodate the expected amount of attendees. No additional public hearings have been scheduled at any alternate locations. However; the Department does accept and consider comments received from all individuals. Any person unable to attend a conference or hearing may submit three copies of a written statement and exhibits within 10 days after that conference or hearing in accordance with 25 Pa. Code §127.49.

47. **Comment:** On April 29, 2015 the American Lung Association released its "Annual State of the Air" report for the United States, showing that Pittsburgh ranked #10 for highest short term particle pollution and #9 for year round particle pollution in America. Many particles are too small to see, unlike soot, which is visible. Unborn babies, infants and young children, those who suffer now from asthma, people with heart problems, and the frail and elderly are at highest risk. (11-13)

Response: Particle pollution from this facility will be minimized by the application of BACT for PM, PM_{10} as well as LAER for $PM_{2.5}$. Shell's PSD air quality analysis demonstrates that it will not cause or contribute to air pollution in violation of the NAAQS for PM_{10}. Shell is also required to obtain $PM_{2.5}$ ERCs as offsets to its potential to emit.

The Department recognizes that Beaver County is included in the Pittsburgh metropolitan statistical area as part of the Pittsburgh-New Castle-Weirton, PA-OH-WV area. However; American Lung Association's State of the Air 2015 report also independently grades Beaver County as "B" for Particle Pollution 24-hour (24-hour $PM_{2.5}$) and "Pass" for Particle Pollution Annual (annual $PM_{2.5}$). The same report shows that the annual

number of days designated as orange (unhealthy for sensitive groups), or worse, for 24-hour $PM_{2.5}$ has decreased in the Pittsburgh area from 62 days in 2000-2002 to 10 days in 2011-2013. The same report shows that the concentration of annual $PM_{2.5}$ has decreased in the Pittsburgh area from 21.4 $\mu g/m^3$ in 2000-2002 to 13.4 $\mu g/m^3$ in 2011-2013 (the annual standard is 12 $\mu g/m^3$).

48. **Comment:** Multiple comments express concern over future projects arising from the presence of this facility or other potentially related polluting activities. Specific concerns include new gas production wells, gas processing activities, plastics production, shipping facilities, and barge and truck traffic. Specific concerns also include the cumulative impact of additional pollution from diesel motors on regional air quality. (11-13, 34, 37, 44)

Response: The merits of each plan approval application are evaluated on a case-by-case basis, considering the project as-proposed which may include an existing facility or other nearby facilities, as appropriate. Consideration of potential future industrial development as a result of the proposal at hand is outside of the scope of the plan approval application review and would be speculative.

Pennsylvania currently has a federally-approved State Implementation Plan (SIP) designed to bring an area of nonattainment with the NAAQS into attainment. This includes consideration of mobile air contamination sources such as vehicles, marine vessels, and locomotives. Pennsylvania's Clean Vehicle Program is a SIP which adopts California's second generation low emission vehicle program for light-duty vehicles. Heavy-duty diesel engines and vehicles also are subject state regulation under 25 Pa. Code Chapter 126 Subchapter E - Pennsylvania Heavy-Duty Diesel Emissions Control Program. Other initiatives to reduce diesel emissions include the Pennsylvania Diesel Idling Restrictions – Act 124 of 2008, projects to retrofit existing diesel engines with exhaust controls such as particulate filters, and emission testing programs.

Additional federal regulations exist for diesel fuel, heavy-duty vehicles, marine diesel engines, and locomotives.

- Diesel fuel is limited to ultra-low sulfur content (15 ppm) under 40 CFR Part 80 Subpart I - Motor Vehicle Diesel Fuel; Nonroad, Locomotive, and Marine Diesel Fuel; and ECA Marine Fuel.
- Heavy-duty vehicle engines are subject to federal regulation under 40 CFR Part 1036 – Control of Emissions from New and In-Use Heavy-Duty Highway Engines.
- Marine diesel engines are subject to federal regulation under 40 CFR Part 1042 – Control of Emissions from New and In-Use Marine Compression-Ignition Engines and Vessels.
- Locomotive engines are subject to federal regulation under 40 CFR Part 1033 – Control of Emissions from Locomotives.

Regional air quality is monitored by the Department's ambient air monitoring network. Stations in this network measure concentrations of NO_2 and other pollutants regardless of whether that concentration was generated by a stationary or mobile source. Monitored background concentrations of NO_2, CO, and PM_{10} were utilized in Shell's air quality analysis, which demonstrates that it will not cause or contribute to air pollution in

violation of the NAAQS for CO, NO_2, or PM_{10}. Additionally, U.S. EPA is currently implementing near-road NO_2 monitoring in support of the NO_2 NAAQS. This near-road monitoring is being coordinated with state and local air monitoring agencies and focuses on new monitoring stations where peak hourly NO_2 emissions are expected in large urban areas.[18] This near-road monitoring will be in addition to the existing air monitoring network within the state.

49. **Comment:** Permitted discharges to the air are recommended to be based on best achievable control technologies. (11-13)

    Response: Air contamination sources to be located at this facility are subject to BACT for NO_2, CO, PM, PM_{10}, and CO_2e; LAER for NO_x, VOC, and $PM_{2.5}$; and BAT for all air contaminants[19]. Review of this plan approval application has shown that the facility will meet these requirements. Additional information may be found on pages 25-42 of the Department's April 1, 2015, memorandum.

50. **Comment:** Many of the statements given during the public hearing and one comment letter express support for the project. Specific expressions of support include creation of construction and permanent jobs; local residents working the site; positive future economic impact; Shell's commitment to employee and community safety and air quality; Shell's environmental, safety, and health core value standards; current site cleanup and remediation efforts; involvement of surrounding municipalities; process transparency; air quality modeling and inhalation risk assessment results; emission offsets; advanced technology for emissions minimization, and air monitoring during site demolition. (14-23, 25-27, 29-32, 38-39, 42)

    Response: The Department acknowledges all those comments submitted in favor of the project.

51. **Comment:** The site footprint should be utilized for solar, wind, or other non-emitting sources of energy. (24, 41)

    Response: Consideration of renewable energy installations is outside of the scope of this plan approval application review for a petrochemicals complex. These do not fit within the defined source category as a facility which will convert ethane feedstock into polyethylene pellets.

52. **Comment:** Multiple comments received expressed concern over traffic impacts due to facility construction and/or operation. (10-13)

    Response: There are no regulations under the Pennsylvania Air Pollution Control Act and the Federal Clean Air Act that specify an acceptable level of or impact on local traffic volumes or patterns associated with the construction or operation of a facility, and this issue is typically handled by the host municipality or another entity like PennDOT. However; Shell has addressed questions about traffic outside of the plan approval

[18] http://www.epa.gov/ttnamti1/files/nearroad/NearRoadTAD.pdf

[19] BACT, LAER, and BAT are regulatory acronyms for Best Available Control Technology, Lowest Achievable Emission Rate, and Best Available Technology respectively. Each acronym is in reference to a particular level of regulatory review that is applicable to each air contaminant. Specific definitions of these terms may be found under 40 CFR §52.21(b)(12) for BACT, and 25 Pa. Code §121.1 for LAER and BAT.

application with the following statement: "Traffic would increase during a potential construction phase, particularly during the approximately two-year peak period. Shell conducted traffic studies and is working with PennDOT and local officials on road improvements and traffic controls. To further help avoid congestion and keep roads safe, Shell plans to use river and rail for materials transport where practical and establish guidelines for scheduling, routing, safety training, vehicle inspections and more[20]."

53. **Comment:** There will be noise impacts due to facility construction and/or operation. (10)

    Response: There are no regulations under the Pennsylvania Air Pollution Control Act and the Federal Clean Air Act that specify an acceptable level of noise associated with the construction or operation of a facility, and this issue is typically handled by the host municipality. However; Shell has addressed questions about noise with the following statement: "Shell is in the process of developing noise monitoring and mitigation plans for all phases of construction, facility startup and operation. We are designing the facility to comply with both Potter and Center Townships' noise ordinances, and our goal is to minimize what neighbors would hear both during construction and operations[21]." The Department expects that Shell's noise mitigation practices and compliance with local noise ordinances will not generate any noise in excess of what was historically present at this former zinc smelter site. Noise causing a public nuisance is not expected to result from this plan approval.

54. **Comment:** There will be visible light impacts due to facility construction and/or operation. (10)

    Response: There are no regulations under the Pennsylvania Air Pollution Control Act and the Federal Clean Air Act that specify an acceptable level of visible light associated with the construction or operation of a facility, and this issue is typically handled by the host municipality. However; Shell has addressed questions about visible light with the following statement: "Once in operation, the facility would be lit at night as required for safety and security, using glare-reduction lights that are directed downwards. The facility would have 10 tall structures, ranging approximately 200- to 300-feet high, including the emergency flare, furnaces and cogeneration plant equipment. (For comparison, the Horsehead zine smelter smokestack was 400 feet.) The stacks would be equipped with the lights necessary to facilitate safe operations and to comply with applicable Federal Aviation Administration regulations[22]."

55. **Comment:** Multiple comments received expressed concern over water quality impacts due to facility construction and/or operation. Specific concerns also include impacts to water quality due to fracking and drilling, and contamination of the Ohio River. (10, 28, 35, 37)

    Response: Evaluation of potential water quality impacts due to this project (and other projects in Pennsylvania) are being conducted by other agencies through the relevant permitting processes. Review of this air quality plan approval application is conducted within the scope of the authority granted to the Department under the Pennsylvania Air

[20] Shell's Proposed Beaver County Petrochemical Facility: Your Top 10, www.shell.us/poly-e
[21] Community Impacts Brochure, www.shell.us/poly-e
[22] *Id.*

Pollution Control Act and the Federal Clean Air Act. Water quality is protected through regulations under authorities including the Safe Water Drinking Act, Pennsylvania's Clean Streams Law, and Federal Clean Water Act. These statues and regulations promulgated under them are implemented by other parts of the agency that focus on these laws (e.g. the Department's Office of Water Management and Bureau of Safe Drinking Water and Bureau of Point and Non-Point Source Management). Shell has also written many statements related to water quality which may be found on its website[23].

56. **Comment:** Property values will be compromised living closely to a cracker plant. (24)

Response: There are no regulations under the Pennsylvania Air Pollution Control Act and the Federal Clean Air Act that identify acceptable or unacceptable levels of impact on property value associated with the physical location of a facility. As such the Department does not have the legal authority to consider potential economic impacts on property value due to this facility's location during review of this plan approval application.

57. **Comment:** Is there any environmental benefit from Shell's proposed facility? (9)

Response: Review of this air quality plan approval application is conducted within the scope of the authority granted to the Department under the Pennsylvania Air Pollution Control Act and the Federal Clean Air Act. This does not include any specific criteria to require or evaluate environmental benefit from a project. However; within the context of this plan approval application review and the Department's understanding of the project and Shell's activities at the site to date, environmental benefit may result, as follows:

- The current responsible demolition and remediation of this industrial brownfield site. This includes an asbestos survey and removal and on-site air and water monitoring during these activities.
- New Source Review provisions require Shell to obtain ERCs as emissions offsets. This reduces the baseline actual emissions in an area in nonattainment with the NAAQS.
- Excess electricity generated by Shell's on-site cogeneration plant will be sold to the grid and have lower emissions per unit of electricity generated than average for this region considering the coal-fired electric generating capacity.
- Application of LAER through New Source Review establishes a new LDAR standard for equipment leaks which is considered more stringent than any other LDAR program currently achieved in practice.
- Utilization of the hydrogen byproduct generated from the ethane cracking process as a fuel will reduce carbon-based emissions such as CO_2, CO, VOC, HAP, and PM compared to combusting additional natural gas (or other carbon-derived) fuel.

58. **Comment:** Multiple comments received expressed concern over the potential for an environmental disaster or emergency from Shell's proposed facility. Specific concerns include the potential for air inversions over river valley terrain, emergency shutdowns not being contained within the facility fenceline, and historical explosions at or near to Shell's Diamond Plant in Louisiana in 1973 and 1988. (9-13, 35, 37)

[23] A Proposed Petrochemical Facility Water Quality, www.shell.us/poly-e

Response: This air quality plan approval is protective of human and environmental health as approved. The Department does recognize that the potential does exist for unforeseen events or malfunctions that may result in an emergency situation at an industrial site of this scale. Department field staff performs facility-wide compliance inspections and complaint response on a periodic or as-needed basis. However; Shell will in almost all cases be in position as the first identifier of any problems occurring at the facility whether related to air quality or otherwise. Responses to any problems or events at the facility which pose an immediate threat to the public would be coordinated between Shell and local emergency services such as the Center and Potter Townships and Beaver County Emergency Management Agencies[24], as well as the Department's Environmental Emergency Response Team[25] and Pennsylvania's Emergency Management Agency[26] as necessary.

Section B Condition #012 on page 12 of the proposed plan approval requires Shell to meet the requirements of Section 112(r) of the Clean Air Act, 40 CFR Part 68: Chemical Accident Prevention Provisions, Federal Chemical Safety Information, and Site Security and Fuels Regulatory Relief Act. This includes the development and implementation of an accidental release program and Risk Management Plan as applicable under those statutes and regulations.

Section C Condition #019 on page 19 of the proposed plan approval requires Shell to report malfunctions to the Department by telephone no later than one hour after discovery if it poses an imminent and substantial danger to the public health and safety or the environment. Appropriate responses to these malfunctions again would be coordinated between the Department, Shell, and local emergency services as each situation dictates.

The potential for facility disruptions due to power grid failure will be mitigated by the on-site steam and electric cogeneration plant which will provide all the power needed by the facility. Additionally, emergency generators and fire pump engines with diesel fuel storage tanks will be permanently located on site. Emergency or malfunction event gases are required to be routed to the HP System for combustion in one of the two HP ground flares or emergency elevated flare where it is practicable to do so. Gases or vapors may only be routed to the emergency elevated flare in the event that the combined capacity of both ground flares is exceeded. Shell is also required to operate according to an approved flare minimization plan to minimize any discharges to the atmosphere or HP and LP Systems during planned and unplanned startup or shutdown of process unit and air pollution control equipment. These requirements can be found under the following proposed plan approval conditions:

- Section D Source ID 201 Condition #008 on page 40
- Section D Source ID 202 Condition #009 on page 43
- Section D Source ID 202 Condition #012 on page 44
- Section D Source ID 204 Condition #012 on page 48
- Section D Source ID 205 Condition #006 on page 51
- Section D Source ID 205 Condition #009 on page 51

[24] http://www.beavercountypa.gov/emergency-services/emergency-services-ema-emergency-management
[25] http://www.depweb.state.pa.us/portal/server.pt/community/report_an_incident/6010
[26] http://www.pema.pa.gov/Pages/Default.aspx

Shell has also written many statements related to safety which may be found on its website[27]. This includes the purchase of additional land surrounding the facility as a buffer zone between the process equipment and public.

59. **Comment:** Multiple comments received ask how Shell will demonstrate compliance in a manner that is transparent to the public. (24, 33, 34, 36)

Response: Shell is required and expected to comply with the final plan approval conditions and all applicable state and federal regulations at all times. Any violation of or deviation from these conditions is handled on a case-by-case basis according to the Department's policies on compliance and enforcement. Department field staff performs facility-wide compliance inspections and complaint response on a periodic or as-needed basis for this and all other facilities. Inspection results and enforcement actions for this and all other facilities visible through the Department's eFACTS online web browser.[28] U.S. EPA compliance and enforcement actions can be found through Enforcement and Compliance History Online ("ECHO").[29] Public documents may include inspection reports, enforcement actions, stack testing protocols and results, actual emissions reporting, air dispersion modeling and inhalation risk assessment protocols and results, and all other monitoring and recordkeeping data related to this and all other facilities in the region will be available at the Department's Southwest Regional Office. File reviews may be requested at 412-442-4000 during normal business hours. Additional information on public records and information requests may be found on the Department's website at http://www.depweb.state.pa.us/portal/server.pt/community/public_records/19207.

60. **Comment:** Will standards be monitored by an independent source and how often? (24)

Response: The Department maintains a statewide network of ambient air quality monitors in order to evaluate air pollution reduction strategies and assist in program planning. This monitoring is implemented primarily by the Department's Division of Air Quality Monitoring according to a developed Annual Ambient Air Quality Monitoring Network Plan, and includes monitoring for pollutants subject to NAAQS set by U.S. EPA. Both continuous and discrete monitors are operated and maintained by the Department. Ambient air monitoring data may be found on the Department's website at http://www.depweb.state.pa.us/portal/server.pt/community/monitoring_topics/21818.

NO_x and CO emissions from the proposed ethane cracking furnaces and combustion turbines will be monitored by CEMS. These CEMS are required to be installed and operated by the Owner/Operator (Shell) in accordance with the Department's Continuous Source Monitoring Manual[30]. This includes a Relative Accuracy Test Audit of each CEM including notification requirements and a test protocol, test methods, and a test report to be approved by the Department. Multiple other air contamination sources and controls to be authorized under this proposed plan approval are subject to periodic source testing and monitoring requirements. Department field staff perform periodic facility-wide compliance inspections to determine compliance with testing and monitoring requirements, as well as all other plan approval requirements.

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[27] A Proposed Petrochemical Facility Safety, www.shell.us/poly-e

[28] http://www.ahs.dep.pa.gov/eFACTSWeb/default.aspx/default.aspx

[29] https://echo.epa.gov/

[30] Commonwealth of Pennsylvania Dept. of Environmental Protection Bureau of Air Quality Division of Source Testing and Monitoring, *Continuous Source Monitoring Manual*, Revision No. 8, 274-0300-001, December 2, 2006.

61. **Comment:** Will Shell develop a comprehensive quality assessment program with associated quality indicators, review panel, root cause analyses and corrective action plans? (24)

Response: The Department has already included multiple conditions in the proposed plan approval that collectively address this comment.

Section C Condition #025 on page 22 of the proposed plan approval requires that, "All air contamination sources and air cleaning devices authorized under this Plan Approval shall be operated and maintained in accordance with the specifications and maintenance schedule recommended by the manufacturer, developed and approved by the engineering procurement and construction contractor, or developed by the Owner/Operator in accordance with industry standards. Developed maintenance plans shall be in place and available within 180 days of startup of each air contamination source or air cleaning device."

Additionally, Section C Condition #019 on pages 19 and 20 of the proposed plan approval requires the following in response to a defined malfunction:

> "i. The date and time that the malfunction started and ended.
> ii. An estimate of the emissions associated with the malfunction and the calculations that were used to determine that quantity;
> iii. The steps, if any, that the facility took to limit the duration and/or quantity of emissions associated with the malfunction;
> iv. A detailed analysis that sets forth the Root Cause of the malfunction, to the extent determinable;
> v. An analysis of the measures, if any, that are available to reduce the likelihood of a recurrence of a malfunction resulting from the same Root Cause or contributing causes in the future. The analysis shall discuss the alternatives, if any, that are available, the probable effectiveness and cost of the alternatives. Possible design, operational, and maintenance changes shall be evaluated. If the facility concludes that corrective action(s) is (are) required, the report shall include a description of the action(s) and, if not already completed, a schedule for implementation, including proposed commencement and completion dates. If the facility concludes that corrective action is not required the report shall explain the basis for that conclusion;
> vi. To the extent that investigations of the causes and/or possible corrective action(s) still are underway on the due date of the report, a statement of the anticipated date by which a follow-up report will be submitted."

62. **Comment:** What happens when 10,000 [construction] jobs go away and will the 400 permanent jobs go to laid-off workers from the zinc plant or Beaver County citizens? (24)

Response: Consideration of the transient nature of construction jobs or specific sourcing of permanent jobs due to facility construction and/or operation is outside of the scope of this air quality plan approval application review. Nevertheless, Shell has responded generally to questions about construction and permanent jobs with the following published statements:

- If the project is built, we would expect to spend a large portion of the project's proposed investment in the area through direct and indirect employment, and the purchase of products and services.
- To help drive more of the proposed project's economic benefits to the community, we want to work with qualified local firms, primarily through our major contractors. Shell will require its construction contractors to identify local goods and services to use during the construction phase and to work with those local suppliers, vendors and subcontractors so they can compete for contracts.
- At an appropriate stage in the future, Shell and its major contractors plan to work with local schools, community and technical colleges, as well as local and regional construction industry leaders, to support education and training programs that prepare students for careers in construction, engineering and plant operations.

63. **Comment:** Tax breaks should be extended to other businesses in Pennsylvania. (24, 34)

Response: Consideration of tax breaks or incentives offered to any applicant is outside of the scope of this air quality plan approval application review.

64. **Comment:** Multiple comments received expressed concern over potential impacts to climate change from carbon dioxide and methane emissions due to this project or other related industrial development. (28, 33, 34, 37, 44)

Response: This facility is subject to BACT for CO_2e which includes regulation of carbon dioxide and methane emissions. Review of this plan approval application has been conducted accordingly and this requirement has been satisfied. Additional information on CO_2e BACT may be found on pages 28-41 of the Department's April 1, 2015, memorandum. Carbon dioxide and methane emissions from future projects at this or any other facility will be evaluated in accordance with applicable air quality rules and regulations at that time. This may include a case-by-case PSD analysis for greenhouse gas emissions as appropriate. At this time, there is no NAAQS for greenhouse gases or carbon dioxide and methane in particular.

One aspect of this project of particular note to this comment is that Shell will be recovering and utilizing hydrogen generated during the ethane cracking process as fuel for the furnaces. Recovered hydrogen is expected to constitute nearly 50% of the fuel requirements of the furnaces and results in a CO_2e PTE that is approximately 950,353 tpy less than if the furnaces combusted natural gas alone.

65. **Comment:** Plastics should be made from other plant-based renewable sources. (28)

Response: Consideration of a primary feedstock change from ethane to renewable plant-based sources is outside of the scope of this plan approval application review for a petrochemicals complex. Switching the manufacturing feedstock and processes would change the defined source category as a facility which will convert ethane feedstock into polyethylene pellets.

66. **Comment:** The plant will cause more pollution. Pollution wouldn't occur without the plant. Fossil fuels should be left in the ground. (10, 28, 40, 41)

Response: The activities authorized by the plan approval were reviewed under the applicable requirements of the Clean Air Act, Air Pollution Control Act and regulations promulgated under them. This facility will also require additional authorizations under several other environmental statutes and regulations that are administered by the Department or other government entities

Potential emissions from this facility will be minimized by the application of BACT for NO_2, CO, PM, PM_{10}, and CO_2e; LAER for NO_x, VOC, and $PM_{2.5}$; and BAT for all air contaminants. Potential emissions from the facility have been eliminated where it is feasible to do so. Shell's air quality analysis demonstrates that it will not cause or contribute to air pollution in violation of the NAAQS for any pollutant for which there is a requirement to model (CO, NO_2, or PM_{10}). Furthermore, the Department's independent inhalation risk assessment concludes that chronic cancer and noncancer risks as well as acute noncancer risks do not exceed the Department's benchmarks. Review of this plan approval application shows that the facility will comply with legal requirements and emissions will not cause air pollution. Shell is required to comply with the final plan approval conditions and all applicable state and federal regulations at all times.

67. **Comment:** Multiple comments received express that the Department must obey Pennsylvania Constitution Article I Section 27 which states:

"The people have a right to clean air, pure water, and to the preservation of the natural, scenic, historic and esthetic values of the environment. Pennsylvania's public natural resources are the common property of all the people, including generations yet to come. As trustee of these resources, the Commonwealth shall conserve and maintain them for the benefit of all the people."

Specific concerns include that the PA Supreme Court quoted this article and section in a decision on Act 13 of 2012. (34, 37, 44)

Response: The Department agrees that Article I Section 27 of the Pennsylvania Constitution must be satisfied. Recent court decisions have employed the *Payne v. Kassab* 3 part test. All three parts are met.

1) Significant statutory and regulatory requirements have been established to protect the Commonwealth's air quality consistent with the requirements of Article I, Section 27. This air quality plan approval meets these applicable statutory and regulatory requirements and is protective of human and environmental health. Compliance with the requirement is shown by, among other things, the plan approval application, the Department's review memoranda, and these responses to public comments set forth in this document.

2) Environmental incursions have been reduced to a minimum by various measures including plan approval requirements that go beyond minimum regulatory requirements. Examples of items that minimize environmental impacts include but are not necessarily limited to the following:

   - A new VOC LAER standard for equipment leaks to be established by this project.
   - Utilization of hydrogen as fuel supplanting additional natural gas combustion.
   - Inhalation risk assessment results which are below the Department's benchmarks.

- Site remediation undertaken by Shell for historical metals contamination.
- Shell's efforts to mitigate noise, visible light, and traffic impacts.
- Excess electricity generation for use by the grid by modern controlled combined cycle turbines.
- Installation of carbon canisters controlling on-site-use diesel fuel storage tanks.
- Malfunction reporting requirements exceed the Department's normal criteria.
- Visible stack emission, fugitive emission, and potentially objectionable odor observation requirements exceed the Department's normal criteria.

3) Finally, the project's benefits outweigh its costs. The project will exceed minimum regulatory requirements and will not jeopardize human health and safety. In addition, the project will result in remediation of existing contamination at the project site. The project will also have direct environmental benefits, including:

    - Responsible demolition and remediation of an industrial brownfield site, which will include asbestos removal and on-site air and water monitoring during remediation.
    - Offsetting any emissions potential increases of non-attainment criteria pollutants pursuant to Nonattainment New Source Review provisions, baseline actual emissions of these pollutants.
    - Generating electricity at Shell's on-site cogeneration plant with lower emissions per unit of electricity generated than average for this region.
    - Greater reduction of fugitive gas emissions by a new Leak Detection And Repair standard for equipment leaks which is considered more stringent than any other LDAR program currently achieved in practice.
    - Reducing carbon based emissions (CO_2, CO, VOC, HAP, and PM) by combusting the hydrogen byproduct generated from the ethane cracking process compared to combusting additional natural gas (or other carbon-derived) fuel.

The project also will create employment and revenue, make a valuable product, and bring new industry to the Commonwealth. Balancing costs and benefits show that the project's benefits outweigh its costs.

Thus, issuance of the plan approval is in complies with the Department's duties under Article I, Section 27.

68. **Comment:** Comments received expressed concern over ionization of radiation due to increased fracking of black shale, concern of uranium content of black shale (radon and radiation), and concern over burning toxic and radio-active waste. (33, 35, 37)

Response: Though emission of radionuclides may be regulated under the air quality laws and regulations, the review does not show that radionuclides are a likely air contaminant from the Shell Facility. Thus, issues regarding radionuclides are beyond the scope of the plan approval review. In addition, Shell does not propose to burn toxic and radioactive waste at the Facility. Shell's facility will utilize pipeline natural gas as fuel and pipeline ethane as feedstock for its manufacturing process. Pipeline (or transmission quality) natural gas consists of primarily methane with smaller amounts of ethane, propane, and other heavier hydrocarbons. Ethane is also a gas at standard temperature

and pressure conditions and is separated from the natural gas as part of the natural gas processing segment following the production segment.

69. **Comment:** The Beaver Valley Mall monitor should be put back into use. (33)

Response: Following EPA approvals, the Department moved two site locations in 2014 – Beaver Valley (Beaver County) and Scranton (Lackawanna County), due to changes in property lease holders and/or lease agreements. In October, the Beaver Valley monitoring station was relocated to property owned by the Center Township Water Authority, approximately 1/4 mile southeast of its original location at the Beaver Valley Mall.[31] Parameters remain unchanged and this location continues to monitor for lead and total suspended particulate and metals (TSP/metals).

70. **Comment:** The hillside should be remediated for lead, mercury, asbestos, and silicon. (33)

Response: Remediation of any existing ground contamination within or near to the proposed facility property boundary is outside of scope of the air quality plan approval application review. However; the following additional information has been provided by the Department's Environmental Cleanup & Brownfields group:

"The property is currently owned by Horsehead Corporation and was previously operated as a zinc smelter since the early 1930s. An evaluation of the property was completed by Environmental Resources Management, Inc. ("ERM") to characterize soil and groundwater conditions and identify potential environmental issues of concern. Shell intends to develop the project over the entire footprint of the property where the zinc smelting operations were located. The location and horizontal and vertical extent of environmental contamination of the property have been assessed in the Remedial Investigation/Risk Assessment Report and Cleanup Plan, Horsehead Corporation Facility dated 16 February 2015. Metals in soil from seven separate areas on the Property exceeded calculated site-specific soil to groundwater pathway values. These included cadmium, mercury, silver, or zinc. Metals in soil from four additional areas in the Southern Parcels exceeded soil to groundwater pathway MSCs for arsenic, cadmium, lead, manganese, or mercury. Shell intends to remediate the identified contamination. The Report was approved by the Department in a letter dated 22 April 2015. The plan proposes remediation of the property to meet a combination of Statewide Health and Site-Specific Standards based on nonresidential use of the property, as those terms are used in Act 2."

71. **Comment:** Shell should implement and pay for health screenings for residents. (34)

Response: Implementation of permittee-provided health screenings for residents is outside of the scope of this plan approval application review. Both Shell's and the Department's independent inhalation risk assessments conclude that chronic cancer and noncancer risks as well as acute noncancer risks from this facility do not exceed accepted benchmarks. A follow-up inhalation risk assessment is also required based upon the final as-built design parameters of the air contamination sources prior to startup of the facility.

[31] *Commonwealth of Pennsylvania Department of Environmental Protection 2015 Annual Ambient Air Monitoring Network Plan*, Proposed, May 2015, p. 14.

72. **Comment:** Multiple comments received express concern over the nonattainment condition in Beaver County. Specific concerns include ozone and particulate matter, and how the NAAQS will be met. (28, 36, 37, 44)

Response: Pennsylvania currently has a federally-approved SIP designed to bring areas of nonattainment with the NAAQS into attainment. Per 40 CFR §81.339, Potter and Center Townships, Beaver County are designated as areas of attainment for all NAAQS except for annual (1997) and 24-hour (2006) $PM_{2.5}$, 8-hour ozone (1997 and 2008), and Pb (2008). Additionally, Potter Township, Beaver County is designated as an area of nonattainment for SO_2 (2010). The Department follows NNSR requirements for major projects in nonattainment areas. This authorization is not a major source for Pb or SO_2, but is major for ozone precursors NO_x and VOC, as well as $PM_{2.5}$. NNSR requirements have been applied to this project. These requirements include obtaining emissions offsets to reduce net emissions increase from the Facility to be zero or cause a net decrease and meeting LAER for each nonattainment pollutant.

73. **Comment:** Will DEP facilitate citizen monitoring and will Shell fund it? (44)

Response: Facilitation of citizen monitoring funded by the permittee is outside of scope of this plan approval application review.

This air quality plan approval is protective of human and environmental health as approved, and the plan approval provides for extensive monitoring. Monitoring at the facility is required in accordance with the plan approval conditions and state and federal regulations. Monitoring includes but is not necessarily limited to monitoring of NO_x and CO emissions from furnaces and turbines; catalyst temperatures and ammonia slip for the furnace and turbine controls; facility visible emissions, fugitive emissions, and potentially objectionable odors; cooling tower water total dissolved solids; flare and incinerator operating parameters including flame detection, combustion temperature, combustion zone net heating value, and exit velocity as appropriate; carbon canisters to prevent breakthrough; and liquid loadout operations. Various other federal regulatory monitoring requirements also exist. Department field staff will perform facility-wide compliance inspections and complaint response on a periodic or as-needed basis. Additionally, regional air quality monitoring is implemented by the Department's Division of Air Quality Monitoring according to a developed Annual Ambient Air Monitoring Network Plan.

74. **Comment:** During construction and operation, require Shell to make data on local air quality continuously and readily accessible via internet, mobile devices, test-based alerts, and email. (33, 44)

Response: Based upon the plan approval review there is no basis to impose such a monitoring requirement. Nevertheless, such information exists and is available

Local air quality can be generally represented by the Air Quality Index (AQI) which is calculated by U.S. EPA for ground-level ozone, particle pollution (also known as particulate matter), carbon monoxide, sulfur dioxide, and nitrogen dioxide. AQI forecasts and current conditions are found on the AirNow website at http://www.airnow.gov/index.cfm?action=airnow.main. Multiple media outlets for the AQI exist including the referenced website, email alerts, phone apps, and social network

sites. Links to these other media outlets, and other local and states air quality resources, are found through the AirNow website.

The Department maintains a statewide network of ambient air quality monitors in order to evaluate air pollution reduction strategies and assist in program planning. This monitoring is implemented primarily by the Department's Division of Air Quality Monitoring according to a developed Annual Ambient Air Quality Monitoring Network Plan, and includes monitoring for pollutants subject to NAAQS set by U.S. EPA. Both continuous and discrete monitors are operated and maintained by the Department. Ambient air monitoring data may be found on the Department's website at http://www.depweb.state.pa.us/portal/server.pt/community/monitoring_topics/21818.

75. **Comment:** A dedicated and properly staffed phone number is recommended to be established to address residents' concerns, complaints, and comments. (36)

Response: Environmental complaints may be sent to the Department's Southwest Regional Office via mail to 400 Waterfront Drive, Pittsburgh, PA 15222-4745; by online form through the Department's website[32]; or by phone at 412-442-4184 (statewide toll free at 1-888-723-3721). All environmental complaints are held in confidentiality. Spills and other emergencies in the Southwest Region should be reported immediately to the Department by telephone to 412-442-4000 or by calling 1-800-541-2050.

Shell's decision of whether or not to dedicate and staff a phone number for receiving resident concerns, complaints, and comments it outside of the scope of this air quality plan approval application review.

76. **Comment:** All environmental permits and enforcement actions are recommended to be openly and easily accessible for the community without the need for a formal file review with PA DEP. (36)

Response: Public documents including applications, inspection reports, enforcement actions, stack testing protocols and results, actual emissions reporting, air dispersion modeling and inhalation risk assessment protocols and results, and all other monitoring and recordkeeping data related to this and all other facilities in the region will be and are available at the Department's Southwest Regional Office. Additionally, this plan approval and comment response document will be hosted on the Department's website[33]. An informal file review request is the normal available format for accessing and viewing these public documents. File reviews may be requested through Phil Bouse at 412-442-4000 during normal business hours. A formal Right-To-Know Law ("RTKL") request is also an available format to access and view these public documents. Additional information related to informal file review and RTKL requests can be found on the Department's website at http://www.portal.state.pa.us/portal/server.pt/community/public_records/19207.

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32 http://www.portal.state.pa.us/portal/server.pt/community/southwest_regional_office/13775/environmental_complaints/617091

33 http://www.depweb.state.pa.us/portal/server.pt/community/southwest_regional_office/13775/community_information/593161

77. **Comment:** A series of infrared (IR) cameras are recommended to be placed throughout the facility and monitored by employees in order to detect and repair leaks in real time. This method of leak detection will not provide specific chemical concentrations but should prove effective in simple leak detection and facilitate quick repair. (36)

    Response: See Response to Comments #31 and #32.

78. **Comment:** Differential absorption light detection and ranging (DIAL) is recommended to be used along with wind speed data to monitor the mass fluxes of specific gases leaving the site. DIAL can be done by an outside independent company periodically. Data can be made available to the public and will be useful for improved leak detection and combustion efficiency measurements for plant operation. (36)

    Response: See Response to Comments #31 and #32.

    Additional information regarding the application of DIAL to fenceline monitoring has been found during an examination of U.S. EPA's proposed refinery rule amendments. The published proposal states, "The DIAL monitoring system has been used in a variety of studies to measure emissions from petroleum refinery and petrochemical sources. It is typically used for specific, shorter-term studies (one to several weeks in duration). The equipment is expensive, has limited availability in the U.S., and requires highly trained professionals to operate. Although DIAL monitoring is included as an appropriate method for EPA's OTM-10, there are no known long-term applications of this technology for the purpose of fenceline monitoring. Given the limited availability of the equipment and qualified personnel to operate the equipment, we do not consider DIAL monitoring to be technically feasible for the purposes of ongoing, long-term fenceline monitoring.[34]"

79. **Comment:** It is recommended that Shell provide estimates for emissions of ethane and ethylene due to fugitive and stack emissions and provide discussion and/or dispersion modeling of these chemicals as ozone precursors and as greenhouse gases. (36)

    Response: Review of this plan approval application has been conducted in accordance with NNSR provisions for VOC as an ozone precursor in a nonattainment area and PSD provisions for GHG as an unclassifiable area. This includes obtaining ERCs as offsets and meeting LAER for VOC, and meeting BACT for GHG (CO_2e). There is currently no NAAQS for GHG (CO_2e).

80. **Comment:** It is recommended that Shell model or provide explanation of why no modeling was included for VOC as an ozone precursor, even though the maximum potential VOC emissions for the site are 484 tons per year. (36)

    Response: See Responses to Comments #15 and #72.

81. **Comment:** It is recommended that Shell provide a copy of Appendix D, which has been redacted from the Plan Approval application. Appendix D contains Table D-4 showing which vents from the polyethylene process go to the control devices and, possibly, which are vented to the atmosphere. Table D-5 has particulate controls. (36)

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[34] Petroleum Refinery Sector Risk and Technology Review and New Source Performance Standards, *Federal Register*, Vol. 79, No. 125 Monday, June 30, 2014, Proposed Rules, p. 36922.

Response: Appendix D has been redacted by the applicant and identified as Trade Secret and/or Confidential Proprietary Information. In accordance with 25 Pa. Code §127.12(d), "Upon cause shown by any person that the records, reports or information, or a particular portion thereof, but not emission data, to which the Department has access under the act, if made public, would divulge production or sales figures or methods, processes or production unique to that person or would otherwise tend to affect adversely the competitive position of that person by revealing trade secrets, including intellectual property rights, the Department will consider the record, report or information, or particular portion thereof confidential in the administration of the act. The Department will implement this section consistent with sections 112(d) and 114(c) of the Clean Air Act (42 U.S.C.A. § § 7412(d) and 7414(c)). Nothing in this section prevents disclosure of the report, record or information to Federal, State or local representatives as necessary for purposes of administration of Federal, State or local air pollution control laws, or when relevant in a proceeding under the act."

VOC-containing process gas vents are required to be routed to the LP or HP Systems as applicable, or are otherwise subject to the polyethylene residual VOC content limit of 50 ppmw. These requirements can be found under the following proposed plan approval conditions:

- Section D Source ID 201 Condition #008 on page 40
- Section D Source ID 202 Condition #009 on page 43
- Section D Source ID 202 Condition #011 on page 43
- Section D Source ID 202 Condition #012 on page 44
- Section D Source ID 301 Condition #002 on page 55

82. **Comment:** It is recommended that vehicle dust, noise, and combustion emissions are controlled by spraying roadways, covering trucks when carrying materials that can be volatilized, reducing vehicle speed, and installing emission control devices on all vehicles and equipment. (36)

Response: In-plant roadways are required to be paved and maintained, and a roadway dust control plan is required to prevent fugitive emissions. This includes roadway watering, sweeping, and application of winterized surfactant as necessary during colder months. Additionally residual VOC content of the manufactured polyethylene, which may be transported in part by truck, is limited to not exceed 50 ppmw. These requirements can be found under the following proposed plan approval conditions:

- Section D Source ID 301 Condition #002 on page 55
- Section D Source ID 503 Condition #001 on page 75
- Section D Source ID 503 Condition #002 on page 75

Additionally; Shell has responded generally to questions about construction noise and dust with the following statements: "We would work to minimize construction noise, particularly from activities outside normal working hours. We currently are studying options to reduce construction noise and we will share those results with the community… In addition, we would take a number of measures to suppress dust and keep roads clear, including paving site roads, spraying water on temporary roads, rinsing heavy trucks before they leave the site, and cleaning mud and dirt off SR18."

However; please note that fugitive emissions from construction or demolition of buildings or structures is not prohibited under 25 Pa. Code §123.1(a)(1), but may not be visible at the point that emissions pass outside the person's property per 25 Pa. Code §123.2.

Additionally, see response to Comment 24 regarding diesel motor emissions.

Department-Initiated Corrections/Clarifications

83. Section C Condition #034 on page 23 of the proposed plan approval lists an incorrect amount of required NO_x and VOC ERCs to be secured by the applicant. NO_x should be lower and VOC should be higher than the values in this proposed condition. These will be corrected to be consistent with the values published for public comment in the values and VOC (ERC) limit included in Section C Condition #005 on page 15 of the proposed plan approval. Section C Condition #034 shall be corrected as follows:

"The Owner/Operator shall secure ~~391~~**400** tons of NO_x, ~~632~~**620** tons of VOC, and 159 tons of $PM_{2.5}$ ERCs…"

84. Section D Source ID: 202 Condition #010 on page 43 of the proposed plan approval does not clearly identify the pollutant controlled by the fabric, sintered metal, or HEPA filters. The controlled pollutant is PM. Section D Source ID: 202 Condition #010 shall be clarified as follows:

"Fabric, sintered metal, and HEPA filters shall be designed not to exceed **an outlet PM rate of** 0.005 gr/dscf ~~at the outlet~~."

85. Section D Source ID: 206 Condition #001 on page 53 of the proposed plan approval lists an incorrect CO emission limit for the Spent Caustic Vent incinerator. The correct limit (and rate used to calculate PTE) determined as representative of BACT is 0.0824 lb/MMBtu. Section D Source ID: 206 Condition #001 shall be corrected as follows:

"Emissions from the Spent Caustic Vent incinerator shall not exceed the following:

a. NOx – 0.0680 lb/MMBtu
b. CO – ~~0.370~~ **0.0824** lb/MMBtu…"

86. Section D Source ID: 301 Condition #003 on page 55 of the proposed plan approval does not clearly identify the pollutant controlled by the fabric filters. The controlled pollutant is PM. Section D Source ID: 301 Condition #003 shall be clarified as follows:

"Fabric filters shall be designed not to exceed **an outlet PM rate of** 0.005 gr/dscf ~~at the outlet~~."

87. Section E Group Name: G02 Condition #005 on page 80 of the proposed plan approval includes an annual PM_{10} and $PM_{2.5}$ emission limit for each combustion turbine that has no function and shall be removed from the plan approval. This limit has no function because there is no exception to the single short term PM_{10} and $PM_{2.5}$ limit, and the

annual total represents max load and full time operation. Section E Group Name: G02 Condition #005 shall be clarified as follows:

"PM_{10} and $PM_{2.5}$ emissions from each of the combustion turbines with duct burners shall not exceed the following:

- 0.0066 lb/MMBtu.
- ~~19.2 tons in any consecutive 12-month period.~~"

88. Page 42 of the Department's April 1, 2015, memorandum incorrectly identifies the WWTP VOC PTE as 0.42 tpy when it is actually calculated to be 0.042 tpy. This is correctly identified later in Table 17 on page 53 of the same document and has no impact on facility PTE or ERC values.

Shell Comments (See Attachment A) (43)

1. Page 1 Owner Information

   Response: The Department shall correct the Owner Information as follows:

   "Name: Shell Chemical Appalachia LLC
   Mailing Address: 910 Louisiana St (~~TSP-2251~~ **OSP 14080C**) Houston, TX 77002-4916"

2. Page 1 Responsible Official

   Response: The Department shall correct the Responsible Official as follows:

   "Name: ~~Daniel K. Carlson~~ **Ate S. Visser**
   Title: ~~Pres~~ **Vice Pres**
   Phone: (713) 241-~~3223~~**0608**

3. Page 1 Signature

   Response: The Department shall update the name of the Southwest Region Air Program Manager to the person who currently holds that position at the time of plan approval issuance.

4. Page 15 Condition #004

   Response: The Department finds the proposed wording change to be acceptable as it is more consistent with the malodor prohibition of 25 Pa. Code §123.31. Section C Condition #004 shall be changed as follows:

   "The Owner/Operator may not permit the emission into the outdoor atmosphere of any malodorous air contaminants from any source in such a manner that the malodors are detectable outside of the **Owner/Operator's** property~~ of the Facility~~."

5. Page 15 Condition #005

Response: The Department acknowledges that facility-wide potential to emit values shown in Table 20 on page 55 of the Department's April 1, 2015, memorandum, published in the *Pennsylvania Bulletin* and *The Times (Beaver County Times)* public notices, and limited in Section C Condition #005 on page 15 of the proposed plan approval do not match the February 2015 Update application in all cases. Various inclusions, updates, and corrections to the submitted potential to emit calculations were made where the Department perceived an omission, carryover, or mistake. Efforts were made discuss and explain these changes on a continuing basis throughout the process, but a few instances appear to have been missed.

Type and quantity of air contaminants being emitted at this facility have been included in the publications in accordance with 25 Pa. Code §127.45(b)(3). Facility-wide potential to emit values included as plan approval limitations may not be increased beyond those values which have been published and been made available for public comment. Proposed changes to these potential to emit values may be considered through a future authorization.

6. Page 17 Condition #009

Response: The Department finds that production throughput limits on polyethylene and C_3+ liquids are unnecessary with the inclusion of a facility-wide VOC (and VOC ERC) limit, residual polyethylene VOC limit, lossless vapor balance pressurized loadout requirement, and liquid loadout low-leak coupling requirement in the proposed plan approval. Throughput limits are also inconsistent with the facility-wide VOC limit approach which has been utilized for other air contamination sources such as loadout of other byproduct liquids, the wastewater treatment plant, LP incinerator, and HP ground flares. NNSR requirements for VOC including LAER and offsets (ERCs) may be satisfied without specific throughput limitations in this case. LAER is satisfied for C_3+ liquids loadout with vapor balance to pressurized storage tanks capable of maintaining working pressures sufficient at all times to prevent vapor or gas loss to the atmosphere and with no venting during loading operations and low-leak couplings, and for manufactured polyethylene with a residual VOC limit of 50 ppmw. Offsets (ERCs) are satisfied with a facility-wide VOC (ERC) limit and the requirement to secure sufficient ERCs prior to commencement of operation. Compliance with the facility-wide VOC (and VOC ERC) limit will be demonstrated through records of actual polyethylene and C_3+ liquids throughput along with the actual sampled residual VOC content of the polyethylene.

Section C Condition #009 shall be removed.

~~"Throughputs for facility production and/or loadout shall not exceed the following during any consecutive 12-month period:~~

~~a. Polyethylene – 1,600,000 metric tons.~~
~~b. C3+ Liquids – 78.7 million gallons."~~

7. Page 18 Condition #014

Response: The Department finds that a change to the recordkeeping requirements for the diesel-fired emergency generator and fire pump engines is acceptable. The proposed change is more consistent with the records which would be necessary to determine compliance with 40 CFR Part 60 Subpart IIII. Reference to "emergency demand response" has been removed as the Department understands it is not applicable to the operation of these engines. Section C Condition #014 shall be changed as follows:

"The Owner/Operator shall maintain the following comprehensive and accurate records…

b. ~~Rolling 12-month~~ **Calendar year** totals for each diesel-fired emergency generator and fire pump engine of (~~and~~ as defined in 40 CFR Pat 60 Subpart IIII):

1) Hours of emergency operation,

~~1)~~2) Hours of **maintenance and/or testing** operation ~~for maintenance, testing, or emergency demand response.~~,

~~2)~~3) Hours of **non-emergency** operation **that is not maintenance and/or testing**~~in all non-emergency situations.~~, **and**

~~3)~~4) Hours of operation."

8. Page 18 Condition #014,
   Page 35 Condition #001,
   Page 45 Condition #001,
   Page 76 Condition #002,
   Page 76 Condition #004,
   Page 79 Condition #016,
   Page 80 Condition #005, and
   Page 83 Condition #025

Response: The Department shall clarify that rolling averages are to be calculated at each increment of the averaging time. Monthly, daily, and hourly averages shall be calculated in monthly, daily, and hourly increments respectively.

9. Page 22 Condition #026

Response: The Department agrees that "Facility personnel" may be overly broad and that office workers, short term personnel, and individuals who are not employees of Shell may be excluded from the observation training requirement. This is consistent with the original intent of the condition. Section C Condition #026 shall be clarified as follows:

"~~Facility personnel~~ **Employees involved in the operation and/or maintenance of any air contamination sources, air cleaning devices, stacks, fugitive emission areas, or process equipment at the Facility** shall be trained to observe air contamination sources, air cleaning devices, stacks, fugitive emission areas, and process equipment to demonstrate compliance with Section C Condition #012.

a. New ~~personnel~~ **employees** shall be trained upon hiring.
b. Existing ~~personnel~~ **employees** shall be trained prior to source startup.
c. ~~Personnel~~ **Employees** shall be given refresher training annually.
d. A copy of the written ~~personnel~~ **employee** training program…"

10. Page 22 Condition #027

Response: Section C Condition #027 shall be corrected as follows:

"This Plan Approval is to allow the construction and temporary **operation** of a petrochemicals complex by Shell Chemical Appalachia LLC to be located in Potter and Center Townships, Beaver County."

11. Page 22 Condition #028

Response: The Department finds that the 1,800 metric tons/hr total capacity of the HP System is consistent with the February 2015 Update application. Section C Condition #028 shall be corrected as follows:

"Air contamination sources and air cleaning devices authorized to be installed at the Facility under this Plan Approval are as follows…

- One (1) HP System**, 1,800 metric tons/hr capacity**; routed to two (2) HP enclosed ground flares 150 **metric** tons/hr capacity each, with backup emergency elevated flare, ~~1,200~~ **1,500 metric** tons/hr capacity…"

12. Page 23 Condition #034

Response: The Department finds that there is no necessary change to ERC requirements at this time. For additional information, see above response to bullet item #5, and item #83 above (as a Department-initiated change).

13. Page 24 Condition #035

Response: The Department agrees that 40 CFR Part 61 Subpart FF – National Emission Standard for Benzene Waste Operations applies to the facility at the site level. Section C Condition #035 shall be clarified as follows:

"The ~~ethylene and polyethylene manufacturing lines are~~ **site is** subject to limited requirements of 40 CFR Part 61 Subpart FF – National Emission Standard for Benzene Waste Operations."

14. Pages 32, 33, and 34 Combustion Turbine/Duct Burner Units #1, #2, and #3

Response: The Department agrees that LDAR monitoring at the facility is to include the fuel gas system as specified in the February 2015 Update application and Department's April 1, 2015, memorandum. Section D Source ID: 501 Condition #005 on pages 70-71 of the proposed plan approval is the LDAR requirement for the facility. It includes the following requirement:

- "LDAR shall be applied to equipment in organic compound service (including fuel gas equipment)…"

The following conditions shall be moved for Section C. Site Level Plan Approval Requirements in order to clarify that they apply to the entire facility including the fuel gas system:

- Section D Source ID 501 Condition #005.
- Section D Source ID 501 Condition #006.
- Section D Source ID 501 Condition #007.
- Section D Source ID 501 Condition #008.

15. Page 40 Condition #008,
Page 43 Condition #009, and
Page 44 Condition #012

Response: The Department agrees that emergency and malfunction event gases may not be captured and routed to the LP System or HP System where it is not practicable due to a safety risk. As these events represent unforeseen or unexpected emissions, there is no change to facility PTE. Facility-wide emission limits remain unchanged by this comment and do not exclude any emissions. Malfunction (including emergency) events are reported and resolved through Section C Condition #019 as pointed out by Shell.

Section D Source ID: 201 Condition #008 shall be changed as follows:

"Compressor seal vent, startup, shutdown, **and** maintenance~~, emergency, or malfunction event~~ gases associated with the ethylene manufacturing line shall be captured and routed to the HP System. **Emergency and malfunction event gases shall be captured and routed to the HP System as practicable.** Hydrocarbon-containing equipment shall be drained, depressurized, and purged with nitrogen to the HP System prior to being opened to the atmosphere."

Section D Source ID: 202 Condition #009 shall be changed as follows:

"Compressor seal gas vents; intermittent VOC process vents; and startup, shutdown, **and** maintenance~~, emergency, or malfunction events~~ **gases** associated with the gas phase polyethylene manufacturing lines shall be routed to the HP System. **Emergency and malfunction event gases shall be captured and routed to the HP System as practicable.** Hydrocarbon-containing equipment shall be drained, depressurized, and purged with nitrogen to the HP System prior to being opened to the atmosphere."

Section D Source ID: 202 Condition #012 shall be changed as follows:

"Compressor seal gas vents; intermittent VOC process vents; and startup, shutdown, **and** maintenance~~, emergency, or malfunction events~~ **gases** associated with the slurry phase polyethylene manufacturing line shall be routed to the HP System. **Emergency and malfunction event gases shall be captured and routed to the HP System as practicable.** Hydrocarbon-containing equipment shall be drained, depressurized, and purged with nitrogen to the HP System prior to being opened to the atmosphere."

16. Page 46 Condition #007

Response: The Department finds that the process cooling tower heat exchangers are subject to 40 CFR Part 63 Subpart XX (already included in the plan approval) which is more stringent than 40 CFR Part 63 Subpart F. Subpart XX requires weekly monitoring (consistent with the applicant's LAER proposal and most stringent precedent) while Subpart F requires less stringent monthly monitoring. Process cooling tower heat exchangers will still be subject to the heat exchange system requirements of 40 CFR §63.104 (from Subpart F) through Table 10 of 40 CFR Part 63 Subpart FFFF.

Section D Source ID: 203 Condition #007 shall be changed as follows:

"The Owner/Operator shall develop and implement a leak detection and repair (LDAR) program for the process cooling tower heat exchanger~~s~~ **system**. The developed LDAR program shall be submitted to the Department for review prior to implementation and at a minimum of 45 days prior to facility startup. Cooling water shall be monitored for VOC. ~~Monitoring shall be conducted on a weekly basis.~~ Other aspects of the LDAR program shall be consistent with the "heat exchange system requirements" under 40 CFR Part 63 Subpart ~~F~~**XX**."

17. Page 47 Condition #002, and
Page 53 Condition #001

Response: The Department finds that the LP and Spent Caustic Vent incinerator NOx limits of 0.0680 lb/MMBtu unnecessarily includes an extra significant digit. The 0.068 value is consistent with the proposed LAER and precedents.

Section D Source ID: 204 Condition #002 shall be corrected as follows:

"Emissions from the LP incinerator shall not exceed the following:

a. NO_x – ~~0.0680~~**0.068** lb/MMBtu..."

Section D Source ID: 206 Condition #001 shall be corrected as follows:

"Emissions from the Spent Caustic Vent incinerator shall not exceed the following:

a. NO_x - ~~0.0680~~**0.068** lb/MMBtu..."

18. Page 48 Condition #009, and
Page 50 Condition #005

Response: The Department finds this change to be acceptable as direct measurement of the MPGF and HP ground flare headers' combustion zone gas net heating value will provide the most accurate determination.

Section D Source ID: 204 Condition #009 shall be changed as follows:

"Net heating value of the combustion zone gas at the MPGF header shall be ~~calculated~~ **measured** and recorded at a minimum of once every 15 minutes. An adjusted net heating value of hydrogen of 1,212 Btu/scf may be used for this calculation."

Section D Source ID: 205 Condition #005 shall be changed as follows:

"Net heating value of the combustion zone gas at the HP ground flare header shall be ~~calculated~~ **measured** and recorded at a minimum of once every 15 minutes. An adjusted net heating value of hydrogen of 1,212 Btu/scf may be used for this calculation."

19. Page 48 Condition #013, and
Page 51 Condition #010

Response: The Department finds this clarification to be acceptable as it is consistent with the intent of the condition.

Section D Source ID: 204 Condition #013 shall be clarified as follows:

"The Owner/Operator shall conduct a root cause analysis within 45 days after any startup **flaring event**, shutdown **flaring event, or**~~and~~ unforeseeable flaring event. Flaring event shall be defined as an event that exceeds the baseline by 500,000 scf within a 24 hour period..."

Section D Source ID: 205 Condition #010 shall be clarified as follows:

"The Owner/Operator shall conduct a root cause analysis within 45 days after any startup **flaring event**, shutdown **flaring event, or**~~and~~ unforeseeable flaring event. Flaring event shall be defined as an event that exceeds the baseline by 500,000 scf within a 24 hour period..."

20. Page 56 Condition #005

Response: The Department finds that the suggested change is acceptable with additional clarification. "Enclosed" as included in the proposed plan approval condition was not intended to imply a full building enclosure of the silos, etc. Section D Source ID: 301 Condition #005 shall be changed as follows:

"Polyethylene pellet blending silos, handling, storage, and loadout shall be ~~enclosed and~~ controlled by fabric filters **and operated with no fugitive emissions**."

21. Page 66 Condition #001

Response: The Department agrees with the typo correction. Section D Source ID: 405 Condition #001 shall be corrected as follows:

"Ethylene, C3+, C3+ refrigerant, butene, isopentane, isobutane, aqueous ammonia, and dimethyl disulfide shall be stored in pressurized and/or refrigerated storage tanks with no uncontrolled vent ~~directly~~ **directed** to the atmosphere."

22. Page 76 Condition #002

Response: The Department finds that the applicant was inconsistent in the NO_x LAER proposal for the cracking furnaces. A proposed NO_x limit of 0.01 lb/MMBtu on a 12-month rolling average was found in Table 5-1 Proposed Control Technology Evaluation

Limits in all versions of the plan approval application. A proposed NO_x limit of 0.010 lb/MMBtu on a 12-month rolling average basis for each furnace was found in the NO_x LAER analysis section in all versions of the plan approval application and most recently on page 5-45 of the February 2015 Update. However; the Department also finds that the 0.01 lb/MMBtu NO_x limit per furnace does comply with LAER in this case. Only a single precedent was found at 0.010 lb/MMBtu, and it applies across a group of 8 furnaces. Multiple precedents were found at 0.01 lb/MMBtu applied to single furnaces, and this is the most stringent single-furnace NO_x limit precedent. Section E Group Name G01 Condition #002 also already includes an annual NO_x emission limit of 181.3 tons from all furnaces combined in any consecutive 12-month period. This limit remains unchanged.

Section E Group Name: G01 Condition #002 shall be corrected as follows:

"NO_x emissions from the ethane cracking furnaces shall not exceed the following:

- ~~0.010~~ **0.01** lb/MMBtu from each furnace…"

23. Page 81 Condition #008

Response: Per page 4-11 of the February 2015 Update, "Using the provisions of 25 Pa. Code §127.12b, the formaldehyde limits contained in Part 63 Subpart YYYY (91 [ppbvd] @ 15% O_2) and the use of an oxidation catalyst have been proposed for this Plan Approval application." The Department does not find sufficient justification to remove the turbine formaldehyde limit and associated compliance testing at this time.

24. Page 82 Condition #017

Response: The Department agrees that only monitoring the catalyst bed inlet temperature is necessary for the turbine SCR systems. 40 CFR Part 60 Subpart KKKK - Standards of Performance for Stationary Combustion Turbines requires that any turbine using SCR to reduce NO_x emissions must continuously monitor appropriate parameters to verify proper operation of the emission controls. Catalyst bed inlet temperature is a primary indicator of SCR performance and each turbine will also be equipped with a NO_x CEM. No specific reference is made to monitoring both inlet and outlet temperatures.

Section E Group Name: G02 Condition #017 shall be changed as follows:

"The Owner/Operator shall continuously monitor and record the catalyst bed inlet ~~and outlet~~ temperature for each SCR system."

Attachment A – Shell Comments on Draft Plan Approval

Attachment A - Shell Comments on Draft Plan Approval

Page	Condition #	Draft Requirement	Requested Revision	Comment
1		Name: SHELL CHEMICAL APPALACHIA LLC Mailing Address: 910 LOUISIANA ST (TSP 2251) HOUSTON, TX 77002-4916	Name: SHELL CHEMICAL APPALACHIA LLC Mailing Address: 910 LOUISIANA ST (OSP 14080C) HOUSTON, TX 77002-4916	Updates to current address
1		Name: Daniel K. Carlson Title: Pres Phone:(713) 241 - 3223	Name: Ate S. Visser Title: Vice Pres Phone: (713) 241 - 0608	Updates to current contact
1		Signature	Remove Mark Wayner and add appropriate name.	Updates to current contact
15	004	The Owner/Operator may not permit the emission into the outdoor atmosphere of any malodorous air contaminants from any source in such a manner that the malodors are detectable outside of the property of the Facility.	The Owner/Operator may not permit the emission into the outdoor atmosphere of any malodorous air contaminants from any source in such a manner that the malodors are detectable outside of the **Owner/Operator's property**.	Shell has acquired a number of properties surrounding the proposed Petrochemical Facility that, although not part of the Facility itself, serve as a buffer between the Facility and other properties. Since this condition is designed to protection neighbors from exposure to malodors, we believe the detection should be for outside of the property Shell owns.
15	005	[25 Pa. Code §127.12b] Plan approval terms and conditions. Emissions from the Facility shall not equal or exceed the following in any consecutive 12-month period: Air Contaminant Emission Rate (tons) NOx 348 CO 1012 PM (filterable) 71 PM_{10} 164 $PM_{2.5}$ 159 SOx 21 VOC 522 Formaldehyde 6.44 VOC (ERC)* 620 HAP 30.5 Ammonia 152 CO2e 2,248,293	[25 Pa. Code §127.12b] Plan approval terms and conditions. Emissions from the Facility shall not equal or exceed the following in any consecutive 12-month period: Air Contaminant Emission Rate (tons) NOx 340 CO 1010 PM (filterable) 81 PM_{10} 165 $PM_{2.5}$ 159 SO_2 21 VOC 536 VOC (ERC) 627 HAP 30.8 Ammonia 152 CO2e 2,248,289	See Attachment B

Page	Condition #	Draft Requirement	Requested Revision	Comment
17	009	[25 Pa. Code §127.12b] Plan approval terms and conditions. Throughputs for facility production and/or loadout shall not exceed the following during any consecutive 12-month period: b. Polyethylene – 1,600,000 metric tons. c. C3+ Liquids – 78.7 million gallons.	Delete throughput limits.	The annual polyethylene production rate and C3+ Liquids loading rate were used in the plan approval application along with a proposed LAER level residual VOC in the pellets and the use of OPW's Drylok™ Dry Disconnect Coupling (or equivalent) low-leak couplings as the basis to determine the annual VOC emission resulting from these activities. Condition #005 on page 15 of the draft Plan Approval includes a VOC limit that makes the resultant annual VOC emissions estimate enforceable, and Condition #002 on page 55 and Condition #006 on page 105 make the residual VOC content in the polyethylene pellets and the use of OPW's Drylok™ Dry Disconnect Coupling (or equivalent) low-leak couplings enforceable, respectively. Because the draft Plan Approval includes the annual VOC limit as well as LAER limits, inclusion of an annual production rate limit is not required. Inclusion of these production rate limits creates the potential to limit production rates at the proposed facility without providing for an additional level of emissions control.
18	014	[25 Pa. Code §127.12b] Plan approval terms and conditions. The Owner/Operator shall maintain the following comprehensive and accurate records: b. Rolling 12-month totals of the hours of operation for each diesel-fired emergency generator and fire pump engine. b. Rolling 12-month totals for each diesel-fired emergency generator and fire pump engine of (and as defined in 40 CFR Part 60 Subpart IIII): 1) Hours of operation for maintenance, testing, or emergency demand response. 2) Hours of operation in all non-emergency situations. 3) Hours of operation.	[25 Pa. Code §127.12b] The Owner/Operator shall maintain the following comprehensive and accurate records: b. Per calendar year for each diesel-fired emergency generator and fire pump engine, as defined in 40 CFR Part 60 Subpart IIII: 1) Hours of emergency operation, 2) Hours of maintenance and /or testing, 3) Hours of non-emergency operation that is not maintenance and/or testing (e.g. fire pump engine used to provide water to hydro-test a storage tank, wash down a slab, etc.) 4) Total hours of operation	To avoid having to keep two sets of records we recommend directly stating the NSPS subpart IIII requirements for monitoring engine usage and hours of operation in each regulatory category. In accordance with the language at 40 CFR 60.4211(f) the term "demand response" does not appear to be applicable to Shell's emergency engines. "Emergency stationary ICE may be operated for emergency demand response for periods in which the Reliability Coordinator under the North American Electric Reliability Corporation (NERC) Reliability Standard EOP-002-3, Capacity and Energy Emergencies (incorporated by reference, see §60.17), or other authorized entity as determined by the Reliability Coordinator, has declared an Energy Emergency Alert Level 2 as defined in the NERC Reliability Standard EOP-002-3."

Page	Condition #	Draft Requirement	Requested Revision	Comment
18	014	The Owner/Operator shall maintain the following comprehensive and accurate records: a. Rolling 12-month totals of the hours of operation in each defined operating mode for each ethane cracking furnace and each combustion turbine.	The Owner/Operator shall maintain the following comprehensive and accurate records: a. **Monthly** rolling 12-month totals of the hours of operation in each defined operating mode for each ethane cracking furnace	The increments for calculating the rolling totals should be specified (e.g., is it a once per month calculation, a once per day calculation, or some other increment). Shell suggests that for rolling 12-month totals, the calculation should be made monthly. For the 4-hour rolling, the calculation should be made hourly. In the draft Plan Approval there are several occurrences where the limit includes an averaging time. To avoid confusion regarding the increment over which the average should be calculated we request that the increment be included. In general, the averages should be stated as follows: • Hourly rolling x-hour average • Daily rolling y-day average • Monthly rolling z-month average
83	025	The Owner/Operator shall maintain records of the 4-hour rolling average of each combustion turbine's oxidation catalyst inlet temperature.	The Owner/Operator shall maintain records of the **hourly** rolling 4-hour average of each combustion turbine's oxidation catalyst inlet temperature.	
35	001	Cooling water TDS not to exceed 2000 ppmw on 12-month rolling average basis	Cooling water TDS not to exceed 2000 ppmw on **monthly** 12-month rolling average basis.	
76	002	NOx limit of 0.010 lb/MMBtu from each furnace on a 12-month rolling average	NOx limit of 0.010 lb/MMBtu from each furnace on a **monthly** rolling 12-month average	
76	002	NOx emissions from the ethane cracking furnaces shall not exceed the following: • 0.010 lb/MMBtu from each furnace on a 12-month rolling average, excluding periods of defined non-normal operating modes.	NOx emissions from the ethane cracking furnaces shall not exceed the following: • 0.01 lb/MMBtu from each furnace on a **monthly** rolling 12-month average, excluding periods of defined non-normal operating modes.	
76	004	CO limit on a 12-month rolling average	The increments for calculating the rolling average should be specified. Shell would suggest that the rolling average be calculated as a monthly rolling 12-month average.	
79	016	Furnace exhaust gas temperature limit on a 12-month rolling average.	Furnace exhaust gas temperature limit on a **monthly** rolling 12-month average.	
80	005	1,030 lbs CO_2e/MWh from all turbines and duct burners combined on a 30-day rolling average. 340,558 tons of CO_2e in any consecutive 12-month period.	1,030 lbs CO_2e/MWh from all turbines and duct burners combined on a **daily** rolling 30-day average. 340,558 tons of CO_2e on a **monthly** rolling12-month average.	
22	026	Facility personnel shall be trained to observe air contamination sources, air cleaning devices, stacks, fugitive	**Employees involved in the operation and/or maintenance of facility air contamination sources, air cleaning devices,**	Shell concurs that a training program is appropriate for those facility personnel who are involved in activities relating to

Page	Condition #	Draft Requirement	Requested Revision	Comment
		emission areas, and process equipment to demonstrate compliance with Section C Condition #012.	**stacks, fugitive emission areas, or process equipment** shall be trained to observe air	operation and maintenance of the plant, as currently written, the provision could be read to apply to office workers, individuals who are only on the site on a temporary basis, truck drivers, etc.
22	027	[25 Pa. Code §127.12b] Plan approval terms and conditions. This plan Approval is to allow the construction and temporary of a petrochemicals complex by Shell Chemical Appalachia LLC to be located in Potter and Center Townships, Beaver County.	[25 Pa. Code §127.12b] Plan approval terms and conditions. This plan Approval is to allow the construction and temporary **operation** of a petrochemicals complex by Shell Chemical Appalachia LLC to be located in Potter and Center Townships, Beaver County.	The word "operation" appears to have been omitted.
22	028	[25 Pa. Code §127.12b] Plan approval terms and conditions. • One (1) HP System; routed to two (2) HP enclosed ground flares 150 tons/hr capacity, with backup emergency elevated flare, 1200 tons/hr capacity.	[25 Pa. Code §127.12b] Plan approval terms and conditions. • One (1) HP System **1800 tons/hr capacity**; routed to two (2) HP enclosed ground flares, 150 tons/hr capacity each; with backup emergency elevated flare, **1500 tons/hr capacity**.	Revise to be consistent with the project description as presented on page 3-22 of the Plan Approval application.
23	034	[25 Pa. Code §127.206] ERC general requirements. The owner/operator shall secure 391 tons of NOx, 632 tons of VOC and 159 tons of PM2.5 ERCs. ERCs shall be...	Revise ERCs as necessary.	See Attachment B, Table1 – Revised estimate of PTE.
24	035	[40 CFR Part 61 NESHAPs §61.340] Subpart FF—NESHAP for Benzene Waste Operations Applicability The ethylene and polyethylene manufacturing lines are subject to limited requirements of 40 CFR Part 61 Subpart FF—NESHAP for Benzene Waste Operations.	The **site** is subject to limited requirements of 40 CFR Part 61 Subpart FF—NESHAP for Benzene Waste Operations.	Per 40 CFR §61.340 Applicability. (a) The provisions of this subpart apply to owners and operators of chemical manufacturing plants, coke by-product recovery plants, and petroleum refineries.
32, 33, 34		Source Name: COMBUSTION TURBINE/DUCT BURNER UNIT(S) Conditions for this source occur in the following groups: G02		Shell has proposed to conduct LDAR monitoring of the site, including the COGEN fuel system. The COGEN fuel system doesn't seem to be included in LDAR sections of the draft

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				Plan Approval. Please clarify the Plan Approval to indicate that the fuel system at the site must be included in LDAR monitoring.
40	008	[25 Pa. Code §127.12b] Plan approval terms and conditions. Compressor seal vent, startup, shutdown, maintenance, emergency, or malfunction event gases associated with the ethylene manufacturing line shall be captured and routed to the HP system. Hydrocarbon-containing equipment shall be drained, depressurized, and purged with nitrogen to the HP system prior to being opened to atmosphere.	[25 Pa. Code §127.12b] Plan approval terms and conditions. Compressor seal vents, startup, shutdown, and maintenance, gases associated with the ethylene manufacturing line shall be captured and routed to the HP system. Emergency and malfunction event gases shall be captured and routed to the HP system as practicable. Hydrocarbon-containing equipment shall be drained, depressurized, and purged with nitrogen to the HP system prior to being opened to atmosphere.	It is not possible to direct all emergency/ malfunction events to the HP and LP system. There will be some relief valves routed to the atmosphere for safety, such as in the fire case. Flares and header systems are never designed such that they can control all venting from a site during a shutdown in the event of an emergency. The language regarding recordkeeping, reporting and corrective action of emergency/malfunction events will capture lifting of relief valves to atmosphere. Where practicable, relief valves will be routed to control devices. Malfunction/emergency events are covered by Condition #019 on p. 19.
43	009	[25 Pa. Code §127.12b] Plan approval terms and conditions. Compressor seal vent, startup, shutdown, maintenance, emergency, or malfunction event gases associated with the gas phase polyethylene manufacturing lines shall be captured and routed to the LP system. Hydrocarbon-containing equipment shall be drained, depressurized, and purged with nitrogen to the LP system prior to being opened to atmosphere.	[25 Pa. Code §127.12b] Plan approval terms and conditions. Compressor seal vents, startup, shutdown, maintenance, gases associated with the gas phase polyethylene manufacturing lines shall be captured and routed to the HP system. Emergency and malfunction event gases shall be captured and routed to the LP system as practicable. Hydrocarbon-containing equipment shall be drained, depressurized, and purged with nitrogen to the HP system prior to being opened to atmosphere.	
44	012	[25 Pa. Code §127.12b] Plan approval terms and conditions. Compressor seal vent, startup, shutdown, maintenance, emergency, or malfunction event gases associated with the slurry phase polyethylene manufacturing line shall be captured and routed to the HP system. Hydrocarbon-containing equipment shall be drained, depressurized, and purged with nitrogen to the HP system prior to being opened to atmosphere	[25 Pa. Code §127.12b] Plan approval terms and conditions. Compressor seal vents, startup, shutdown, maintenance, gases and the powder conveying package vent associated with the slurry phase polyethylene manufacturing line shall be captured and routed to the HP system. Emergency and malfunction event gases shall be captured and routed to the HP system as practicable. Hydrocarbon-containing equipment shall be drained, depressurized, and purged with	

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			nitrogen to the HP system prior to being opened to atmosphere.	
46	007	[25 Pa. Code §127.12b] Plan approval terms and conditions. The owner/operator shall develop and implement a leak detection and repair (LDAR) program for the process cooling tower heat exchanger. The developed LDAR program shall be submitted to the Department for review prior to implementation and at a minimum of 45 days prior to facility startup. Cooling water shall be monitored for VOC. Monitoring shall be conducted on a weekly basis. Other aspects of the LDAR program shall be consistent with the "heat exchange system requirements" under 40 CFR Part 63 Subpart F.	[25 Pa. Code §127.12b] Plan approval terms and conditions. The owner/operator shall develop and implement a leak detection and repair (LDAR) program for the process cooling tower heat exchange system. The developed LDAR program shall be submitted to the Department for review prior to implementation and at a minimum of 45 days prior to facility startup. Cooling water shall be monitored for VOC. Other aspects of the LDAR program shall be consistent with the "heat exchange system requirements" under 40 CFR Part 63 Subpart XX.	Part 63 Subpart XX for heat exchange systems must be implemented for the heat exchange system in the ethylene manufacturing process. All heat exchangers using the process cooling tower will be included in the LDAR program. Rather than HAP, the cooling water will be monitored for VOC from leaking exchangers in the ethylene and polyethylene manufacturing processes. Shell recommends that the frequency and procedures of Subpart XX be used rather than introducing another regulation. Using Subpart XX to monitor for total VOC on the inlet/outlet of the process cooling water tower circulation will catch VOC leaks from all exchangers associated with the process cooling water tower.
47	002	[25 Pa. Code §127.12b] Plan approval terms and conditions. Emissions from the LP incinerator shall not exceed the following: • NOx – 0.0680 lb/MMBtu • CO – 0.0824 lb/MMBtu • PM10 – 0.0075 lb/MMBtu • PM2.5 – 0.0075 lb/MMBtu	[25 Pa. Code §127.12b] Plan approval terms and conditions. Emissions from the LP incinerator shall not exceed the following: • NOx – **0.068** lb/MMBtu • CO – 0.0824 lb/MMBtu • PM10 – 0.0075 lb/MMBtu • PM2.5 – 0.0075 lb/MMBtu	By including the extra significant figure the Department has increased the stringency of the proposed LAER limit, which already represents the most stringent limit that is achieved in practice by the class or category of source.
53	001	Emissions from the Spent Caustic Vent Incinerator shall not exceed the following: • 0.0680 lb NOx per MMBtu • 0.370 lb CO per MMBtu • 0.0075 lb PM10 per MMBtu • 0.0075 lb PM2.5 per MMBtu	Emissions from the Spent Caustic Vent Incinerator shall not exceed the following: • **0.068** lb NOx per MMBtu • 0.0824 lb CO per MMBtu • 0.0075 lb PM10 per MMBtu • 0.0075 lb PM2.5 per MMBtu	By including the extra significant figure the Department has increased the stringency of the proposed LAER limit, which already represents the most stringent limit that is achieved in practice by the class or category of source.
48	009	[25 Pa. Code §127.12b] Plan approval terms and conditions.	[25 Pa. Code §127.12b] Plan approval terms and conditions.	To comply with these conditions Shell will install a gas chromatograph (GC).

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		Net heating value of the combustion zone gas at the MPGF header shall be calculated and recorded at a minimum of once every 15 minutes. An adjusted net heating value of hydrogen of 1,212 Btu/scf may be used for this calculation.	Net heating value of the combustion zone gas at the MPGF header shall be **measured** and recorded at a minimum of once every 15 minutes. An adjusted net heating value of hydrogen of 1,212 Btu/scf may be used for this calculation.	
50	005	[25 Pa. Code §127.12b] Plan approval terms and conditions. Net heating value of the combustion zone gas at the HP ground flare header shall be calculated and recorded at a minimum of once every 15 minutes. An adjusted net heating value of hydrogen of 1,212 Btu/scf may be used for this calculation.	[25 Pa. Code §127.12b] Plan approval terms and conditions. Net heating value of the combustion zone gas at the HP ground flare header shall be **measured** and recorded at a minimum of once every 15 minutes. An adjusted net heating value of hydrogen of 1,212 Btu/scf may be used for this calculation.	
48 51	013 001	The Owner/Operator shall conduct a root cause analysis within 45 days after any startup, shutdown and unforeseeable flaring event. Flaring event shall be defined as an event that exceeds the baseline by 500,000 scf within a 24 hour period.	The Owner/Operator shall conduct a root cause analysis within 45 days after any startup **flaring event**, shutdown **flaring event**, or unforeseeable flaring event. Flaring event shall be defined as an event that exceeds the baseline by 500,000 scf within a 24 hour period.	As written, the condition could be misinterpreted.
56	005	[25 Pa. Code §127.12b] Plan approval terms and conditions. Polyethylene pellet blending silos, handling, storage, and loadout shall be **enclosed** and controlled by fabric filters.	[25 Pa. Code §127.12b] Plan approval terms and conditions. Polyethylene pellet blending silos, handling, storage, and loadout particulate emissions shall be controlled by fabric filters.	Delete "enclosed". The term "enclosed" typically refers to sources located within a building. These sources will not be located within a building.
66	001	"uncontrolled vent directly to the atmosphere"	"uncontrolled vent **directed** to the atmosphere"	Correct typo.
76		NOx emissions from the ethane cracking furnaces shall not exceed the following: • 0.010 lb/MMBtu from each furnace on a 12-month rolling average, excluding periods of defined non-normal operating modes.	NOx emissions from the ethane cracking furnaces shall not exceed the following: • **0.01** lb/MMBtu from each furnace on a monthly rolling 12-month, excluding periods of defined non-normal operating modes.	Table 5-3 in the Plan Approval application provides a summary of the recent ethylene cracker furnace NOx limits. The Chevron/Phillips NOx limit of 0.010 lb/mmBtu is an eight (8) furnace cap limit. The BASF Fina NOx limit is a single furnace limit. The single furnace limit is more stringent on a furnace-by-furnace basis so it was proposed as LAER. By including an extra significant figure on the more stringent single furnace, limit the Department has increased the stringency of the proposed LAER limit, which already represents the most stringent limit that is achieved in practice

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				by the class or category of source.
81	008	[25 Pa. Code §127.12b] Plan approval terms and conditions. HCHO emissions from each of the combustion turbines with duct burners shall not exceed 91 ppbvd @ 15% O_2.	Delete this condition.	Shell presumes that the 91 ppbvd @ 15% O_2 limit for HCHO is based on 40 CFR subpart YYYY. In accordance with 40 CFR §63.6125(a), "If you are operating a stationary combustion turbine that is required to comply with the formaldehyde emission limitation and you use an oxidation catalyst emission control device, you must monitor on a continuous basis your catalyst inlet temperature in order to comply with the operating limitations . . ." Shell has proposed the use of an oxidation catalyst as part of the purposed VOC LAER for the combustion turbines. As a result, removal of this limit and associated compliance testing is requested.
82	017	The Owner/Operator shall continuously monitor and record the catalyst bed inlet and outlet temperature for each SCR system.	The Owner/Operator shall continuously monitor and record the catalyst bed inlet temperature for each SCR system.	Only inlet is needed. The amount of temperature change across the catalyst is likely within the accuracy of the thermocouple.

Attachment B
Draft Plan Approval Condition 005 (Page 15) – Not to Exceed Limits

In the Department's April 1, 2015 memo documenting its review of the Shell Plan Approval Application, the Department presents revised estimates for the facility-wide potential-to-emit (PTE) for criteria pollutants and selected HAP. Table 1 presents a summary of the Department's PTE estimates compared to the values presented in the February 2015 Plan Approval application. As shown, there are differences between the PaDEP and Shell Plan Approval Application PTE values for filterable PM, PM_{10}, VOC, ammonia, and CO_2e. A review of the Department's discussion of the emission estimates for each emission unit type was performed to understand the basis and logic behind the Department's revised PTE values. Based on the results of this review, the Department's revisions were found to be acceptable with the following exceptions:

- The decrease in Residual VOC emissions,
- The decrease in $PM/PM_{10}/PM_{2.5}$ emissions from the truck and rail loading operations, and
- The increase in $PM_{10}/PM_{2.5}$ emissions from the DeDuster Vents.

Further revision to the PTE values based on this review are also provided in Table 1. A discussion of these revisions is provided in the following subsections.

Table 1. Comparison of Application and the Draft Plan Approval PTE Values (TPY)

Air Contaminant	Shell Application PTE	PaDEP Plan Approval PTE	Difference between Shell & PaDEP PTEs	Recommended PTE After Review
NOx	340	348	8	348
CO	1,010	1,012	2	1,012
PM (filterable)	81	71	-10	71.7
PM_{10}	165	164	-1	164
$PM_{2.5}$	159	159	-	159
SOx	21	21	-	21
VOC	536	522	-14	531
Hexane	26	26	-	26
Formaldehyde	1.44	1.44	-	1.44
Benzene	0.99	0.99	-	0.99
Toluene	0.34	0.34	-	0.34
Naphthalene	0.31	0.31	-	0.31
1,3-Butadiene	0.30	0.30	-	0.30
HAP	30	30.5	-	30
Ammonia	-	151.85	151.85	152
CO_2e[1]	2,248,289	2,248,293	4	2,248,289

[1] The Department's estimate is based on the same methodology as presented in the Shell Plan Approval Application. It is slightly higher due to rounding differences in the calculation. Shell recommends that the CO_2e value remain unchanged from what was submitted in the Application for Plan Approval.

Residual VOC

Shell/RTP does not agree with the change to the PTE for the residual VOC in the pellets. The residual VOC emission rate was calculated based on the 50 ppmw LAER limit and 8760 hrs/yr of operation. The production basis of 1,600,000 MT of PE/yr at 8000 hrs/yr of operation was scaled to 8760 hrs/yr to obtain the maximum production capacity for the PTE calculation.

PE PM Handling, Storage, and Loadout

Truck and Rail Loadout - Shell/RTP agrees that PM emissions from Blending Silos, Railcar Storage & Handling, Truck Storage & Handling, and the DeDuster Vents should be based on a grain loading of 0.005 grains/dscf. However, as presented in Section 5.0 of the Plan Approval Application, the BACT/LAER limit for the railcar and truck loading operations is 0.01 gr/dscf. As a result, the emissions for these loading operations should remain unchanged. Thus, the annual PM emissions from handling, storage, and loadout should be 6.10 tons/yr as summarized in Table 2.

Table 2. Summary of Handling, Storage, and Loadout PM Emissions

Operation	PM Grain Loading (µg/dscf)	Annual PM PTE (tons/yr)
Blending Silo	0.005	3.16
Railcar Handling & Storage	0.005	1.6
Truck Handling & Storage	0.005	0.34
DeDuster Vents	0.005	0.96
Railcar Loading	0.01	0.042
Truck Loading	0.01	0.009
	Total	6.10

DeDuster Vent $PM_{10}/PM_{2.5}$ – To estimate the annual $PM_{10}/PM_{2.5}$ emissions rate from the DeDuster Vents, Shell/RTP recommends the basis presented in the Plan Approval Application be used. The DeDuster system is a closed-loop design. The only point of emissions is a bleed air valve located downstream of the baghouse. The bleed air valve is used to relieve pressure within the system and avoid bumping, such that a steady flow of product through the DeDuster to the railcar/truck is maintained. To conservatively approximate the emissions from the bleed air valve, a PM grain loading of 0.01 gr/dscf was first applied to the circulating air flowrate. To determine the $PM_{10}/PM_{2.5}$ it was then assumed that one (1) percent of the calculated PM emissions are $PM_{10}/PM_{2.5}$. This approach was used for calculation purposes only and should not be considered as a characterization of the actual $PM_{10}/PM_{2.5}$ grain loading.